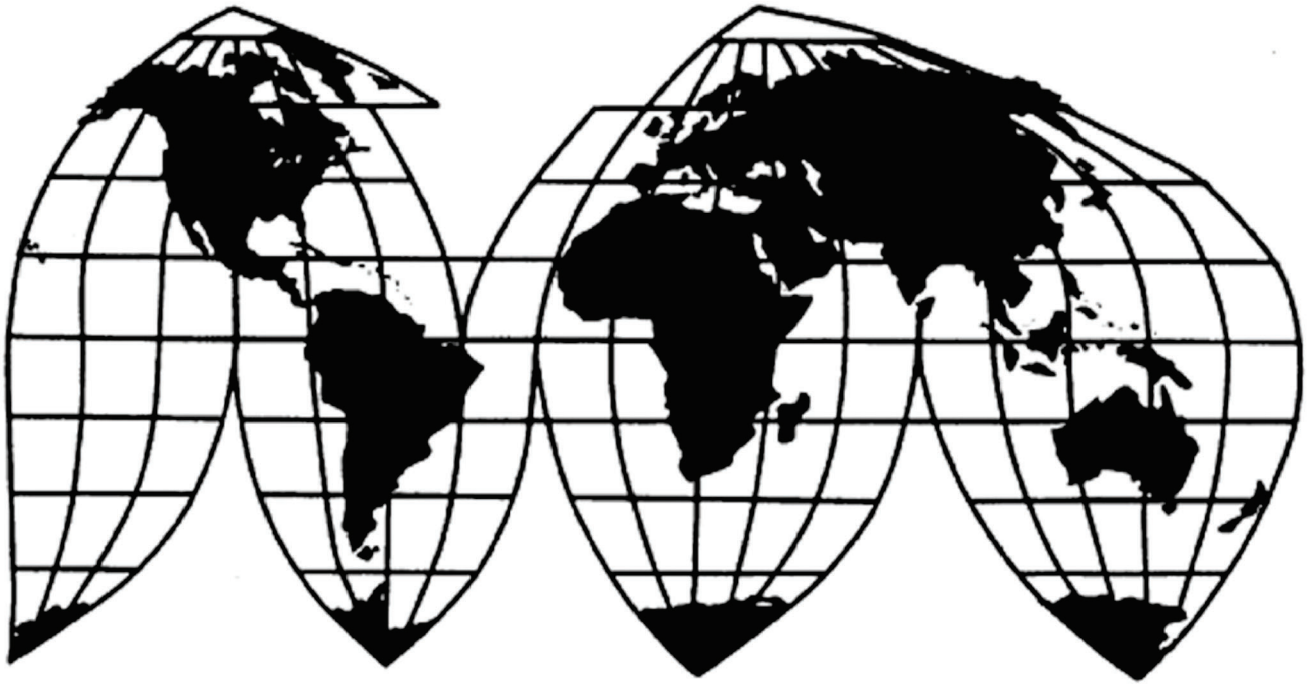
In the Matter of

CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME

Investigation No. 337-TA-1031

Publication 4960 **September 2019**

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME	Investigation No. 337-TA-1031

NOTICE OF THE COMMISSION'S FINAL DETERMINATION FINDING NO VIOLATION OF SECTION 337; TERMINATION OF INVESTIGATION

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission (the "Commission") has determined, upon review of the final initial determination (the "ID"), that the complainants have not shown a violation of section 337 of the Tariff Act of 1930, as amended, in connection with the asserted patents. This investigation is terminated.

FOR FURTHER INFORMATION CONTACT: Ron Traud, Office of the General Counsel, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436, telephone 202-205-3427. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at *https://www.usitc.gov*. The public record for this investigation may be viewed on the Commission's electronic docket ("EDIS") at *https://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal, telephone 202-205-1810.

SUPPLEMENTARY INFORMATION: On December 5, 2016, the Commission instituted this investigation based on a complaint filed by DSM Desotech, Inc. of Elgin, IL; and DSM IP Assets B.V. of Heerlen, Netherlands (collectively, "DSM"). 81 FR 87588-89 (Dec. 5, 2016). The complaint alleges violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337 ("section 337"), based upon the importation into the United States, the sale for importation, or the sale within the United States after importation of certain UV curable coatings for optical fibers, coated optical fibers, and products containing same by reason of infringement of one or more of claims 1-8, 10-15, and 18-22 of U.S. Patent No. 6,961,508 ("the '508 patent"); claims 1-10 and 13-15 of U.S. Patent No. 7,171,103 ("the '103 patent"); claims 2-4, 9, 11-12, and 15 of U.S. Patent No. 7,067,564; and claims 1-3, 9, 12, 16-18, 21, and 30 of U.S. Patent No. 7,706,659 ("the '659 patent"). *Id.* The Commission's Notice of Investigation named as respondents

Momentive UV Coatings (Shanghai) Co., Ltd. of Shanghai, China ("MUV"); and OFS Fitel, LLC of Norcross, Georgia ("OFS") (collectively, "Respondents"). *Id.* The Office of Unfair Import Investigations ("OUII") was also named as a party in this investigation. *Id.*

Prior to the evidentiary hearing, DSM withdrew its allegations as to certain patent claims. *See* Order 12 (Apr. 12, 2017), *unreviewed*, Notice of Commission Determination Not to Review an Initial Determination Granting Complainants' Unopposed Motion to Terminate this Investigation with respect to One Patent Claim (May 11, 2017); Order 50 (Aug. 25, 2017), *unreviewed*, Notice of Commission Determination Not to Review An Initial Determination Withdrawing from the Complaint Certain Allegations Regarding U.S. Patent No. 7,067,564 (Sept. 15, 2017). DSM proceeded at the evidentiary hearing on the following patents and claims: claims 1-8, 11-15, 18-19, 20-21, and 22 of the '508 patent; claims 1-10 and 13-15 of the '103 patent; and claims 1-3, 9, 12, 16-18, 21, and 30 of the '659 patent.

On February 15, 2018, the presiding administrative law judge ("ALJ") issued the ID, which finds only MUV in violation of section 337, and only as to the '508 and '103 patents. On February 27-28, 2018, OUII, DSM, MUV, and OFS filed petitions for review of the ID, and on March 7-8, 2018, the parties filed responses to the petitions. On March 19, 2018, the private parties filed statements on the public interest. The Commission also received comments on the public interest from members of the public.

On April 16, 2018, after considering the parties' petitions and responses thereto, the Commission determined to review the following issues:

> (1) Whether respondent OFS imports respondent MUV's accused KS1-043/048 coating.
>
> (2) Whether claim 30 of '659 patent is invalid for lack of written description.
>
> (3) Whether claims 1-8, 11, 15, and 18-19 of the '508 patent are invalid for lack of written description and enablement.
>
> (4) Whether claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are invalid for lack of written description and enablement.
>
> (5) Whether the accused products infringe the '508, '103, and '659 patents.
>
> (6) Whether the technical and economic prongs of the domestic industry requirement have been met for the '508, '103, and '659 patents.

The Commission had determined to not review the remainder of the ID and did not request any briefing.

On review, the Commission has now determined that DSM has not shown that Respondents have violated section 337. As to the issues under review and as explained more fully in the related Commission Opinion, the Commission has determined to affirm with

modifications in part, reverse in part, and take no position as to certain issues under review. More particularly, the Commission has determined to affirm with modified reasoning the ID's conclusion that claims 1-8, 11, 15, and 18-19 of the '508 patent are invalid for lack of written description. The Commission has also determined to supplement the ID's reasoning as to its conclusion that claim 30 of the '659 patent is invalid for lack of written description. The Commission has further determined to reverse the ID's conclusion that claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are not invalid for lack of written description. The Commission has additionally determined to modify the ID to include a finding that respondent OFS imports respondent MUV's accused KS1-043/048 coating. Finally, the Commission has determined not to take a position as to whether claims 1-8, 11, 15, 18-19, and 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are invalid for lack of enablement; whether the accused products infringe the '508, '103, and '659 patents; and whether the technical and economic prongs of the domestic industry requirement have been met for those patents.

This action is taken under the authority of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in part 210 of the Commission's Rules of Practice and Procedure (19 CFR part 210).

By order of the Commission.

Lisa R. Barton

Secretary to the Commission

Issued: May 8, 2018

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME

Inv. No. 337-TA-1031

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **Notice** has been served by hand upon the Commission Investigative Staff, Claire K. Comfort, Esq., and the following parties, as indicated, on **May 8, 2018**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
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PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME**	**Investigation No. 337-TA-1031**

COMMISSION OPINION

This investigation is before the Commission for a final determination on review of the final initial determination (the "ID") in this investigation. The Commission, upon review, has determined that Respondents have not violated section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337) ("Section 337").

I. BACKGROUND

On December 5, 2016, the Commission instituted this investigation based on a complaint filed by DSM Desotech, Inc. of Elgin, IL and DSM IP Assets B.V. of Heerlen, Netherlands (collectively, "DSM"). 81 *Fed. Reg.* 87588-89 (Dec. 5, 2016). The complaint alleges violations of Section 337 based upon the importation into the United States, the sale for importation, or the sale within the United States after importation of certain UV curable coatings for optical fibers, coated optical fibers, and products containing same by reason of infringement of one or more of claims 1-8, 10-15, and 18-22 of U.S. Patent No. 6,961,508 ("the '508 patent"); claims 1-10 and 13-15 of U.S. Patent No. 7,171,103 ("the '103 patent"); claims 2-4, 9, 11-12, and 15 of U.S. Patent No. 7,067,564 ("the '564 patent"); and claims 1-3, 9, 12,

16-18, 21, and 30 of U.S. Patent No. 7,706,659 ("the '659 patent"). *Id.* The Commission's Notice of Investigation named as respondents Momentive UV Coatings (Shanghai) Co., Ltd. of Shanghai, China ("MUV") and OFS Fitel, LLC of Norcross, Georgia ("OFS") (collectively, "Respondents"). *Id.* The Office of Unfair Import Investigations ("OUII") was also named as a party. *Id.*

DSM Desotech, Inc. is a Delaware corporation with its principal place of business in Elgin, Illinois. Complaint at ¶ 8 (hereinafter, "Compl."). DSM IP Assets B.V. is a Netherlands corporation with a registered place of business in the Netherlands. *Id.* at ¶ 9. DSM develops and manufactures curable coating products for use by its customers in the manufacture of coated optical fibers. DSM Post-Hearing Brief at 8 (hereinafter, "DSM Post-Hrg. Br."). DSM sells "coatings, as well as matrix materials and inks, to their customers who apply the coatings to optical fibers in draw towers, and use related matrix materials and inks to make and sell coated optical fibers." *Id.*

MUV is a joint venture formed under the laws of the People's Republic of China with a principal place of business in China. *E.g.*, Compl. at ¶ 13. MUV is the successor in interest to Borden Chemical, Inc., which was a leading producer of ultra-violet ("UV") coatings for the fiber optic industry and obtained numerous patents on its coatings. ID at 12. MUV develops and manufactures UV curable acrylate coatings for optical fibers and sells those coatings to optical fiber manufacturers. *Id.* Like DSM, MUV does not manufacture optical fibers. *Id.*

OFS is a Delaware limited liability company with its principal place of business in Norcross, Georgia. *E.g.*, Compl. at ¶ 16. MUV manufactures optical fiber coatings in China and imports them into the United States and sells them to OFS, among others. DSM Post-Hrg. Br. at 8. OFS also imports MUV's accused coating compositions. *See infra*, section II.D.

Unlike the other private parties, OFS manufactures optical fibers in the United States using MUV-supplied coatings. *See id.* at 8-9 (citing Hearing Transcript. at 1038:1-14, 1325:16-1326:10 (hereinafter, "Tr.")). OFS sells its coated optical fibers in the United States, including products it manufactures in the United States, as well as products that are coated outside the United States, but which are then imported into the United States. *Id.* at 8-9.

The '508 and '103 patents are both titled "Coated Optical Fibers" and are referred to herein collectively as the "Cure Dose Patents." The '103 patent is a continuation of the '508 patent and shares the same specification. These two patents are directed to coating compositions for optical fibers and coated optical fibers that exhibit "reduced attenuation," that is, they attempt to minimize the loss of optical power as light travels down the fibers caused by the "microbending" of the fibers. JX-0001 at 1:29-33, 2:21-23. The coatings on optical fibers allow those fibers to survive testing and the rigors of cabling and installation. DSM's Claim Construction Brief at 7. *Id.* Currently, most fiber optic cable fibers have two coatings: (i) a primary coating that is soft and touches the fiber optic glass; and (ii) a secondary or outer coating, which is hard. *See* JX-0009.

The '659 patent is also titled "Coated Optical Fibers" and is referred to herein as the "Cavitation Patent." This patent relates generally to optical fiber coatings that display increased resistance to formation defects, or cavitations. Cavitations degrade the fiber optic coatings, which then can result in the loss of signals during transmission through the optical fibers. Compl. at ¶ 37. "Soft" optical fiber coatings typically provide better protection to optical fibers, but they decrease the strength of the coating. *Id.* The Cavitation Patent aims to identify coatings that would be resistant to developing cavitations and that would exhibit beneficial physical properties.

A more detailed discussion of the three asserted patents relevant to this opinion can be found in the ID at pages 17-25.

DSM accused MUV's primary coating products KlearShield ("KS") 1-043 (also known as KS1-048) and KS1-037 (also known as KS1-049) [1] (collectively, "Accused MUV Coatings") of infringing the following claims of the '508, '103, and '659 patents.

Accused MUV Coatings	'508 patent	'103 patent	'659 patent
MUV's KS1-043/048 Coating	20-22	1-10, 13-15	1-5, 9, 12, 16-21, 30
MUV's KS1-037/049	--	--	1-5, 9, 16-21, 30

DSM accused all models of OFS's single-mode and multi-mode coated optical fibers[2] that are manufactured using MUV's 1-043/048 primary coating composition ("Accused OFS Fibers") of infringing the following claims of the '508, '103, and '659 patents.

Accused OFS Fibers	'508 patent	'103 patent	'659 patent
OFS's Coated Optical Fibers	20-22	1-10, 13-15	1-5, 9, 12, 16-21, 30
OFS's Single-Mode Coated Optical Fibers	1-8, 11-15, 18-19	--	--

A discussion of the products relied on by DSM to satisfy Section 337's domestic industry requirement can be found at pages 26-27 of the ID.

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[1] KS1-043 is the same formulation as KS1-048. CX-0302C (MUV Resp. to Request for Admission ("RFA") No. 56). KS1-037 is the same formulation as KS1-049. CX-0310C (MUV Resp. to Interrog. No. 6).

[2] Single-mode fibers are of narrower fiber dimension and transmit light in just one "mode." CX-0192. Multi-mode fibers are thicker and can transmit light in several "modes." CX-0193.

On April 13, 2017, a *Markman* hearing and a technical tutorial were held, and on May 10, 2017, the presiding administrative law judge ("ALJ") issued a *Markman* Order construing disputed claim terms. *See* Order No. 17 (May 10, 2017). The evidentiary hearing was held from July 31, 2017, through August 4, 2017, and recommenced from August 14, 2017, through August 15, 2017.

On February 15, 2018, the ALJ issued the ID, which finds only MUV in violation of Section 337, and only as to claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent. The ID also includes recommendations on remedy and bond and the public interest, if the Commission finds a violation of Section 337.[3] A summary of the ID's findings and conclusions on the issues presented is provided in the table below.

[3] The '564 patent and claim 10 of the '508 patent were terminated earlier in the investigation. Order No. 50 (Aug. 25, 2017), *unreviewed*, Notice of Commission Determination Not to Review An Initial Determination Withdrawing from the Complaint Certain Allegations Regarding U.S. Patent No. 7,067,564 (Sept. 15, 2017)); Order No. 12 (Apr. 12, 2017), *unreviewed*, Notice of Commission Determination Not to Review an Initial Determination Granting Complainants' Unopposed Motion to Terminate this Investigation with respect to One Patent Claim (May 11, 2017). The ID includes a more detailed discussion of the procedural history of this investigation. *See* ID at 4-9.

Product	Patent	Claims	Determination
MUV's KS1-043/048 Coating Composition	'508 patent	20-22	**Violation**: claim 21 **No violation**: claims 20 and 22 found invalid under 35 U.S.C. § 112 (written description and enablement). *Importation*: MUV imports the coating composition. No finding as to whether OFS imports this composition.
	'103 patent	1-10, 13-15	**Violation**: claims 1-10 and 13-15. *Importation*: MUV imports the coating composition. No finding as to whether OFS imports this composition.
	'659 patent	1-3, 9, 12, 16-18, 21, and 30	**No violation**: claims 1-3, 9, 16-18, and 21 found invalid under 35 U.S.C. § 102 and 35 U.S.C. § 112 (indefiniteness, enablement, and written description). Claims 12 and 30 found invalid under 35 U.S.C. § 112 (written description). *Importation*: MUV imports the coating composition. No finding as to whether OFS imports this composition.
MUV's KS1-037-049 Coating Composition	'659 patent	1-3 and 9	**No violation**: claims 1-3 and 9 found invalid under 35 U.S.C. § 102 and 35 U.S.C. § 112 (indefiniteness, enablement, and written description). *Importation*: MUV imports the coating composition.
OFS's Single-Mode Coated Optical Fibers	'508 patent	1-8, 11-15, and 18-19	**No violation**: claims 1-8, 11-15, and 18-19 found invalid under 35 U.S.C. § 112 (written description and enablement). *Importation*: OFS imports the accused coated fibers.
OFS's Coated Optical Fibers (Single-Mode and Multi-Mode)	All Asserted Patents	All claims shown above for KS1-043/048	**No violation**: OFS's accused optical fibers do not infringe any of the asserted claims directed to "primary coating composition[s]." Claims 9 and 21 found invalid under 35 U.S.C. § 102 and 35 U.S.C. § 112 (indefiniteness, enablement, and written description). Claims 21 and 30 found invalid under 35 U.S.C. § 112 (written description)). *Importation*: OFS imports the accused coated fibers.

DSM's DI Coatings	All Asserted Patents	Technical Prong	**Satisfied** based on claim 21 of the '508 patent and claims 1-10, 13-15 of the '103 patent. The ID also concludes that if its validity findings as to claims 20 and 22 of the '508 patent and claims 1-5, 9, 12-13, 16-22, and 30 of the '659 patent are reversed, DSM would have also satisfied the technical prong as to those claims.
		Economic Prong	**Satisfied** based on 19 U.S.C. § 337(a)(3)(A), (B), and/or (C) and the '508 and '103 patents. The ID also concludes that if its validity findings as to claims 20 and 22 of the '508 patent and claims 1-5, 9, 12-13, 16-22, and 30 of the '659 patent are reversed, DSM would have also satisfied the economic prong as to those claims.

On February 27, 2018, OUII filed a petition for review of the ID, and on February 28, 2018, DSM, MUV, and OFS each filed petitions for review. On March 8, 2018, the parties filed respective responses to those petitions.[4]

II. ISSUES UNDER REVIEW

On April 16, 2018, the Commission determined to review whether claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are invalid for lack of written description. Notice of Commission Determination to Review in Part a Final Initial Determination Finding a Violation of Section 337; Extension of Target Date (Apr. 16, 2018). On review, the Commission has determined to reverse the ID's conclusion that those claims are not invalid. The Commission also determined to review whether claim 30 of the'659 patent and claims 1-8, 11, 15, and 18-19 of the '508 patent are invalid for lack of written description. On review, the

[4] OUII's petition for review and petition response are cited herein as "OUII Pet." and "OUII Resp.," respectively; DSM's petition for review and petition responses are cited herein as "DSM Pet.," "DSM Resp. to MUV Pet.," and "DSM Resp. to OFS Pet.," respectively; MUV's petition for review and petition response are cited herein as "MUV Pet." and "MUV Resp.," respectively; and OFS's petition for review and responses are cited herein as "OFS Pet.," OFS Resp. to OUII Pet.," and "OFS Resp. to DSM Pet.," respectively.

Commission has determined to affirm the ID's conclusion that those claims are invalid based upon modified reasoning.

The Commission additionally determined to review whether respondent OFS imports respondent MUV's accused KS1-043/048 coating. On review, the Commission has determined to find that OFS imports that coating. The Commission further determined to review whether claims 1-8, 11, 15, 18-19, and 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are invalid for lack of enablement. On review, the Commission has determined to take no position as to these issues. Finally, the Commission determined to review whether the accused products infringe the '508, '103, and '659 patents; and whether the technical and economic prongs of the domestic industry requirement have been met for the '508, '103, and '659 patents. Given the Commission's ultimate conclusion that the above claims are invalid, we do not reach these issues.

These determinations result in a finding of no violation of Section 337. The Commission adopts the ID to the extent that it does not conflict with this opinion or to the extent that it is not expressly addressed in this opinion.

A. Whether Claim 21 of the '508 Patent and Claims 1-10 and 13-15 of the '103 Patent Are Invalid for Lack of Written Description

MUV petitioned the ID's conclusion that claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are not invalid for lack of written description support. ID at 228. On review, the Commission has determined to reverse the ID.

35 U.S.C. § 112 declares, "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same. . . ." "[T]his statutory language mandates

satisfaction of two separate and independent requirements: an applicant must both describe the claimed invention adequately and enable its reproduction and use." *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003) (citing *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991)). The purpose of the written description requirement is to "ensure that the scope of the right to exclude, as set forth in the claims, does not overreach the scope of the inventor's contribution to the field of art as described in the patent specification." *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 920 (Fed. Cir. 2004). It is part of the *quid pro quo* of the patent grant and ensures that the public receives a meaningful disclosure in exchange for being excluded from practicing an invention for a period of time. *See Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 970 (Fed. Cir. 2002).

To comply with the written description requirement, a patent applicant must "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the [claimed] invention." *Vas-Cath*, 935 F.2d at 1563-64 (emphasis omitted). The test for written description "requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art." *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). "[T]he applicant [for a patent] may employ 'such descriptive means as words, structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention.'" *In re Skvorecz*, 580 F.3d 1262, 1269 (Fed. Cir. 2009) (citing *In re Alton*, 76 F.3d 1168, 1172 (Fed. Cir. 1996)); *see also Enzo Biochem*, 323 F.3d at 964 (declaring that the written description may also be met by other "sufficiently detailed, relevant identifying characteristics," such as "physical and/or chemical properties, functional characteristics when coupled with a known or disclosed correlation between function and structure, or some combination of such characteristics") (emphasis omitted)). Compliance with

the written description requirement is a question of fact, and in order to overcome the presumption of validity, a party must set forth clear and convincing evidence. *Centocor Ortho Biotech, Inc. v. Abbott Labs.*, 636 F.3d 1341, 1347 (Fed. Cir. 2011).

The determination of whether a "patent complies with the written description requirement will necessarily vary depending on the context." *Ariad*, 598 F.3d at 1351 (citing *Capon v. Eshhar*, 418 F.3d 1349, 1357-58 (Fed.Cir.2005)).

> Specifically, the level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology. [*Capon*, 418 F.3d at 1357-58]. For generic claims, we have set forth a number of factors for evaluating the adequacy of the disclosure, including "the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue." *Id.* at 1359.

Id. For example, "[t]he character and amount of evidence needed may vary, depending on whether the alleged operation described in the application appears to accord with or to contravene established scientific principles or to depend upon principles alleged but not generally recognized." *In re Chilowsky*, 229 F.2d 457, 462 (C.C.P.A. 1956).

There are no "bright-line rules governing, for example, the number of species that must be disclosed to describe a genus claim, as this number necessarily changes with each invention, and it changes with progress in a field," but the specification must demonstrate that the inventors were in possession of the full scope of the invention that is claimed. *Ariad*, 598 F.3d at 1351-52. To satisfy the written description requirement, a claim directed to a genus must allow of person of ordinary skill in the art to "visualize or recognize" the members of the claimed genus. *Id.* at 1350. "[W]hen a genus is claimed but the specification only describes a part of that genus[,] that is insufficient to constitute a description of the genus." *AbbVie Deutschland GmbH & Co., KG v. Janssen Biotech, Inc.*, 759 F.3d 1285, 1299 (Fed. Cir. 2014).

The written description requirement is not satisfied when the patentee "merely draws a fence around the outer limits of a purported genus" without providing a supporting disclosure, *Ariad*, 598 F.3d at 1350; or by a "mere wish or plan for obtaining [a] claimed chemical invention." *Regents of the Univ. of Calif. v. Eli Lilly & Co.*, 119 F.3d 1559, 1566 (Fed. Cir. 1997) (citing *Fiers v. Revel*, 984 F.2d 1164, 1171 (Fed.Cir.1993)). "The written description requirement prohibits a patentee from leaving the industry to complete an unfinished invention." *Novozymes A/S v. DuPont Nutrition Biosciences APS*, 723 F.3d 1336, 1350 (Fed. Cir. 2013) (internal quotations and citations omitted).

Claims 1-10 and 13-15 of the '103 patent and claim 21 of the '508 patent are directed to inner primary coating compositions for optical fibers having certain physical properties. Claim 1 of the '103 patent, the sole independent claim, is reproduced below.

> 1. An inner primary coating composition having:
>
> (a) an in-situ modulus (after cure) of less than 0.6 MPa;
>
> (b) a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2; and
>
> (c) a modulus retention ratio (after cure) of at least 0.6 after hydrolytic aging; wherein said composition comprises:
>
> (i) 20-98 wt. % relative to the total weight of the composition of a radiation curable urethane (meth)acrylate oligomer[5] having polyether polyol backbone;

[5] The claim term "oligomer" was construed in the context of all asserted patents to mean "molecules composed of repeating structural units, wherein the molecules must include acrylate or methacrylate." *See* Order No. 17, Appendix A at 23-24, 35-36 (May 10, 2017).

(ii) 0-80% wt. % relative to the total weight of the composition of one or more reactive diluents;[6]

(iii) 0.1-20 wt. % relative to the total weight of the composition of one or more photoinitiators; and

(iv) 0-5 wt. % relative to the total weight of the composition of additives.

JX-0003 at 13:14-32. This claim includes three physical property limitations (*i.e.*, limitations (a), (b), and (c))[7] and four chemical compositional limitations (*i.e.*, limitations (i) through (iv).

Claim 21 of the '508 patent (and claim 20, from which it depends) are reproduced below.

20. An inner primary coating composition having:

(a) an in-situ modulus (after cure) of less than 0.6 MPa;

(b) a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2; and

(c) a modulus retention ratio (after cure) of at least 0.6 after hydrolytic aging.

21. The composition of claim 20, wherein said composition comprises a radiation-curable oligomer selected from the group consisting of:

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[6] The parties agreed that the term "reactive diluents" means "polymerizable vinyl or acrylate monomers." *See* Order No. 17 at 7, Appendix A at 44.

[7] DSM asserts, as to each asserted patent, that the ID errs in considering these limitations to be functional limitations. *See, e.g.*, DSM Resp. to MUV Pet. at 9-10; DSM Pet. at 15 n.2 (addressing the '659 patent). We are not convinced, however, that the nature of these disputed limitations, whether they are physical properties or functional, is meaningful as to the outcome of this case. There are no "bright-line rules" governing the written description requirement. *Ariad*, 598 F.3d at 1351-52 (citing and comparing *Eli Lilly*, 119 F.3d at 1567, with *In re Wallach*, 378 F.3d 1330, 1334 (Fed.Cir.2004)). As explained in this opinion, in light of the record we find that the disclosures for the asserted patents do not show that the inventors were in possession of the full scope of the claimed inventions.

(i) radiation-curable oligomers having a backbone derived from one or more polyether polyols; and

(ii) radiation-curable oligomers having a backbone derived from one or more polyether polyols in combination with one or more polyester polyols.

JX-0001 at 13:1-14:3. Claim 21 also includes, through dependency on claim 20, three physical property limitations (*i.e.*, limitations 20(a), (b), and (c)) and one chemical compositional limitation (*i.e.*, limitation 21(i) / (ii)).

Respondents have set forth clear and convincing evidence that claims 1-10 and 13-15 of the '103 patent and claim 21 of the '508 patent lack adequate written description support under § 112. Looking at the claim language itself, these claims are directed to a broad genera of coating compositions that exhibit certain physical attributes – *i.e.*, exhibit in-situ modulus, cure dose, and modulus retention ratio properties. The claims contain compositional limitations that broadly recite the chemical families to be used in the claimed coating compositions. However, the record indicates that the compositional limitations are so broad that they fail to place any meaningful limit on the scope of the claims. Tr. 1144:1-11, 1157:1-8. For example, claim 1 of the '103 patent includes wide weight percentage ranges for the four chemical families: oligomer (20-98 wt. %), reactive diluent (0-80 wt. %), photoinitiators (0.1-20 wt. %), and additives (0-5 wt. %). Claim 21 of the '508 patent does not even limit the weight percentage of oligomer (or any chemical type). Additionally, each of these generic chemical compositional limitation can be met by a wide variety of different chemical species. *See, e.g.*, JX-0001 at 3:32-5:17; Tr. at 1148:5-1146:18, 1147:11-1152:20, 1155:9-21, 1313:3-1314:2, 1713:2-15, 1714:13-16 ((declaring, *e.g.*, that "oligomers could come from a huge - - a broad family of base chemicals"; that as to the polyether polyol limitation, "any two polyols can be reacted together to make a polyether polyol," so that limitation is "wide open"; that polyester polyols are "a

broad family of building blocks"; that there are "hundreds of choices" for reactive diluents; that there are various classes of photoinitiators; and that "there's a functionally broad range of additives"); RX-2188.0008-14; RDX-0004.28.

Despite the breadth of the claims, the specification fails to provide guidance on how to choose from among all of the possible chemical components to form a primary coating that will meet the physical properties claimed. Tr. 1154:8-11. DSM argues that, in assessing the adequacy of the disclosure as to the asserted claims, an important aspect to consider is that each of the claimed physical property limitations must exist simultaneously, which DSM views as significantly narrowing the scope of the claims. *See, e.g.*, DSM Pet. at 17 (arguing that Mr. Overton misapprehends the physical property limitations by not considering the simultaneous presence of two different physical properties); 26-28 (arguing that the ALJ failed to consider the "interplay between all the limitations of the claims at issue which properly define the narrow scope of the claim"). We agree. Thus, one important aspect of the invention is the simultaneous presence of each of the claimed physical property limitations, and the unpredictability of that aspect, discussed below, is relevant for the Commission to consider in evaluating the adequacy of the written description.

However, we also agree with MUV that the record shows the unpredictability of obtaining a primary coating having the relevant physical properties simultaneously present. *See Ariad*, 598 F.3d at 1351. Regarding that simultaneous presence, Respondents' expert witness, Mr. Overton[8], testified as follows at the evidentiary hearing.

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[8] The ID finds the overall testimony of Mr. Overton, the only expert in this investigation who has actually formulated primary coating compositions, to be "reliab[le] and credib[le]." ID at 149 n.67.

> Q Now, how would you characterize the complexity of the claimed invention [of the Cure Dose Patents], then?
>
> A It's complex, yes.
>
> Q And why?
>
> A Well, you -- it's not straightforward at all to change any one of the components of a coating formulation *when you are attempting to achieve a certain property and achieve that property without ruining others.* There's -- everything must always be tested, and it must be formulated, compounded, tested and then examined to see what's next, because we will not arrive at the answer with one round of experiments.
>
> Q Okay. So with regard to the technology in the cure dose patents, do you think that is a predictable field of technology?
>
> A *Only in the most general sense.* Again, it may be known in a general way that using one kind of oligomer versus another kind of oligomer will result in a change of modulus. *But all the other parameters that might change have to be thoroughly investigated.* And always, there are adjustments that have to be made with rounds of designed experiments.

Tr. at 1143:1-22 (emphasis added), 1141:20-1142:25. Mr. Overton further asserts that that Cure Dose Patents themselves do not remedy that unpredictability:

> Q Now, in your expert opinion, was there any known or disclosed correlation between the *claimed combination of physical properties* in claim 20 and the primary coating compositions needed to obtain them?
>
> A No.

Tr. at 1152:21-25 (emphasis added).

DSM argues that "the chemistry of formulating coating compositions based on acrylate oligomers was well-known and fairly predictable." DSM Resp. to MUV Pet. at 12; *see also id.* at 12-16. DSM further argues that "the claimed physical properties vary in known ways with underlying structural features of the optical fiber coating." *Id.* at 12. DSM points out, for example, that it was known that "modulus" is "essentially proportional to cross-linking density"; that the "molecular weight of the oligomer 'can be selected to achieve the desired viscosity, *modulus*, solvent resistance, oxidative stability, and other important properties'"; that

"reactive diluents 'function to adjust the mechanical properties and crosslink density of the compositions,' and that 'diluents with long chain alkyl groups also tend to soften the composition'"; and that the "disclosure within the Cure Dose Patents teaches that '[m]ultifunctional diluents like trimethylolpropane triacrylate can increase *cure speed* and crosslink density.'" *Id.* at 12-14. However, DSM's evidence does not directly address Mr. Overton's point that whether certain physical properties of a coating will remain when others are changed is unpredictable. Tr. at 1143:1-22. Mr. van Eekelen, an inventor on the Cure Dose Patents, acknowledged this unpredictability. He testified that it took DSM years to develop a primary coating composition that practiced all of the elements of the claims—even though he said they "knew exactly where to go." Tr. at 135:12-136:2, 154:8-155:8. He also testified that it gave them "quite some headache" because the claimed physical characteristics were "in conflict" with each other. *Id.* . Mr. van Eekelen's testimony is thus consistent with Mr. Overton's statement that the amount of experimentation required to arrive at the invention having the properties of claim 21 was "unlimited." Tr. 1154:8-11.

Despite the unpredictability and claim breadth discussed above, the specification provides little in the way of a supporting disclosure, including working examples. As to claim breadth, claim 1 of the '103 patent includes wide weight percentage ranges for the four chemical families: oligomer (20-98 wt. %), reactive diluent (0-80 wt. %), photoinitiators (0.1-20 wt. %), and additives (0-5 wt. %). Claim 21 of the '508 patent does not even limit the weight percentage of oligomer (or any chemical type). As to working examples and claim 21 of the '508 patent and claims 1-10 and 13 of the '103 patent, the specification provides, at most, only two working examples (examples 4 and 7) of the claimed invention. *See, e.g.*, JX-0001 at Table 2; Tr. at 1153:1-8, 1156:9-11, 1157:22-24, 1731:21-1732:14. There are no working

examples of claims 14-15 of the '103 patent. Tr. at 1733:2-12, 1169:20-24. Further, the two working examples provided in the specification have similar compositions and describe a very narrow range of primary coating compositions that are not representative of each widely variant genus covered by claim 21 of the '508 patent and claims 1-10 and 13 of the '103 patent. For example, both of the working examples use the same oligomer (*i.e.*, "Oligomer 1") in essentially the same amount (*i.e.*, 74.1 wt. % and 70.6 wt. %), which is nowhere near the lower limit of 20 wt. % or the upper limit of 98 wt. %. *See, e.g.*, JX-0001 at Table 2 (examples 4 and 7) (reproduced below).

TABLE 2

	Primary coating compositions						
	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7
Ingredients							
Oligomer 1*	66.15	—	—	74.10	66.4	66.0	70.60
Oligomer 2*	—	—	—	—	—	—	—
Oligomer 3*	—	77.10	—	—	—	—	—
Oligomer 4*	—	—	66.20	—	—	—	—
Ethoxylated Nonyl Phenol Acrylate	5.0	—	10.0	—	5.0	5.0	6.0
Tridecyl acrylate	—	—	—	—	—	—	—
Isodecyl acrylate	8.5	8.5	8.5	10.0	8.5	8.5	8.5
Phenoxyethylacrylate	4.0	—	—	—	4.0	4.0	—
Isobornyl acrylate		—	—	—	—	—	—
Lauryl acrylate	—	—	—	—	—	—	—
Propoxylated (3) Trimethylolpropane triacrylate	4.0	—	5.0	4.0	4.0	4.0	4.0
Ethoxylated bisphenol diacrylate	2.0	—	2.0	—	2.0	2.0	2.0
Vinyl Caprolactam	—	5.0	—	—	—	—	—
Ethoxylated Aliphatic Acrylate (Ebecryl 111 from UCB Chemicals)	—	—	—	—	—	—	—
Propoxylated (2) Neopentyl Glycol Diacrylate (SR9003)	4.0	5.0	3.0	6.0	4.0	4.0	3.0
Lucerine TPO (photoinitiator)	1.5	1.3	1.3	1.3	1.5	2.3	1.3
Irgacure 184 (photoinitiator)	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Irganox 1035 (stabilizer)	—	0.3	—	—	—	—	—
Irganox 3790 (stabilizer)	1.4	—	0.7	—	1.4	1.4	1.4
Cyanox 1790 (stabilizer)	—	—	—	1.4	—	—	—
Tinuvin 123	0.4	—	—	0.4	0.4	—	0.4
Silane coupling agent	1.25	1.0	1.5	1.0	1.0	1.0	1.0
Properties							
Viscosity (mPas)	6134	8500	6673	8761	6329	5850	6300
Tensile Strength (MPa)	2.36	0.8	1.8	1.085	1.89	2.56	1.6–1.9
Elongation at break (%)	184	150	160	171	163	173	170
Secant modulus (MPa)	0.98	0.9	0.86	1.14	1.06	0.98	0.9
Cure dose to attain 95% of modulus (J/cm^2)	0.47	ND	0.32	0.51	0.6	0.3–0.4	0.4–0.5

TABLE 2-continued

	Primary coating compositions						
	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7
Tg (° C.)	-47.4	ND	-23.2	-50.4	-50	-52	-52
Measured shear modulus $G_{measured}$ (MPa)	0.16	0.17	0.16	0.15	0.12	0.15	0.15
Primary coating thickness (micron)	28	30	27	30	28	28	31
In-situ Modulus (MPa)	0.55	0.65	0.54	0.54	0.40	0.51	0.59
Microbending attenuation increase @ 1310 nm (dB/km)	0.116	0.184	0.117	0.213	0.135	ND	0.115
Microbending attenuation increase @ 1550 nm (dB/km)	0.365	0.405	0.375	0.628	0.465	ND	0.442
Microbending attenuation increase @ 1700 nm (dB/km)	1.168	0.960	1.148	1.805	1.504	ND	1.434
Modulus retention ratio after hydrolytic aging	ND	ND	ND	0.64	ND	ND	0.80

Both working examples of the compositions of claim 21 of the '508 patent and claims 1-10 and 13 of the '103 patent use essentially the same amount of reactive diluent (*i.e.*, 20 wt. % and 23.5 wt. %), which is nowhere near the lower limit of 0 wt. % or the upper limit of 80 wt. %. *Id.* Both use the same two photoinitiators in the same amounts (1.3 wt. % and 1.8 wt. %, respectively, for a total of 3.1 wt. %), which is nowhere near the lower limit of 0.1 wt. % or the upper limit of 20 wt. % of photoinitiator. *Id.* And both use basically the same additives in the same amounts (2.8 wt. %), which is nowhere near the lower limit of 0 wt. % or the upper limit of 5 wt. %. *Id.* There are no working examples of a primary coating composition that contain only approximately 20 wt. % of an oligomer and/or approximately 80 wt. % of reactive diluents. *E.g.*, JX-0001 at Table 2. Similarly, there are no working examples that are representative of a primary coating composition containing only 0.1 wt. % of photo initiator and/or 0 wt. % of additive. *Id.*

Moreover, both working examples also have very similar physical properties. For example, the in-situ moduli of the working examples are 0.54 and 0.59 MPa, respectively; the cure doses to obtain 95% of the maximum attainable modulus of the working examples are 0.51

and 0.4-0.5 J/cm^2, respectively; and the modulus retention ratios of the two working examples are 0.64 and 0.80, respectively. *Id.*

Furthermore, as Mr. Overton explained, a person of ordinary skill in the art would understand that the inventors needed the additives and photoinitiators in the two working examples to achieve the claimed combination of physical properties. Tr. at 1145:6-24, 1150:13-1152:6, 1153:20-1154:15. Yet the claims cover compositions that, unlike the two working examples, have no additives and use as little as 0.1 wt. % of photoinitiator, but still have a high modulus retention ratio and a fast cure speed. *Id.* Claim 21 of the '508 patent does not even limit the claims by requiring additives or photoinitiators. JX-0001 at 13:1-14:3. As Mr. Overton testified, this makes no sense and is probably not even possible. *Id.*

DSM argues that MUV incorrectly discounts the value of other examples (both those that are allegedly working examples and those that are non-working examples) in the specification of the Cure Dose Patents. DSM Resp. to MUV Pet. at 21 (citing Tr. at 1688:16-1689:5). DSM asserts that, as "Dr. Bowman testified, because they lie near the outer boundaries of the claims' scope, they provide valuable guidance to a person of ordinary skill to visualize the species falling within the claims' scope." *Id.* However, even these examples that are allegedly just outside the outer boundaries of the relevant claims' scope are nowhere near the outer boundaries of the claimed compositional ranges. For example, in terms of oligomer, examples 1-3, 5, and 6 go only as low as 66 wt. %, which is still nowhere near the lower boundary of 20 wt. %. *See* JX-0001 at Table 2. And, even the non-working examples go only as low as approximately 52 wt. %. *See* JX-0001 at Table 1. Thus, Respondents have shown that DSM "merely dr[ew] a fence around the outer limits of a purported genus," without

providing a supporting disclosure, *Ariad*, 598 F.3d at 1350, and/or merely "provided a wish or plan for obtaining the claimed chemical invention." *Eli Lilly*, 119 F.3d at 1566.

DSM argues that, because the claims include physical properties limitations and chemical compositional limitations that limit the oligomers to the common structural features of certain classes of polymeric backbones, the claims satisfy the written description requirement. DSM Resp. at 7-11. However, as discussed above, the evidence, including the four corners of the specification, shows that the physical property limitations are merely the drawing of a line around certain desirable traits or properties. *Ariad,* 598 F.3d at 1350-51 (declaring that the test for written description "requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art," and that the written description requirement is not satisfied when the patentee "merely draws a fence around the outer limits of a purported genus"). And, as to the common backbone, any ability that a person of ordinary skill in the art may have to "visualize or recognize" the members of the claimed genera is greatly outweighed by the clear and convincing evidence discussed above showing a lack of written description. *See Centocor*, 636 F.3d at 1347 (declaring that the written description requirement is a question of fact, and in order to overcome the presumption of validity, a party must set forth clear and convincing evidence); *Ariad*, 598 F.3d at 1350 (declaring that to satisfy the written description requirement, a claim directed to a genus must allow a person of ordinary skill in the art to "visualize or recognize" the members of the claimed genus).

Considering the evidence as a whole, we find that the aspect of the claimed invention wherein the claimed compositions simultaneously contain different physical property limitations is unpredictable. This unpredictability, together with the exceedingly broad scope of the claims and the limited disclosure in the specification, supports a finding that the patents fail to convey

possession of the full scope of the claimed invention. *See Ariad*, 598 F.3d at 1358. We therefore find that Respondents have shown by clear and convincing evidence that these claims lack the written description required by § 112. *See, e.g.*, *AbbVie*, 759 F.3d at 1299 ("[W]hen a genus is claimed but the specification only describes a part of that genus[,] that is insufficient to constitute a description of the genus."); *Boston Sci. Corp. v. Johnson & Johnson,* 647 F.3d 1353, 1364 (Fed. Cir. 2011) (declaring that "examples are not always required to satisfy the written description requirement," but the "lack of any disclosure of examples may be considered when determining whether the claimed invention is adequately described").

B. Whether claims 1-8, 11, 15, and 18-19 of the '508 Patent are Invalid for Lack of Written Description

DSM petitioned the ID's conclusion that claims 1-8, 11, 15, and 18-19 of the '508 patent are invalid for lack of written description. On review, the Commission has determined to affirm the ID, but provides its own reasoning.

Claims 1-8, 11, 15, and 18-19 of the '508 patent are directed to coated optical fibers having certain physical properties. Claim 1 of the '508 patent, the sole independent claim at issue, is reproduced below.

> 1. A coated optical fiber comprising:
>
> (i) an optical fiber;
>
> (ii) a primary coating; and
>
> (iii) a secondary coating;
>
> wherein
>
> (a) said coated optical fiber has an attenuation increase of less than 0.650 dB/km at 1550 nm;
>
> (b) said primary coating has a modulus retention ratio after hydrolytic aging of at least 0.5 and/or a glass transition temperature (Tg) below -35° C.; and

> (c) said primary coating is obtained by curing a primary coating composition having a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2.

JX-0001 at 12:2-16. This claim includes three physical property limitations (*i.e.*, limitations (a), (b), and (c)) and three structural limitations (*i.e.*, limitations (i), (ii), and (iii)). The evidence shows that the claimed attenuation increase correlates with and/or is a rough proxy for in-situ modulus, a physical property limitation included in the claims discussed in the previous section, claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent. JX-0001 at 13:1-14:3; JX-0003 at 13:14-32; Tr. 1677:12-24, 1853:22-1864:8; DSM Pet. at 26. Thus, there is similarity between the claims addressed in this section and those addressed in the previous section. Indeed, our analysis is quite similar. Some of the claims that depend on claim 1 provide additional physical property limitations and/or narrower ranges for those physical property limitations. JX-0001, claims 2-3 and 15. Other asserted dependent claims include further chemical compositional limitations. Claims 18 and 19 limit the optical fiber and the secondary coating, respectively. The dependent claims are reproduced below.

> 2. The coated optical fiber of claim 1, wherein said primary coating has an in-situ modulus of less than 0.60 MPa.
>
> 3. The coated optical fiber of claim 1, wherein said primary coating has an in-situ modulus of less than 0.56 MPa.
>
> 4. The coated optical fiber of claim 1, wherein said attenuation increase is less than 0.5 dB/km.
>
> 5. The coated optical fiber of claim 1, wherein said primary coating composition comprises an ethylenically unsaturated oligomer.
>
> 6. The coated optical fiber of claim 5, wherein said oligomer is prepared by reacting the following components:
>
> (1) one or more polyisocyanates;
>
> (2) one or more polyols; and

(3) one or more hydroxyfunctional (meth)acrylates.

7. The coated optical fiber of claim 6, wherein said one or more polyols includes polypropylene glycol.

8. The coated optical fiber of claim 6, wherein said one or more polyols consists essentially of polypropylene glycol.

11. The coated optical fiber of claim 6, wherein said one or more hydroxyfunctional (meth)acrylates includes hydroxyethyl acrylate.

15. The coated optical fiber of claim 1, wherein said cure dose is below 0.55 J/cm^2.

18. The coated optical fiber of claim 1, wherein said secondary coating has:

(a) a Tg of at least 40° C.;

(b) a secant modulus of at least 400 MPa; and

(c) an elongation at break of at least 10%.

19. The coated optical fiber of claim 1, wherein said an optical fiber is an optical glass fiber.

In our view, Respondents have set forth clear and convincing evidence that these claims lack adequate written description support under § 112. Like claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent, claims 1-8, 11, 15, and 18-19 of the '508 patent are also each directed to a genus. DSM argues that the use of "primary coating" in these claims implies in the context of the '508 patent's disclosure that the coating comprises oligomers, reactive diluents, photoinitiators, and additives. DSM Pet. at 29. Yet, even if DSM is correct, those claims would each still be directed to a genus at least for the reasons noted above for claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent. And, even the dependent claims including express chemical compositional limitations (claims 5-8 and 11) are directed to genera. For example, claim 6 recites,

6. The coated optical fiber of claim 5, wherein said oligomer is prepared by reacting the following components:

(1) one or more polyisocyanates;

(2) one or more polyols; and

(3) one or more hydroxyfunctional (meth)acrylates.

Thus, in claim 6, one component of the primary composition, the oligomer, is formed from three different classes of materials, each of which includes different species. *See, e.g.*, Tr. 1152:7-16 (declaring that "we still have dozens of isocyanates, hundreds of polyols that can be used"); Tr. 1160-:1-11 ("[W]e've still got the isocyanates and the hydroxyl functional acrylates, the broad families there."). Dependent claims 7, 8, and 11 limit at most one of those three classes of materials; thus, at least two of those classes are generic in each of those claims. JX-0001, at claim 7 (limiting only the "one or more polyols" to include "polypropylene glycol"); JX-0001, at claim 8 (limiting only the "one or more polyols" to "consist[ ] essentially of polypropylene glycol"); JX-0001, at claim 11 (limiting only the "one or more hydroxyfunctional (meth)acrylates" to include "hydroxyelthyl acrylate"). Accordingly, all of the relevant claims are directed to a genera of coated optical fibers.

Like claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent discussed above, an important aspect of the inventions of claims 1-8, 11, 15, and 18-19 of the '508 patent is that the claimed physical property limitations exist simultaneously, and the evidence shows that obtaining a primary coating having the simultaneous presence of the several physical property limitations contained in claims 1-8, 11, 15, and 18-19 of the '508 patent is unpredictable. *See, e.g.*, Tr. at 1143:1-22, 1141:20-1142:25, 1152:21-25. This unpredictability, coupled with the limited disclosure in the written description, supports a finding that claims 1-8, 11, 15, and 18-19 of the '508 patent lack sufficient written description support. *See Ariad*, 598 F.3d at 1358.

Similar to the discussion in the preceding section, the written description fails to provide guidance on how to choose from the universe of possible components to achieve coatings with the claimed physical properties. *See, e.g.*, Tr. at 1152:21-25, 1154:8-11. In terms of working examples, the specification provides at most four similar working examples, which are not representative of the breadth of each claimed genus. For example, the specification provides extremely broad weight percentage ranges for the chemical components that the inventors described as comprising the primary coatings. The specification states that "[t]he primary coating composition of the present invention generally comprises" (A) *20-98%* by wt. of at least one oligomer having a molecular weight of about 1000 or higher; (B) *0-80%* by wt. of one or more reactive diluents; (C) *0.1-20%* by wt. of one or more photoinitiators; and (D) *0-5%* by wt. of additives. *See e.g.*, JX-0001 at 3:11-23. And, each of these working examples has strikingly similar compositions. For example, working examples 1, 4, 5, and 7 comprise oligomer in amounts of 66.15, 74.10, 66.4, and 70.60 wt. %, respectively. These weight percentages are nowhere near the lower limit of 20 wt. % or the upper limit of 98 wt. %. *See* JX-0001 at Table 2. Working examples 1, 4, 5, and 7 comprise photoinitiators in the total amounts of 3.3, 3.1, 3.3, and 3.1 wt. %, respectively. *Id.* These weight percentages are nowhere near the lower limit of 0.1 wt. % or the upper limit of 20 wt. %. *Id.* And, again, the working examples have similar physical properties. *Id.* Furthermore, photoinitiators are needed in the working examples to achieve, for example, a high cure speed, Tr. at 1145:6-24, 1150:13-1152:6, 1153:20-1154:15, yet the claims cover compositions that, unlike the working examples, use as little as 0.1 wt. % of photoinitiator, but still have the claimed combination of physical properties. *Id.* Dependent claims 2-8, 11, 15, and 18-19, although narrower in other aspects, are not narrower in this important aspect. Accordingly, those claims are exceedingly broad for these same reasons.

Given the unpredictability as to important aspects of the claimed inventions, the broad scope of the claims, and the limited disclosure in the patent, we find that Respondents have shown by clear and convincing evidence that these claims lack the written description support required by § 112. DSM's argument regarding the value of the other examples (both those that are allegedly working examples and those that are non-working examples) in the specification of the Cure Dose Patents is unpersuasive for the same reasons discussed above.

C. Whether Claim 30 of '659 patent is Invalid for Lack of Written Description

DSM petitioned the ID's conclusion that claim 30 of '659 patent is invalid for lack of written description. On review, the Commission has determined to affirm the ID and supplement the ID with the following reasoning.

Claim 30 of '659 patent is directed to primary coating compositions for optical fibers having certain physical properties. Claim 30 is reproduced below.

> 30. Primary coating having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less and a calculated volumetric thermal expansion coefficient α_{23} of 6.85×10^{-4} K^{-1} or less, wherein said primary coating is obtained by curing a composition comprising:
>
> (a) 20-98% by wt. of at least one oligomer having a molecular weight of 1000 or higher;
>
> (b) 0-80% by wt. of one or more reactive diluents;
>
> (c) 0.1-20% by wt. of one or more photoinitiators; and
>
> (d) 0-5% by wt. of additives.

This claim includes two physical property limitations in the body of the claim and four chemical compositional limitations (*i.e.*, limitations (a), (b), (c) and (d)).

Respondents have set forth clear and convincing evidence that claim 30 of the '659 patent lacks adequate written description support under § 112. First, as with the claims in the

Cure Dose Patents, claim 30 the '659 patent is also directed to a broad genus. And like the Cure Dose Patents, the compositional limitations fail to place any meaningful limit on the scope of the claim. For example, the claim is not limited to any particular primary coating material. Thus, factors for the Commission to consider in evaluating the adequacy of the written description include the predictability of the technology and whether DSM described a sufficient number of species to properly claim this genus. *Ariad*, 598 F.3d at 1351.

Similar to the claims in the Cure Does Patents, an important aspect of the invention at issue is that the claimed physical property limitations must exist simultaneously. And, also as noted above, the evidence shows that obtaining a primary coating having the simultaneous presence of different physical property limitations is unpredictable. *See* Tr. at 1215:5-14 (declaring that the same unpredictability analysis for the Cure Dose Patents also applies to the '659 patent). Here, the physical properties at issue are the "equilibrium modulus" and the "calculated volumetric thermal expansion coefficient." DSM argues, with respect to the '659 patent, that the "inventors' discovery yielded such predictability of behavior that they described how coating designers could simply calculate the physical property at issue here using commercially available software." DSM Pet. at 10. DSM further argues that the inventors upended the prevailing classical understanding that those properties were linked, and instead have taught that "these physical properties are linked to *different* underlying structural features of the coating." *Id.* at 13.

Yet, merely qualitatively linking the properties at issues to other features of the coating is not sufficient to establish possession of the full scope of the claimed invention, especially given the heightened evidentiary requirement when an invention allegedly "contravene[d] established scientific principles." *In re Chilowsky*, 229 F.2d at 462. For example, the

specification does not provide any quantitative guidance as to those relationships. *See generally* JX-0004. DSM itself acknowledges the limited effect of the inventors' contribution to the predictability in the art: the "teaching of these structure-property correlations upends the classical understanding of optical fiber coatings, and allows coating designers, *at least to some extent*, to independently manipulate the modulus and thermal expansion coefficient by controlling the underlying structural features (network density and cohesive energy density respectively) of the coating." DSM Pet. at 14 (emphasis added). Mr. Overton affirmed that there was no "known or disclosed correlation between the claimed combination of physical properties and the claimed ranges of chemical components." Tr. at 1830:21-24. The absence of any working examples in the patent (see below) would appear to belie DSM's assertion that the inventors provided predictability to this aspect of the invention.

Furthermore, despite the claim encompassing an extremely broad genus of widely-variant chemical species, the specification provides no working examples. For example, the specification provides extremely broad weight percentage ranges for the chemical compositional limitations: (A) *20-98%* by wt. of at least one oligomer having a molecular weight of about 1000 or higher; (B) *0-80%* by wt. of one or more reactive diluents; (C) *0.1-20%* by wt. of one or more photoinitiators; and (D) *0-5%* by wt. of additives. *E.g.*, JX-0004 at 11:9-21; Tr. 1145:12-1146:18, 1147:11-1152:20 (declaring, *e.g.*, that "oligomers could come from a huge - - a broad family of base chemicals," that there are "hundreds of choices" for reactive diluents, that there are various classes of photoinitiators, and that "there's a functionally broad range of additives); RDX-0004.28.

Given the unpredictability as to important aspects of the claimed inventions, the exceedingly broad scope of the claims, and the limited disclosure, including the fact that there

are no working examples, Respondents have shown by clear and convincing evidence that these claims lack the written description required by § 112.

D. Whether Respondent OFS Imports Respondent MUV's Accused KS1-043/048 Coating

The Commission determined to review the issue of whether OFS imports MUV's accused KS1-043/048 coating. This issue was not decided in the ID and was petitioned by both OUII and DSM. On review, the Commission finds that OFS imports that coating.

DSM has shown by a preponderance of the evidence that OFS imported and used KS1-043, which meets the limitations of claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent. OFS acknowledged that it imported accused MUV coating compositions:

> Provided below are the currently known statistical data on the quantity and shipment value of Accused Products imported into the United States from
>
> [During this period OFS imported Momentive coating in both Kilogram and Liter measures:]
>
> [Liter Amount: [9]; Value: USD $]
>
> [Kilogram Amount: ; Value: USD $]

OFS Response to Complaint at Confidential Ex. 1 (December 20, 2016) (EDIS Doc. ID 598631). Furthermore, the evidence shows that OFS uses the KS1-043 coating composition for its coated optical fibers (Tr. at 1428:2-4); that MUV sells KS1-043 to OFS, (Tr. at 929:2-6; CX-234C (Purchase Agreement between OFS and MUV)); CX-293C (Amendment No. 5 to

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[9] This number is as it appears in the response to the complaint. We understand this number to include a typographical error in the form of an extra "9." When the extra 9 is removed from the liter amount, the value in USD of the coating composition in both liters and kilograms is approximately the same, as we would expect.

Purchase Agreement between OFS and MUV)); that OFS imports coating compositions that are applied domestically to its optical fibers (CX-1426C at 49:22-50:12); that OFS does not obtain coating compositions from (*Id.*); and that OFS received shipments from MUV , and is responsible for those shipments (CX-266C (showing importation records); Tr. at 931:16-19). This evidence is sufficient to meet the preponderance of the evidence standard. OFS argues that it is possible that the imported coating compositions do or that all of its offerings that use cured to optical fibers prior to importation (such that a coating or a coated optical fiber is imported, rather than a coating composition), but the preponderance of the evidence standard does not require absolute certainty.

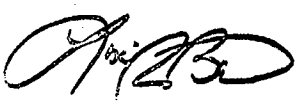
E. Whether Claims 1-8, 11, 15, 18-19, and 21 of the '508 Patent and Claims 1-10 and 13-15 of the '103 Patent are Invalid for Lack of Enablement

On review, the Commission has determined to take no position as to whether claims 1-8, 11, 15, 18-19, and 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are invalid for lack of enablement. *See Beloit Corp. v. Valet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984).

F. Whether the Accused Products Infringe the '508, '103, and '659 Patents; and Whether the Technical and Economic Prongs of the Domestic Industry Requirement Have Been Met for the '508, '103, and '659 Patents

The Commission determined to review whether the accused products infringe the '508, '103, and '659 patents; and whether the technical and economic prongs of the domestic industry requirement have been met for the '508, '103, and '659 patents. Given the Commission's ultimate conclusion that those claims are invalid, the Commission has determined not to reach these issues. *See Beloit Corp. v. Valet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984).

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: June 7, 2018

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME

Inv. No. 337-TA-1031

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **COMMISSION OPINION** has been served by hand upon the Commission Investigative Staff, Claire K. Comfort, Esq., and the following parties, as indicated, on **June 7, 2018**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants DSM Desotech, Inc. and DSM IP Assets B.V.:

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On Behalf of Respondent Momentive UV Coatings (Shanghai) Co., Ltd.:

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On Behalf of Respondent OFS Fitel, LLC:

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME	Investigation No. 337-TA-1031

NOTICE OF COMMISSION DETERMINATION TO REVIEW IN PART A FINAL INITIAL DETERMINATION FINDING A VIOLATION OF SECTION 337; EXTENSION OF TARGET DATE

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission (the "Commission") has determined to review in part the final initial determination (the "ID") issued by the presiding administrative law judge ("ALJ") on February 15, 2018, finding a violation of section 337 of the Tariff Act of 1930, as amended, in connection with certain asserted patents. The Commission has also determined to extend the target date for the completion of this investigation from June 18, 2018, to June 25, 2018.

FOR FURTHER INFORMATION CONTACT: Ron Traud, Office of the General Counsel, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436, telephone 202-205-3427. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436, telephone 202-205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at *https://www.usitc.gov*. The public record for this investigation may be viewed on the Commission's electronic docket ("EDIS") at *https://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal, telephone 202-205-1810.

SUPPLEMENTARY INFORMATION: On December 5, 2016, the Commission instituted this investigation based on a complaint filed by DSM Desotech, Inc. of Elgin, IL; and DSM IP Assets B.V. of Heerlen, Netherlands (collectively, "DSM" or "Complainants"). 81 FR 87588-89 (Dec. 5, 2016). The complaint alleges violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337 ("section 337"), based upon the importation into the United States, the sale for importation, or the sale within the United States after importation of certain UV curable coatings for optical fibers, coated optical fibers, and products containing same by reason of infringement of one or more of claims 1-8, 10-15, and 18-22 of U.S. Patent No. 6,961,508 ("the '508 patent");

claims 1-10 and 13-15 of U.S. Patent No. 7,171,103 ("the '103 patent"); claims 2-4, 9, 11-12, and 15 of U.S. Patent No. 7,067,564 ("the '564 patent"); and claims 1-3, 9, 12, 16-18, 21, and 30 of U.S. Patent No. 7,706,659 ("the '659 patent"). *Id.* The Commission's Notice of Investigation named as respondents Momentive UV Coatings (Shanghai) Co., Ltd. of Shanghai, China ("MUV"); and OFS Fitel, LLC of Norcross, Georgia ("OFS") (collectively, "Respondents"). *Id.* The Office of Unfair Import Investigations ("OUII") was also named as a party in this investigation. *Id.*

Prior to the evidentiary hearing, DSM withdrew its allegations as to certain patent claims. *See* Order 12 (Apr. 12, 2017), *unreviewed*, Notice of Commission Determination Not to Review an Initial Determination Granting Complainants' Unopposed Motion to Terminate this Investigation with respect to One Patent Claim (May 11, 2017); Order 50 (Aug. 25, 2017), *unreviewed*, Notice of Commission Determination Not to Review An Initial Determination Withdrawing from the Complaint Certain Allegations Regarding U.S. Patent No. 7,067,564 (Sept. 15, 2017). DSM proceeded at the evidentiary hearing on the following patents and claims: claims 1-8, 11-15, 18-19, 20-21, and 22 of the '508 patent; claims 1-10 and 13-15 of the '103 patent; and claims 1-3, 9, 12, 16-18, 21, and 30 of the '659 patent.

On February 15, 2018, the ALJ issued the ID, which finds only MUV in violation of section 337, and only as to the '508 and '103 patents. The ALJ recommended that the Commission issue a limited exclusion order directed to MUV's infringing products. The ALJ also recommended a bond of forty percent of entered value during the Presidential review period. *See* 19 U.S.C. 1337(j)(3).

On February 27-28, 2018, OUII, DSM, MUV, and OFS filed petitions for review of the ID, and on March 7-8, 2018, the parties filed responses to the petitions. On March 19, 2018, the private parties filed statements on the public interest. The Commission also received comments on the public interest from members of the public.

Having examined the record in this investigation, including the ID, the petitions for review, and the responses thereto, the Commission has determined to review the ID in part. In particular, the Commission has determined to review the following:

(1) Whether respondent OFS imports respondent MUV's accused KS1-043/048 coating.

(2) Whether claim 30 of '659 patent is invalid for lack of written description.

(3) Whether claims 1-8, 11, 15, and 18-19 of the '508 patent are invalid for lack of written description and enablement.

(4) Whether claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are invalid for lack of written description and enablement.

(5) Whether the accused products infringe the '508, '103, and '659 patents.

(6) Whether the technical and economic prongs of the domestic industry requirement have been met for the '508, '103, and '659 patents.

The Commission has determined to not review the remainder of the ID. The Commission does not request any briefing at this time.

This action is taken under the authority of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in part 210 of the Commission's Rules of Practice and Procedure (19 CFR part 210).

By order of the Commission.

Lisa R. Barton
Secretary to the Commission

Issued: April 16, 2018

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME **Inv. No. 337-TA-1031**

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Staff, Claire K. Comfort, Esq., and the following parties, as indicated, on **April 16, 2018**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants DSM Desotech, Inc. and DSM IP Assets B.V.:

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☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

Public Version

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME**	**Inv. No. 337-TA-1031**

INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge MaryJoan McNamara

(February 15, 2018)

Appearances:

For the Complainants DSM Desotech, Inc. and DSM IP Assets B.V.:

Christine E. Lehman, Esq., Rajeev Gupta, Esq., Aidan C. Skoyles, Esq., and Karthik Kumar, Esq. of Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., Washington, D.C.

Kyle Friesen, Esq. of Mayer Brown LLP, Houston, TX.

For the Respondent Momentive UV Coatings (Shanghai) Co., Ltd.:

Ahmed J. Davis, Esq., Thomas S. Fusco, Esq., and W. Peter Guarnieri, Esq. of Fish & Richardson P.C., Washington, D.C.

Edmond R. Bannon, Esq. and Michael A. Anderson, Esq. of Fish & Richardson P.C., New York, N.Y.

Carl E. Bruce, Esq. of Fish & Richardson P.C., Dallas, TX.

Ryan O'Connor, Esq. of Fish & Richardson P.C., San Diego, CA.

For the Respondent OFS Fitel, LLC:

Bradley J. Olson, Esq., Jordan S. Weinstein, Esq., Jeffrey Morgan, Esq., Rishi Suthar, Esq., David M. Spooner, Esq., Christine J. Sohar-Henter, Esq., and Scott Rothenberger, Esq. of Barnes & Thornburg, LLP, Washington, D.C.

For the Commission Investigative Staff:

Margaret D. McDonald, Esq., Director; Jeffrey T. Hsu, Esq., Supervisory Attorney; and Claire K. Comfort, Esq., Investigative Attorney, of the Office of Unfair Import Investigations, U.S. International Trade Commission, Washington, D.C.

SELECTED SUMMARY FINDINGS

Pursuant to the Notice of Investigation, 81 Fed. Reg. 87588, dated December 5, 2016, this is the Initial Determination ("ID") of the Investigation in the Matter of Certain UV Curable Coatings for Optical Fibers, Coated Optical Fibers, and Products Containing Same, United States International Trade Commission Investigation No. 337-TA-1031. *See* 19 C.F.R. § 210.42(a).

It is a finding of this ID that Complainants DSM Desotech, Inc. and DSM IP Assets B.V. (collectively, "DSM" or "Complainants") have proven by a preponderance of evidence that Respondent Momentive UV Coatings (Shanghai) Co., Ltd. ("Respondent MUV") has violated subsection (b) of Section 337 of the Tariff Act of 1930, in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain UV curable coatings for optical fibers.

It is a finding of this ID that Respondent MUV has infringed asserted claim 21 of U.S. Patent No. 6,961,508 ("the '508 patent"); and claims 1-10 and 13-15 of U.S. Patent No. 7,171,103 ("the '103 patent").

It is a finding of this ID that Complainants have not proven by a preponderance of evidence that Respondent OFS Fitel, LLC ("Respondent OFS," and with Respondent MUV, "Respondents") has violated subsection (b) of Section 337 of the Tariff Act of 1930, in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain coated optical fibers.

It is a finding of this ID that Respondents have proven by clear and convincing evidence that claims 1-8, 11-15, 18-20 and 22 of the '508 patent are invalid under 35 U.S.C. § 112 for lack of written description and enablement, and therefore, by operation of law, none of those claims are infringed.

It is a finding of this ID that Respondents have proven by clear and convincing evidence that claims 1-3, 9, 12, 16-18, and 21, and 30 of U.S. Patent No. 7,706,659 ("the '659 patent," and with the '508 and '103 patents, "Asserted Patents") are invalid under 35 U.S.C. § 102 as anticipated, and/or under 35 U.S.C. § 112 for indefiniteness, lack of written description, and lack of enablement. Therefore, by operation of law, none of those claims are infringed.

It is a finding of this ID that one or more of Complainants' domestic industry fiber optic coating products have satisfied the technical industry prong of the domestic industry requirement for the '508 and '103 patents.

It is also a finding of this ID that Complainants' domestic industry fiber optic coating products have not satisfied the technical industry prong of the domestic industry requirement for the '659 patent.

It is a finding of this ID that Complainants have satisfied the economic prong of the domestic industry requirement under Section 337(a)(3)(A), (B), and (C).

Because Respondent MUV does not keep a significant inventory of its infringing coating products in the United States, no Cease and Desist Order should issue. However, a bond amount of the entered value of 40% is recommended against Respondent MUV during the Presidential Review Period. Similarly, a Limited Exclusion Order with a certification provision is recommended against Respondent MUV for any infringing products it may try to import into the United States.

Because there has been no violation of Section 337 by Respondent OFS, no remedy is recommended or warranted against Respondent OFS.

If the Commission disagrees with the finding that Respondent OFS has not violated Section 337, then it is a recommendation of this ID that a Limited Exclusion Order with a

certification provision be entered against Respondent OFS. Similarly, a Cease and Desist Order is also recommended.

However, it is a finding that Public Interest considerations support delaying the entry of remedial orders against Respondent OFS for a period of four (4) months to give Respondent OFS and its customers time to obtain, test and deploy non-infringing UV curable coatings that can be applied to the optical fiber cable that Respondent OFS manufactures. According to the weight of the evidence, the immediate imposition of any remedial orders would cause a disruption in the optical fiber market because there is a worldwide shortage of optical fiber that is likely to affect United States consumers if optical fiber were to be embargoed under any form of a remedial order.

TABLE OF CONTENTS

APPENDICES

Appendix A: Accused MUV Coatings

Appendix B: Accused OFS Fibers

Appendix C: DI Products

Appendix D: Prior Art Coatings

ABBREVIATIONS

The following shorthand references to the Parties and related cases are used in this Initial Determination:

Complainants or DSM	DSM Desotech, Inc. and DSM IP Assets B.V., collectively
Respondent MUV	Respondent Momentive UV Coatings (Shanghai) Co. Ltd.
Respondent OFS	Respondent OFS Fitel LLC
Respondents	Respondent MUV and Respondent OFS, collectively
Staff	Commission Investigative Staff, Office of Unfair Import Investigations
Ohio Case	*DSM Desotech, Inc. v. Momentive Specialty Chemicals Inc.*, C.A. No. 2:15-cv-00070-MHW-EPD (S.D. Ohio)

The following abbreviations for pleadings, exhibits, briefs, transcripts, and Orders are used in this Initial Determination:

Compl.	Complaint
MUV Resp.	Response of Respondent MUV to the Notice of Investigation and Complaint Under Section 337 of the Tariff Act of 1930, as Amended
OFS Resp.	Response of Respondent MUV to the Notice of Investigation and Complaint Under Section 337 of the Tariff Act of 1930, as Amended
MUV Am. Resp.	First Amended Response of Respondent MUV to the Notice of Investigation and Complaint Under Section 337 of the Tariff Act of 1930, as Amended
OFS Am. Resp.	First Amended Response of Respondent OFS to the Notice of Investigation and Complaint Under Section 337 of the Tariff Act of 1930, as Amended

CX	Complainants' exhibit
CDX	Complainants' demonstrative exhibit
CPX	Complainants' physical exhibit
CPBr.	Complainants' Pre-Hearing Brief
CBr.	Complainants' Initial Post-Hearing Brief
CRBr.	Complainants' Post-Hearing Reply Brief
CPSt.	Complainants' Pre-Hearing Statement
JX	Joint exhibit
RX	Respondents' exhibit
RDX	Respondents' demonstrative exhibit
RPX	Respondents' physical exhibit
RMPBr.	Respondent MUV's Pre-Hearing Brief
ROPBr.	Respondent OFS' Pre-Hearing Brief
RMBr.	Respondent MUV's Initial Post-Hearing Brief
ROBr.	Respondent OFS' Initial Post-Hearing Brief
RMRBr.	Respondent MUV's Post-Hearing Reply Brief
RORBr.	Respondent OFS' Post-Hearing Reply Brief
RPSt.	Respondents' Pre-Hearing Statement
SPBr.	Commission Investigative Staff's Pre-Hearing Brief
SBr.	Commission Investigative Staff's Initial Post-Hearing Brief
SRBr.	Commission Investigative Staff's Post-Hearing Reply Brief
SPSt.	Commission Investigative Staff's Pre-Hearing Statement

SX	Staff's exhibit
Tr.	Evidentiary hearing transcript
Dep. Tr.	Deposition transcript
Comp'ls Claim Br.	Complainants' Claim Construction Brief
Res'pts Claim Br.	Respondents' Claim Construction Brief
Staff Claim Br.	Commission Investigative Staff's Claim Construction Brief
***Markman* Order**	Order No. 17

The following abbreviations for technical business-related terms are used in this Initial Determination:

CVTE or α_{23}	Calculated volumetric thermal expansion coefficient
E'_{23}	Storage modulus at 23°C
IPR	*Inter partes* review
ISM	In-situ modulus
MRR	Modulus retention ratio
POSA	Person having ordinary skill in the art
PTAB	Patent Trial and Appeal Board of the U.S. Patent and Trademark Office
USPTO	U.S. Patent and Trademark Office
σ^{10}_{cav}	Cavitation strength at which a tenth cavitation appears
T_g	Glass transition temperature

The following shorthand references to certain products and patents at issue in this are used in this Initial Determination:

'508 patent	U.S. Patent No. 6,961,508
'103 patent	U.S. Patent No. 7,171,103
'659 patent	U.S. Patent No. 7,706,659
Asserted Patents	'508, '103, and '659 patents, collectively
Cure Dose Patents	'508 and '103 patents, collectively
Cavitation Patent	'659 patent
Accused Products	Accused MUV Coatings and Accused OFS Fibers, collectively
Accused MUV Coatings	Respondent MUV's [ ] primary coating products listed in Appendix A
Accused OFS Fibers	Respondent OFS' single-mode and multi-mode coated optical fiber products listed in Appendix B
Accused OFS Single-Mode Fibers	Respondent OFS' single-mode coated optical fiber products listed in Appendix B
Tested OFS Single-Mode Fibers	Respondent OFS' AllWave®+ Zero Water Peak (ZWP) and AllWave® FLEX+ Zero Water Peak (ZWP)
DI Products	DI Cure Dose Products and DI Cavitation Products, collectively
DI Cure Dose Coatings	Complainants' DP1017/[ ] and DP-1032 primary coating products listed in Appendix C
DI Cavitation Coatings	Complainants' DP1017/[ ], DP-1032, DCP-0041, and DP-1014XS primary coating products listed in Appendix C
Prior Art Coatings	JSR's R-1128 and R-1166 primary coating products listed in Appendix D

I. INITIAL DETERMINATION ON VIOLATION OF SECTION 337, AND RECOMMENDED DETERMINATION ON REMEDY AND BOND: INTRODUCTION AND OVERVIEW

The evidentiary hearing in this Investigation was held from July 31, 2017 through August 4, 2017, and then recommenced on August 14, 2017 and concluded on August 15, 2017.

At issue in this Investigation are the chemical coating compositions and the coatings that protect the thin strands of glass that make up fiber optic cables and certain fiber optic cable products that transmit information "around the office, across continents, and even deep under the ocean at the speed of light." (CBr. at 2; *see also* JX-0009 (Joint Technology Stipulation) at 1.).

The two (2) remaining Cure Dose Patents, U.S. Patent Nos. 6,961,508 ("the '508 patent") and 7,171,103 ("the '103 patent"), in this Investigation are directed to the coating compositions that shield the various types of fiber optic cable by ensuring that the coated optical fibers remain strong and flexible, and that the coatings do not degrade due to "microbending-induced attenuation." (*See* JX-0001 ('508 patent); JX-0003 ('103 patent).).

The remaining Cavitation Patent, U.S. Patent No. 7,706,659 ("the '659 patent"), claims to introduce a new test for measuring the "cavitation strength" of a primary coating composition and is directed toward increasing the resistance of a primary coating to the formation of "cavities" or defects, while still keeping the coating sufficiently soft so that the coated fiber cable can be bent and rolled, and used for the commercial applications that, for example, enable and enhance telephone and television communication without degrading. (*See* JX-0004 ('659 patent).).

One of the major sources of disagreement among the Parties is tied to the accuracy and reliability of testing that was performed: (1) to demonstrate the full scope of the claimed inventions; (2) on Complainants' DI Products to determine if they practice the claims; and (3) on

Respondents' Accused Products to determine if they infringe the asserted claims.

Other significant sources of disagreement involved whether certain claims of the Cure Dose and Cavitation Patents: (1) are described in the patent specifications in sufficient detail such that a person of ordinary skill in the art could reasonably conclude that the inventors had possession of the claimed inventions; (2) are enabled by the disclosures contained in those patents; and (3) particularly point out and distinctly claim the subject matter which the applicants regard as their invention. Another source of dispute focused on whether the invention claimed in the Cavitation Patent was in fact invented by the named inventors or derived from JSR.[1]

As this decision finds, certain claims of the Cure Dose Patents and all of the claims of the Cavitation Patent are invalid under 35 U.S.C. § 112, and certain claims of the Cavitation Patent are invalid under 35 U.S.C. § 102. As this decision also finds, Complainants' testing fell short in proving that the two representative single-mode coated optic fibers, Respondent OFS' AllWave®+ Zero Water Peak (ZWP) and AllWave® FLEX+ Zero Water Peak (ZWP), that Complainants tested to prove infringement of claims 1-8, 11-15, and 18-19 of the '508 patent by Respondent OFS, also reflected infringement by a long list of Respondent OFS' Accused Single-Mode Fibers. (*See* Appendix B; *see also* Section VIII.F.1.).

Chart No. 1: Summary of Findings

Product	Patent	Claims	Determination
MUV's [ ] Coating	'508 patent	20-22	***Violation (claim 21)***: Claim 21 of the '508 patent is valid and infringed by the

[1] Respondents alleged that the asserted claims of the '659 patent was derived from prior art coatings manufactured by JSR.

Product	Patent	Claims	Determination
			[ ] coating. *No violation*: Claims 20 and 22 of the '508 patent are invalid for failure to satisfy the written description and enablement requirements set forth in 35 U.S.C. § 112.
	'103 patent	1-10, 13-15	***Violation (claims 1-10, 13-15)***: Claims 1-10 and 13-15 are valid and infringed by the [ ] coating.
	'659 patent	1-3, 9, 12, 16-18, 21, and 30	*No violation*: Claims 1-3, 9, 12, 16-18, 21, and 30 are invalid for failure to satisfy the requirements set forth in 35 U.S.C. § 112. Claims 1-3, 9, 16-18, and 21 are also invalid over certain prior art.
MUV's [ ] Coating	'659 patent	1-3 and 9	*No violation*: Claims 1-3 and 9 are invalid for failure to satisfy the requirements set forth in 35 U.S.C. § 112. Claims 1-3 and 9 are also invalid over certain prior art.
OFS' Single-Mode Coated Optical Fibers	'508 patent	1-8, 11-15, and 18-19	*No violation*: Claims 1-8, 11-15, and 18-19 are invalid for failure to satisfy the written description and enablement

Product	Patent	Claims	Determination
			requirements set forth in 35 U.S.C. § 112.
OFS' Coated Optical Fibers (Single-Mode and Multi-Mode)	All Asserted Patents	All claims shown above for [ ]	*No violation*: OFS' accused optical fibers do not infringe any of the asserted claims directed to "primary coating composition[s]." Claims 9, 12, 21, and 30 of the '659 patent, which are directed to "primary coatings," are invalid for the reasons stated above.
DSM's DI Coatings	All Asserted Patents		***Satisfied.*** Complainants' domestic R&D activities regarding their patent primary coating products satisfy the domestic industry requirement set forth in 19 U.S.C. § 337(a)(3)(A), (B), and/or (C).

II. BACKGROUND

A. Institution and Selected Procedural History.

On October 31, 2016, DSM Desotech, Inc. and DSM IP Assets B.V. filed a complaint under Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, ("Complaint") alleging infringement of certain claims of U.S. Patent No. 6,961,508 (JX-0001, hereafter "the '508 patent"), U.S. Patent No. 7,067,564 (JX-0002, hereafter "the '564 patent"), U.S. Patent No. 7,171,103 (JX-0003, hereafter "the '103 patent"), and U.S. Patent No. 7,706,659 (JX-0004,

hereafter "the '659 patent"). (Compl. at ¶ 3 (Oct. 31, 2016).).[2]

The Commission instituted this Investigation pursuant to subsection (b) of Section 337 of the Tariff Act of 1930, as amended, to determine:

> whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain UV curable coatings for optical fibers, coated optical fibers, and products containing same by reason of infringement of one or more of claims 1-8, 10-15, and 18-22 of the '508 patent; claims 1-10 and 13-15 of the '103 patent; claims 2-4, 9, 11-12, and 15 of the '564 patent; and claims 1-3, 9, 12, 16-18, 21, and 30 of the '659 patent; and whether an industry in the United States exists as required by subsection (a)(2) of section 337[.]

81 Fed. Reg. 87588 (Dec. 5, 2016).

Following the termination of the '564 patent, the Asserted Patents and claims remaining that are the subject of this decision are claims 1-8, 10-15, and 18-22 of the '508 patent; claims 1-10 and 13-15 of the '103 patent, and claims 1-3, 9, 12, 16-18, 21, and 30 of the '659 patent.[3]

The Notice of Investigation ("NOI") names DSM Desotech, Inc., of Elgin, IL and DSM IP Assets B.V., of TE Heerlen, the Netherlands as complainants ("Complainants"). *See id.* at 87589. The NOI names Momentive UV Coatings (Shanghai) Co., Ltd., of Shanghai, China ("Respondent MUV"), and OFS Fitel, LLC ("Respondent OFS"), of Norcross, Georgia as respondents (collectively, "Respondents."). *Id.*

The NOI also names the Commission Investigative Staff of the Office of Unfair Import Investigations ("Staff," and collectively, with Complainants and Respondents, "the Parties") as a

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[2] On March 8, 2017, Complainants filed a motion for leave to file an amended Complaint. (Doc. ID No. 605115 (Mar. 8, 2017).). Complainants sought to add claims 10 and 21 of the '564 patent, and claims 13 and 22 of the '659 patent. (*Id.*) Complainants' motion was denied. (*See* Order No. 8 (Mar. 23, 2017).).

[3] On August 25, 2017, an ID was issued granting Complainants' partial termination of this Investigation against Respondents as to the '564 patent. (Order No. 50 (Aug. 25, 2016).). The Commission determined not to review the ID. (Doc. ID No. 623224 (Sept. 15, 2017).).

party in this Investigation. *Id.*

On December 20, 2016, Respondent OFS filed a response to the Complaint and NOI. (Doc. ID No. 598630 ("OFS Response") (Dec. 20, 2017).). On December 27, 2016, Respondent MUV filed a response to the Complaint and NOI. (Doc. ID No. 599113 ("MUV Response") (Dec. 27, 2016).). In the MUV Response, Respondent MUV identified eleven (11) affirmative defenses ("Respondent MUV's Affirmative Defenses"), one of which was a defense of unenforceability due to inequitable conduct. (MUV Resp. at 16-22, ¶¶ 1-24; *id.* at 20-21, ¶¶ 13-15.). In the OFS Response, Respondent OFS identified five (5) affirmative defenses ("Respondent OFS' Affirmative Defenses"). (OFS Resp. at ¶¶ 1-22.).

On March 7, 2017, Complainants filed a motion to strike Respondent MUV's affirmative defense of inequitable conduct. (Motion Docket No. 1031-003 (Mar. 7, 2017).). Complainants' motion was granted. (*See* Order No. 9 (Mar. 27, 2017).).

On April 13, 2017, a *Markman* hearing and a technical tutorial were held. (Doc. ID No. 608649 (Apr. 14, 2017).). A *Markman* Order construing disputed claim terms issued on May 10, 2017. (*See* Order No. 17 (May 10, 2017).).

On April 14, 2017, Respondent MUV filed a motion to amend its response to the Complaint to add defenses related to improper inventorship and amend its invalidity contentions. (Motion Docket No. 1031-010 (Apr. 14, 2017).). On the same day, Respondent OFS filed a joinder to Respondent MUV's motion. (Doc. ID No. 608755 (Apr. 14, 2017).). Respondent MUV's motion was granted. (*See* Order No. 16 (May 3, 2017).).

On May 4, 2017 and May 8, 2017, Respondent MUV and Respondent OFS, respectively, filed amended responses to the Complaint and NOI. (Doc. ID No. 610702 ("MUV Amended Response") (May 4, 2017); Doc. ID No. 611058 ("OFS Amended Response") (May 8, 2017).).

In the MUV Amended Response, Respondent MUV amended its eleven (11) affirmative defenses to include a defense concerning improper inventorship ("MUV Amended Affirmative Defenses"). (MUV Am. Resp. at 21-23, ¶¶ 14-19.). Similarly, in the OFS Amended Response, Respondent OFS added an improper inventorship defense to the five (5) affirmative defenses it originally identified in the OFS Response ("OFS Amended Affirmative Defenses"). (OFS Am. Resp. at 26-28, ¶¶ 24-29.).

On July 5, 2017, an initial determination issued (Order No. 32) based on a summary determination motion filed by Respondent MUV, finding that the accused [

] optical fiber coating products do not infringe the asserted claims 2-4, 9, 11, 12, and 15 of the '564 patent. (*See* Order No. 32 (July 5, 2017).). Even before the Commission issued its opinion on review of Order No. 32, the Parties entered into a Stipulation ("the '564 Patent Stipulation") in which Complainants conceded that under the claim construction set forth in Order No. 32 (and in Order No. 17), they could not establish Respondents' infringement of the '564 patent. (*See* the '564 Patent Stipulation, Doc. ID No. 618347 (July 27, 2017).). The Parties agreed that the '564 patent would not be raised during the evidentiary hearing.

In its opinion issued on review of the initial determination in Order No. 32, the Commission affirmed the initial determination's ultimate conclusions on both claim construction and non-infringement. (*See* Comm'n Opinion, Doc. ID No. 619137 (Aug. 4, 2017).).

Based on the '564 Patent Stipulation and the Commission Opinion on the '564 patent, on August 11, 2017, Complainants filed a motion to partially terminate the Investigation with respect to the '564 patent. (*See* Doc. ID No. 619767 (Aug. 11, 2017).).

On July 6, 2017, an initial determination issued that found claims 16-18, 21, and 30 of the '659 patent to be invalid for indefiniteness under 35 U.S.C. § 112. (*See* Order No. 33 (July 6,

2017).). On review, the Commission reversed and remanded, holding that the "molecular weight" claim term should be construed as "number average molecular weight," a construction that had not previously been advanced by the Parties. (*See* Comm'n Opinion, Doc. ID No. 620093 (Aug. 16, 2017).).

Six (6) motions *in limine* ("MIL") were filed before the evidentiary hearing. Complainants filed five (5) such MILs. Complainants' MIL No. 1, to preclude Respondents from arguing invalidity theories stricken by Order No. 21, was granted. (*See* Order No. 37 (July 21, 2017); *see also* Order No. 21 (May 24, 2017).). Complainants' MIL No. 2, to strike invalidity theories not discussed in expert reports, was granted in-part with respect to the "Chawla Prior Art" and "031VH Fiber." (*See* Order No. 38 (July 17, 2017).). Complainants' MIL No. 3, to strike and preclude Respondents' inequitable conduct defense based on "Chawla Prior Art," was granted. (*See* Order No. 40 (July 19, 2017).).[4] Complainants' MIL No. 4, to strike and preclude Respondents from arguing inadequately referenced and explained obviousness challenges, was granted in-part. (*See* Order No. 41 (July 20, 2017).). Complainants' MIL No. 5, to preclude Mr. Timothy Murray[5] from testifying with respect to public interest and remedy, was denied. (*See* Order No. 42 (July 19, 2017).).

[4] Complainants noted that Respondent OFS failed to redact from its Pre-Hearing Brief and other documents used during the evidentiary hearing all references to the Chawla Prior Art and its patent prosecution counsel consistent with Order No. 40, or if it did, Complainants were not served with the same. (CBr. at 7 n.3; *see also* Order No. 40 at 3.). The aforementioned references appear not to have been stricken from the initially filed documents as ordered.

[5] When he testified during the evidentiary hearing on August 3, 2017, Mr. Timothy Murray was Chief Executive Officer and Chairman of the Board of OFS. (*See* Tr. (Murray) at 1033:3-17.). Mr. Murray was called to testify with respect to OFS' historical roots, founded in 1879 as the Western Electric Co. and later, as AT&T. (*Id.* at 1034:1-17.). Additionally, he was called to testify with respect to remedy and bond, and specifically the effects that any remedies barring importation of its products would have on OFS and the market supply for fiber optic coated products. (*Id.* at 1035:1–1037:2.).

Respondents' single MIL, to preclude Ms. Caroline Liu[6] from testifying during the evidentiary hearing with respect to the testing of certain accused and domestic industry coatings, was denied.[7] (*See* Order No. 44 (July 19, 2017).).

The evidentiary hearing was held from July 31, 2017 through August 4, 2017 and recommenced from August 14, 2017 through August 15, 2017. Complainants alleged that Respondents have infringed the Asserted Patents and claims identified in Chart No. 2, below, which were the focus of testimony during the evidentiary hearing.

Chart No. 2: Cure Dose and Cavitation Patents and Claims at Issue

	U.S. Patent No.	Claims Asserted
Cure Dose	6,961,508	**1**-8, 11-15, 18-19, **20**-21, **22**
	7,171,103	**1**-10, 13-15
Cavitation	7,760,659	**1**-3, 9, **12**, **16**-18, 21, **30**[8]

[6] When she testified during the evidentiary hearing on August 1, 2017, Ms. Caroline Liu had been employed by DSM in Elgin, Illinois as a chemist for approximately seven (7) years. (*See* Tr. (Liu) at 408:22–409:9.). In that capacity, Ms. Liu worked in research and development, quality control, product testing, troubleshooting, and method development. (*Id.* at 409:11-16.). For this Investigation, Ms. Liu was asked to perform modulus ratio testing for samples PHY3 and PHY4, and equilibrium modulus testing on sample PHY1. (*Id.* at 409:17-21.). Ms. Liu testified that she did not know the identities of the chemicals she tested at the time she did so, or in other words, it was "blind" testing. (*Id.* at 409:17-23.).

[7] One of the tests that Ms. Liu was asked to perform concerned the Cure Dose Patents, and is at the heart of this Investigation. It is called the "modulus retention ratio." At a high level, as Ms. Liu explained, modulus retention testing involves taking a liquid chemical coating then "cured," (typically using UV light), on a substrate, which for this case was glass. Then, the samples are cut to certain geometry, and their modulus (or retention of the desired properties such as strength) is measured. The samples are then cured and stored in a humidity chamber, for a period (here eight (8) weeks, and then re-measured after the curing process. A measurement of the samples is taken before and after curing and that is modulus retention ratio. (*See* Tr. (Liu) at 410:7-21.). How the curing is done, and whether it was done in accordance with the specification of the Cure Dose Patents is one of the issues in this decision. (*See* Section VIII.C.).

[8] The bolded claims are independent claims.

B. The Parties.

1. Complainants DSM Desotech, Inc. and DSM IP Assets B.V. ("Complainants")

Complainant DSM Desotech, Inc. is a Delaware corporation with its principal place of business at 1122 Saint Charles Street, Elgin, Illinois 60120. (Compl. at ¶ 8.). Complainant DSM IP Assets B.V. is a Netherlands corporation with a registered place of business at Het Overlook 1, 6411 Te Heerlen, Netherlands. (*Id.* at ¶ 9.).

Complainants develop and manufacture curable coating products for use by their customers in the manufacture of coated optical fibers. (CBr. at 8.). Complainants describe themselves as selling "coatings as well as matrix materials and inks, to their customers who apply the coatings to optical fibers in draw towers, and use related matrix materials and inks to make and sell coated optical fibers. (CBr. at 8.).

[ ]

[ ]

Complainants conduct the majority of their optical fiber research and development ("R&D") and the customer support for their optical fiber coating products at their facility in Elgin, Illinois. (*Id.*). Complainants' coating products are manufactured in Hoek van Holland, Netherlands. (*Id.*). Complainants do not themselves manufacture optical fibers. (SBr. at 4.).

2. Respondent Momentive UV Coatings (Shanghai) Co., Ltd. ("Respondent MUV")

Respondent Momentive UV Coatings (Shanghai) Co., Ltd. is a joint venture formed under the laws of the People's Republic of China with a principal place of business at No. 1 KangQiao High Tech Zone, 1-39# East KangQiao Road, Pudong, Shanghai 201315, China.

(Compl. at ¶ 13; MUV Am. Resp. at ¶ 13.).

According to Respondent MUV, Borden Chemical, Inc. ("Borden") was a leading producer of UV coatings for the fiber optic industry and obtained numerous patents on its coatings. (RMBr. at 2-3.). Respondent MUV, Borden's successor, develops and sells UV-curable acrylate coatings for optical fibers. (*Id.*). According to Staff, the joint venture that MUV briefly mentions in its description of itself is [

] (SBr. at 4.). Respondent MUV manufactures and sells UV curable coatings for optical fibers to optical fiber manufacturers. Like Complainants, Respondent MUV does not manufacture optical fibers. (*Id.* at 5.).

3. Respondent OFS Fitel, LLC ("Respondent OFS")

Respondent OFS Fitel, LLC is a Delaware limited liability company with its principal place of business at 2000 Northeast Expressway, Norcross, Georgia 30071, but with other locations throughout the world. (Compl. at ¶ 16; OFS Am. Resp. at ¶ 16; CBr. at 8.).

Respondent OFS, unlike the other private Parties, manufactures optical fibers in the United States. Respondent MUV [

] (CBr. at 8).

Respondent OFS is a wholly-owned subsidiary of Furukawa, a Japanese company. (*Id.* (citing Tr. (Murray) at 1037:15-19).). Respondent OFS manufactures coated optical fibers in the United States, in Europe and in Asia, using Respondent MUV-supplied coatings. (*See id.* at 8-9 (citing Tr. (Konstadinidis) at 1325:16–1326:10; Tr. (Murray) at 1038:1-14).).

Respondent OFS sells its coated optical fibers in the United States, which includes

products it manufactures in the United States, and products that are coated outside the United States but which are then imported into the United States. (*Id.* at 8-9.). Respondent OFS supplies approximately [ ] of the fiber optic cable in the North American market, which is the equivalent of some [ ] of fiber optic cable or some [ ] of fiber annually. (*See* Tr. (Andrew Oliviero)[9] at 1403:21–1404:7; *see also* SBr. at 5 (citing Tr. (Oliviero) at 1403:21-25).). Respondent OFS includes among its customers [ ] (*See* SBr. at 5 (citing Tr. (Oliviero) at 1429:3–1430:30; Tr. (Murray) at 1041:8-20).).

III. JURISDICTION AND IMPORTATION

To have the authority to decide a case, a court or agency must have both subject matter jurisdiction and jurisdiction over either the parties or the property involved. *See Certain Steel Rod Treating Apparatus and Components Thereof*, Inv. No. 337-TA-97, Comm'n Opinion, 215 U.S.P.Q. 229, 231 (U.S.I.T.C. 1981). For the reasons discussed below, the facts support a finding that the Commission has jurisdiction over this Investigation.

[9] When he testified during the evidentiary hearing on August 4, 2017, Dr. Andrew Oliviero was Senior Director of Product Line Management and Research and Development for OFS' Global Products. (Tr. (Oliviero) at 1396:5-11.). Dr. Oliviero holds a B.S. and a Ph.D. in Chemical Engineering. (*Id.* at 1396:12-17.). He has worked for Respondent OFS and Furukawa Electric in Japan, where he has variously had management responsibilities for what are termed "single-mode" and "multi-mode" optical fibers. (*Id.* at 1397:1–1398:8.). Dr. Oliviero was called to testify specifically about Respondent OFS' products, its position in the fiber optic cable marketplace, and the impacts that an embargo of any type would have on Respondent OFS and the world supply of optical fiber cable. He is responsible for Respondent OFS' fiber optic cable inventory and testified to the competitive conditions in the United States and the capabilities of other manufacturers to provide fiber optic cable in the event Respondent OFS' products are embargoed. (*See generally* Tr. (Oliviero) at 1399:1–1424:25.).

A. The Commission Has Subject Matter, *In Rem*, and *In Personam* Jurisdiction

The Commission has subject matter jurisdiction over this Investigation because Complainants alleged that Respondents have violated 19 U.S.C. §1337(a)(1)(B). *See Amgen v. U. S. Int'l Trade Comm'n*, 902 F.2d 1532, 1536 (Fed. Cir. 1990). Respondents have not contested that the Commission has subject matter jurisdiction. (RMBr. at 9; ROBr. at 3.). Additionally, Respondents have consented to *in personam* jurisdiction for purposes of this Investigation. (RMBr. at 9.). Respondents have responded to the Complaint and NOI, and participated in discovery and the evidentiary hearing.

Respondents have not contested that the Commission has *in rem* jurisdiction over the Accused Products that are imported into the United States. (RMBr. at 9; ROBr. at 3-4.).

Specifically, Respondent OFS acknowledged that its following coated optical fiber products have been imported into the United States: TrueWave RS, TrueWave Reach, EZ-Bend, AllWave FLEX Max, AllWave FLEX 190, TeraWave ULA, TeraWave SCUBA, TeraWave ULL, TrueWave XL, and TrueWave SRS. (ROBr. at 3-4.). Moreover, Respondent OFS acknowledged that it has used Respondent MUV's imported optical fiber coatings to coat its optical fiber products, and imported into the United States coated optical fiber. (*See* CBr. at 17 (citing Doc. ID 598631 (Dec. 20, 2016) (OFS Resp. at Ex. 1); CX-0304C (OFS Resp. to RFA Nos. 166-220)).). Respondent OFS also acknowledged that it uses Respondent MUV's accused [ ] coating to coat fibers outside the U.S. and then imports those fibers into the United States. (*See* CBr. at 17 (citing Tr. (Murray) at 1038:9-14; CX-0222C (importation of fibers including AllWave+ from BFFO (Birla in India) to NAR (North America Region)); CX-1426 (Dep. Tr. (Oliviero)) at 53:13-23, 54:5–57:5.).

Respondent MUV acknowledged that it has imported the accused coating products and

sold for importation the accused coating products, including: (i) [

]; and (ii) [ ] (*See* RMBr. at 9; *see also* Compl. at Ex. 47; CBr. at 17 (citing MUV Resp. at ¶ 61, Ex. A at ¶¶ 3-4 (Dec. 27, 2016) (Doc. ID 599114); CX-0293 (OFS-MUV Purchase Agreement); CX- 0294 (MUV Sales); Doc ID 613921 (June 12, 2017) (Respondent MUV's Motion for Partial Termination of the Investigation Based on a Consent Order) at Exhibit 1 (stipulating that Commission has *in rem* jurisdiction and *in personam* jurisdiction over MUV).).

B. Complainants Have Standing in the Commission

Jurisdiction also requires standing. *See SiRF Technology, Inc. v. Int'l Trade Comm'n*, 601 F.3d 1319, 1326 (Fed. Cir. 2016) (standing to bring an infringement suit is the same under Commission Rules as it would be in a Federal District Court case); *Certain Optical Disc Drives, Components Thereof and Prods. Containing Same*, Inv. No. 337-TA897, Opinion Remanding the Investigation at 4 (Jan. 7, 2015). Commission Rule 210.12 requires that intellectual-property based complaints filed by a private complainant "include a showing that at least one complainant is the exclusive license of the subject intellectual property." 19 C.F.R. § 210.12(a)(7).

Complainants have standing to bring suit for infringement under Section 337 because DSM IP Assets B.V. is the owner of the Asserted Patents. (Compl. at ¶¶ 28, 30, 32, 34; *id.* at Exs. 5, 7, 9.). Moreover, because Respondents have not contested Complainants' standing, Respondent MUV's Ninth Affirmative Defense (i.e., lack of standing) is deemed by this decision to be waived and abandoned pursuant to Ground Rules 7.2 and 10.1.

IV. OVERVIEW OF THE ASSERTED PATENTS

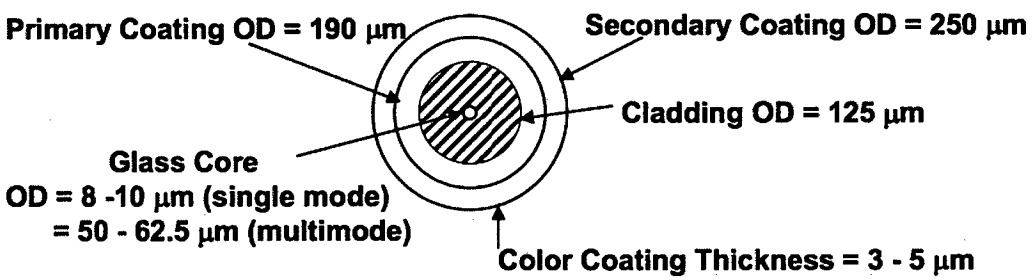
A. Overview of the Technology

This Investigation concerns chemical coating compositions and the coatings that are then

used to cover optical fibers. (*See* JX-0009 (Joint Technology Stipulation) at 1-2; (Doc. ID No. 606879 (Mar. 28, 2017)).). Coated optical glass fibers are typically bundled together to provide ribbon assemblies and fiber optic cables that are used extensively in the telecommunications industry "to transport large volumes of digital data over long distances. (*Id.* at 1.). Optical fibers are typically thin strands of glass, not much thicker than a human hair, through which data can be efficiently transmitted with coordinated pulses of light. (*Id.* at 1-2.).

Because optical fibers are fragile, one or more protective coatings are applied to them through high-pressured sprayer systems. (*Id.* at 2.). The first coating, which directly contacts the optical fiber itself, is commonly referred to as a ***primary coating***. The primary coating is typically a soft coating. (*Id.*). An outer coating, also referred to as a ***secondary coating***, is a harder coating that is typically applied over the primary coating. The secondary coating protects the primary coating against mechanical damage and serves as a barrier to moisture and provides resistance to handling. (*Id.*).

Figure No. 2: Schematic Cross-Section of Fiber Optic Coated Cable



(*Markman* Order at 5; CXM-0003 at 3.).

This Investigation involves patents claiming they improve coatings that protect the thin strands of fiber glass so that the fibers are able to transmit information around the world at the speed of light. (*See* Comp'ls Claim Br. at 1.). According to Complainants' description, the

modern era of fiber optics began in 1966 with the demonstration that optical fibers were feasible as a communication medium that was capable of "carrying 65,000 times more information than copper wire." (Compl. at ¶ 18.). As Complainants also describe:

> [T]he widespread deployment of high bandwidth optical fiber would not have been feasible without the immediate protection afforded by UV curable coatings. Without protective coatings, optical fibers would never have been a practical alternative to copper for telecommunications.

(Compl. at ¶ 26.).

B. The Cure Dose Patents: U.S. Patent No. 6,961,508 ("the '508 Patent") and U.S. Patent No 7,171,103 ("the '103 Patent")

1. Overview of the Cure Dose Patents

Both entitled "Coated Optical Fibers," the '508 patent and the '103 patent, which is a continuation of the '508 patent, share the same specification. (JX-0001; JX-0003.). They claim priority to U.S. Provisional Patent Application Serial No. 60/374,778 ("the '778 provisional application"), filed on April 24, 2002. (Compl. at ¶ 28; JX-0001 at (60); JX-0003 at (60).). Both patents name Jan van Eekelen, Sandra Nagelvoort, Duurt Alkema, Paul Buijsen, Huimin Cao, Robert W. Johnson and David Szum as their inventors. (JX-0001 at (75); JX-0003 at (75).).

The '508 patent was filed on April 24, 2003, as U.S. Patent Application Serial No. 10/421,946 ("the '946 application"). (JX-0001 at (21), (22).). The '946 application issued as the '508 patent on November 1, 2005. (*Id.* at (10), (45).). Complainant DSM IP Assets B.V. is the assignee of the '508 patent. (Compl. at ¶ 28; *see also id.* at Ex. 5.). Complainant DSM Desotech, Inc. is the exclusive licensee of the '508 patent. (Compl. at ¶ 28; *see also id.* at Ex. 9.).

The '103 patent was filed on October 3, 2005, as U.S. Patent Application Serial No. 11/240,397 ("the '397 application"). (JX-0003 at (21), (22).). The '397 application issued as the

'103 patent on January 30, 2007. (*Id.* at (10), (45).). Complainant DSM IP Assets B.V. is the assignee of the '103 patent. (Compl. at ¶ 30; *see also id.* at Ex. 6; JX-0003.). Complainant DSM Desotech, Inc. is the exclusive licensee of the '103 patent. (Compl. at ¶ 30; *see also id.* at Ex. 9.).

Complainants developed the claimed inventions of the Cure Dose Patents in the early 2000's through a project involving Complainants' customer [ ] of the Netherlands [ ].[10]

These two (2) patents are directed to coating compositions and coated optical fibers that exhibit "reduced attenuation," that is, they attempt to minimize the loss of optical power as light travels down the fibers caused by the "microbending" of the fibers. (Comp'ls Claim Br. at 8; JX-0001 at 1:29-33, 2:21-23.). Microbending losses occur when small stresses are applied on the length of an optical fiber altering the optical path through microscopically small deflections in the core of the optical fiber. (Comp'ls Claim Br. at 9.). The widespread use of optical fiber would not have been feasible without the protective coatings that cover optical fiber. (*Id.* at 7.).

Coatings are applied to the fiber optic cable on "fiber optic draw towers" at speeds close to 60 mph. (*Id.*). The coatings on the optical fiber enable the optical fibers to survive testing and

[10] According to Complainants, [ ] merged to become part of the [ ], which is also a customer of DSM's. (*See* CBr. at 4 n.2.). Order No. 16 granted Respondent MUV's motion (Motion Docket No. 1031-010) to amend its invalidity contentions and to amend its response to the Complaint to add a defense based on what it described as "newly discovered information" that supported Respondent MUV's assertions that the '508 and '103 patents are: (1) invalid for failure to name the proper inventors under 35 U.S.C. § 102(f); and (2) unenforceable because of DSM's alleged inequitable conduct based upon its alleged failure to disclose the correct inventors of the referenced patents to the USPTO was granted. (*See* Order No. 16 at 8 (May 3, 2017)). Respondent MUV claimed that [ ] actually invented the Cure Dose Patents by supplying all of the requirements for testing. However, Respondent MUV failed to provide the necessary evidence to support its invalidity defense regarding improper inventorship, and accordingly, has waived that defense pursuant to Ground Rule 10.1.

the rigors of cabling and installation. (*Id.*). Fiber coatings changed from "single layer to dual layer systems." (Comp'ls Claim Br. at 7 (citing CXM-0003 at 1-2).).

As previously stated in Section IV.A, most fiber optic cable fibers have two coatings: (i) a primary coating that is soft and touches the fiber optic glass; and (ii) a secondary or outer coating, that is hard. (*See* JX-0009; *see also* Compl. at ¶¶ 21-22, 24-27; Fig. No. 2 at p. 16, *supra.*).

Figure No. 2 at p. 16 shows a cross-section of a fiber optic cable coated with both primary and secondary coatings. (*See* Comp'ls Claim Br. at 7 (citing CXM-0003 at 3).).

2. Asserted Claims of the '508 Patent

Asserted claims 1-8, 11-15, and 18-22 of the '508 patent are recited below.[11] They are product claims directed to, *inter alia*, coated optical fibers and compositions of primary coatings.

> **1.** A coated optical fiber comprising: (i) an optical fiber; (ii) a primary coating; and (iii) a secondary coating; wherein (a) said coated optical fiber has an attenuation increase of less than 0.650 dB/km at 1550 nm; (b) said primary coating has a modulus retention ratio after hydrolytic aging of at least 0.5 and/or a glass transition temperature (T_g) below -35° C.; and (c) said primary coating is obtained by curing a primary coating composition having a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2.
>
> 2. The coated optical fiber of claim 1, wherein said primary coating has an in-situ modulus of less than 0.60 MPa.
>
> 3. The coated optical fiber of claim 1, wherein said primary coating has an in-situ modulus of less than 0.56 MPa.
>
> 4. The coated optical fiber of claim 1, wherein said attenuation increase is less than 0.5 dB/km.
>
> 5. The coated optical fiber of claim 1, wherein said primary coating composition comprises an ethylenically unsaturated oligomer.

[11] Bolded patent claim numbers indicate independent claims.

6. The coated optical fiber of claim 5, wherein said oligomer is prepared by reacting the following components: (1) one or more polyisocyanates; (2) one or more polyols; and (3) one or more hydroxyfunctional (meth)acrylates.

7. The coated optical fiber of claim 6, wherein said one or more polyols includes polypropylene glycol.

8. The coated optical fiber of claim 6, wherein said one or more polyols consists essentially of polypropylene glycol.

11. The coated optical fiber of claim 6, wherein said one or more hydroxyfunctional (meth)acrylates includes hydroxyethyl acrylate.

12. The coated optical fiber of claim 1, wherein said primary coating composition comprises one or more monomers.

13. The coated optical fiber of claim 12, wherein said one or more monomers includes an alkoxylated acrylate monomer.

14. The coated optical fiber of claim 12, wherein said one or more monomers includes an alkoxylated aliphatic polyacrylate monomer.

15. The coated optical fiber of claim 1, wherein said cure dose is below 0.55 J/cm^2.

18. The coated optical fiber of claim 1, wherein said secondary coating has: (a) a T_g of at least 40° C.; (b) a secant modulus of at least 400 MPa; and (c) an elongation at break of at least 10%.

19. The coated optical fiber of claim 1, wherein said an optical fiber is an optical glass fiber.

20. An inner primary coating composition having: (a) an in-situ modulus (after cure) of less than 0.6 MPa; (b) a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2; and (c) a modulus retention ratio (after cure) of at least 0.6 after hydrolytic aging.

21. The composition of claim 20, wherein said composition comprises a radiation-curable oligomer selected from the group consisting of: (i) radiation-curable oligomers having a backbone derived from one or more polyether polyols; and (ii) radiation-curable oligomers having a backbone derived from one or more polyether polyols in combination with one or more polyester polyols.

22. An inner primary coating composition having: (i) an in-situ modulus (after cure) of less than 0.56 MPa; (ii) a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2; and (iii) a modulus

retention ratio (after cure) of at least 0.5 after hydrolytic aging.

(*Id.* at 12:2-36, 12:42-54, 12:60–14:10.).

3. Asserted Claims of the '103 Patent

Remaining asserted claims 1-10 and 13-15 of the '103 patent are recited below.[12] The asserted claims of the '103 patent are all product claims directed to inner primary coating compositions.

> **1.** An inner primary coating composition having: (a) an in-situ modulus (after cure) of less than 0.6 MPa; (b) a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2; and (c) a modulus retention ratio (after cure) of at least 0.6 after hydrolytic aging; wherein said composition comprises: (i) 20-98 wt. % relative to the total weight of the composition of a radiation curable urethane (meth)acrylate oligomer having polyether polyol backbone; (ii) 0-80% wt. % relative to the total weight of the composition of one or more reactive diluents; (iii) 0.1-20 wt. % relative to the total weight of the composition of one or more photoinitiators; and (iv) 0-5 wt. % relative to the total weight of the composition of additives.
>
> 2. The composition according to claim 1, wherein the number average molecular weight of said urethane (meth)acrylate is from about 1,200 g/mol to about 20,000 g/mol.
>
> 3. The composition according to claim 1, wherein the number average molecular weight of said urethane (meth)acrylate is from about 2,200 g/mol to about 10,000 g/mol.
>
> 4. The composition according to claim 1, wherein the number average molecular weight of said polyether polyol is from about 500 g/mol to about 15,000 g/mol.
>
> 5. The composition according to claim 1, wherein the number average molecular weight of said polyether polyol is from about 1,500 g/mol to about 6,000 g/mol.
>
> 6. The composition according to claim 5, wherein said polyether polyol is polypropylene glycol.
>
> 7. The composition according to claim 1, wherein said one or more

[12] Bolded patent claim numbers indicate independent claims.

reactive diluents are selected from the group consisting of alkoxylated alkyl substituted phenol acrylates, alkoxylated aliphatic polyacrylates, and alkoxylated bisphenol A diacrylates.

8. The composition according to claim 1, wherein said one or more reactive diluents comprise one or more aromatic rings.

9. The composition according to claim 1, wherein said one or more photoinitiators contain a phosphorous, sulfur or nitrogen atom.

10. The composition according to claim 1, wherein said one of said additives is a silane coupling agent.

13. The composition according to claim 1, wherein said composition has an in-situ modulus (after cure) of less than 0.56 MPa.

14. The composition according to claim 1, wherein said composition has an in-situ modulus (after cure) of less than 0.54 MPa.

15. The composition according to claim 1, wherein said composition has an in-situ modulus (after cure) of less than 0.52 MPa.

(*Id.* at 13:64–14:13, 14:27-34.).

C. The Cavitation Patent: U.S. Patent No. 7,706,659 ("the '659 Patent")

1. Overview of the Cavitation Patent

The '659 patent, titled "Coated Optical Fibers," was filed on November 9, 2005, as U.S. Patent Application Serial No. 11/269,765 ("the '765 application"). (JX-0004 at (21), (22), (54).). The '765 application issued as the '659 patent on April 27, 2010, and names Markus J. H. Bulters, Gerrit Rekers, Philippe W. P. V. Bleiman, Jozef M. H. Linsen, Alexander A. M. Stroeks, Johannes A. van Eekelen, Adrianus G.M. Abel, Marko Dorschu, and Paulus A. M. Steeman as the inventors. (*Id.* at (10), (45), (75).). The '765 application is a continuation of U.S. Patent Application Serial No. 09/989,703 ("the '703 application"),[13] filed November 21, 2001, which is

[13] The '703 application issued as the '564 patent, which Complainants terminated from this Investigation. (*See* Order No. 50 (Aug. 25, 2017).).

a continuation-in-part of U.S. Patent Application Serial No. 09/717,377 ("the '377 application"),[14] filed November 22, 2000. (*Id.* at (63).).

Complainant DSM IP Assets is the assignee of the '659 patent. (Compl. at ¶ 34; *see also id.* at Ex. 8.). Complainant DSM Desotech, Inc. is the exclusive licensee of the '659 patent. (Compl. ¶ 34; *see id.* at Ex. 9.).

The '659 patent relates generally to optical fiber coatings that display increased resistance to formation defects, or cavitations, in the coatings. Cavitations, as they are magnified, appear to be like "worms," and are reflected, as magnified, in Figure No. 14 (Section IX.E.5). Cavitations degrade the fiber optic coatings, which then can result in the loss of signals during transmission through the optical fibers. (Compl. at ¶ 37.). "Soft" optical fiber coatings typically provide better protection to optical fibers, but they decrease the strength of the coating. (*Id.*). "When the strength of the optical coating is compromised, the optical fiber coatings become very fragile and can result in the formation of defects in the coating during processing or use of the coated optical fibers." (*Id.*).

The Cavitation Patent identifies the problem with defects and then was drafted to provide a chemical coating solution as well as physical testing that identifies coating that would be resistant to developing cavitations and that would exhibit beneficial properties such as increased strength and pliability.

2. Asserted Claims of the '659 Patent

Remaining asserted claims 1-3, 9, 12, 16-18, 21, and 30 of the '659 patent are recited

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[14] The '377 application was abandoned for the patent applicants' failure to respond to an office action.

below.[15] They are product claims directed to, *inter alia*, primary coatings and primary coating compositions.

> **1.** Primary coating composition when cured having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less, a storage modulus at 23° C. (E'_{23}) and a cavitation strength at which a tenth cavitation appears (σ^{10}_{cav}) of at least about 1.0 MPa as measured at a deformation rate of 0.20 min^{-1}, said cavitation strength being at least about 1.4 times said storage modulus at 23° C.
>
> 2. Primary coating composition according to claim 1, wherein the cavitation strength σ^{10}_{cav} is at least about 1.5 times the storage modulus at 23° C.
>
> 3. Primary coating composition according to claim 1, wherein the cavitation strength σ^{10}_{cav} is at least about 1.1 MPa.
>
> 9. Primary coating having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less according to claim 1, wherein said coating has a strain energy release rate Go of at least about 20 J/m^2 as measured at a rate of about 1.10^{-5} s^{-1} or less.
>
> **12.** Primary coating having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less and a calculated volumetric thermal expansion coefficient α_{23} of about $6.85x10^{-4}$ K^{-1} or less.
>
> **16.** Primary coating composition when cured having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less, a storage modulus at 23° C. (E'_{23}) and a cavitation strength at which a tenth cavitation appears (σ^{10}_{cav}) of at least about 1.0 MPa as measured at a deformation rate of 0.20 min^{-1}, said cavitation strength being at least about 1.4 times said storage modulus at 23° C., wherein said primary coating composition comprises: (a) 20-98% by wt. of at least one oligomer having a molecular weight of about 1000 or higher; (b) 0-80% by wt. of one or more reactive diluents; (c) 0.1-20% by wt. of one or more photoinitiators; and (d) 0-5% by wt. of additives.
>
> 17. Primary coating composition according to claim 16, wherein the cavitation strength σ^{10}_{cav} is at least about 1.5 times the storage modulus at 23° C.

[15] Bolded patent claim numbers indicate independent claims.

18. Primary coating composition according to claim 16, wherein the cavitation strength σ^{10}_{cav} is at least about 1.1 MPa.

21. Primary coating having an equilibrium modulus of about 1.2 MPa or less according to claim 16, wherein said coating has a strain energy release rate G_o of at least about 20 J/m^2 as measured at a rate of about 1.10^{-5} s^{-1} or less.

30. Primary coating having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less and a calculated volumetric thermal expansion coefficient α_{23} of $6.85x10^{-4}$ K^{-1} or less, wherein said primary coating is obtained by curing a composition comprising: (a) 20-98% by wt. of at least one oligomer having a molecular weight of 1000 or higher; (b) 0-80% by wt. of one or more reactive diluents; (c) 0.1-20% by wt. of one or more photoinitiators; and (d) 0-5% by wt. of additives.

(JX-0004 at 27:25-37, 28:18-22, 28:30-33, 28:44-50, 28:58-63, 29:4-7, 30:32-41.).

V. THE PRODUCTS AT ISSUE.

A. Respondents' Accused Products

1. Respondent MUV's Accused Fiber Optic Coatings

Complainants accused Respondent MUV's primary coating products [ ][16] and [ ][17] (collectively, "Accused MUV Coatings") of infringing the following claims of the '508, '103, and '659 patents. (*See, e.g.*, CBr. at 11-12.).

Chart No. 3: Accused MUV Coatings

Accused MUV Coatings	'508 Patent	'103 Patent	'659 Patent
MUV's [ ] Coating	20-22	1-10, 13-15	1-5, 9, 12, 16-21, 30

[16] [ ]

[17] [ ]

Accused MUV Coatings	'508 Patent	'103 Patent	'659 Patent
MUV's [ ] Coating			1-5, 9, 16-21, 30

(*Id.*).

2. Respondent OFS' Accused Coated Optical Fibers

Complainants accused all models of Respondent OFS' single-mode and multi-mode coated optical fibers[18] that are manufactured using Respondent MUV's [ ] primary coating composition ("Accused OFS Fibers"), of infringing the following claims of the '508, '103, and '659 patents. (CPBr. at 10-12; ROPBr. at 1-2; *see also* Tr. (Oliviero) at 1428:2-4 ("Q: Do all of OFS's current optical fiber offerings use the Momentive [ ] coating? A: Yes, yes, to the best of my knowledge."). Complainants also accused Respondent OFS' single-mode coated optical fibers ("Accused OFS Single-Mode Fibers") of infringing the following claims of the '508 patent. (CPBr. at 10-12; ROPBr. at 1-2; *see also* Tr. (Oliviero) at 1428:2-4.).

Chart No. 4: Accused OFS Fibers

Accused OFS Fibers	'508 Patent	'103 Patent	'659 Patent
OFS' Coated Optical Fibers	20-22	1-10, 13-15	1-5, 9, 12, 16-21, 30
OFS' Single-Mode Coated Optical Fibers	1-8, 11-15, 18-19		

(CPBr. at 10-12.).

A list of the different brands and models of coated optical fiber that are manufactured and

[18] Single-mode fibers are of narrower fiber dimension and transmit light in just one "mode." (CPBr. at 11; CX-0192.). Multi-mode fibers are thicker and can transmit light in several "modes." (CPBr. at 11; CX-0193.). Different fibers are appropriate for different applications. (CPBr. at 11.).

sold by Respondent OFS and accused of infringement in this investigation is attached to this ID as Appendix B.

B. Complainants' DI Products

Complainants manufacture and sell optical fiber coatings under the brand name "DeSolite." (Compl. at ¶ 12.). Complainants alleged that the DP-1017/[ ],[19] DP-1032, DCP-0041, and DP-1014XS products practice the following claims of the '508, '103, and '659 patents. (CBr. at 13-14.).

Chart No. 5: DI Coatings

DI Coatings	'508 Patent	'103 Patent	'659 Patent
DSM's DP-1017/[ ] Coating	20-22	1, 2, 4-10, 13-15	1-5, 9, 13, 16-22
DSM's DP-1032 Coating	20-22	1-10, 13-15	1-5, 9,12, 16-21, 30
DSM's DP-0041 Coating			1-5, 9, 12, 13, 16, 22
DSM's DP-1014XS Coating			1-5, 9, 12, 16-21, 30

(*Id.*).

VI. THE ASSERTED PATENTS

A. Level of Ordinary Skill in the Art

1. Relevant Law

The relevant time for assessing the level of ordinary skill in the art is the effective filing date of the patent. *Phillips v, AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc) ("We

[19] [ ]

have made clear, moreover, that the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.")

Factors to consider in determining the level of ordinary skill in the art include: (1) the educational level of the inventor; (2) the type of problems encountered in the art; (3) the prior art solutions to those problems; (4) the rapidity with which innovations are made; (5) the sophistication of the technology; and (6) the educational level of active workers in the field. *See Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696 (Fed. Cir. 1983). "These factors are not exhaustive but are merely a guide to determining the level of ordinary skill in the art." *Daiichi Sankyo Co., Ltd. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007).

2. Definition of Person of Ordinary Skill in the Art

It was determined that a person of ordinary skill in the art, for the relevant timeframe of the Asserted Patents, would have had at least a B.S. in Chemistry, Chemical Engineering, Materials Science or a related field, approximately three to five years of postgraduate experience, including some experience in one or more of photopolymerization reactions, molecular synthesis, polymer characterization, polymer chemistry, and optical fibers. (*Markman* Order at 13-15.). This definition applies to the Cure Dose and Cavitation Patents.

B. Claim Construction[20]

1. Relevant Law

Claim construction begins with the plain language of the claims themselves. Claims should be given their ordinary and customary meaning as understood by a person of ordinary

[20] The claim constructions for the agreed upon and disputed claim terms are listed in Sections VIII.B and IX.B, *infra*.

skill in the art, viewing the claim terms in the context of the entire patent. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005), *cert. denied*, 546 U.S. 1170 (2006). In some cases, the plain and ordinary meaning of the claim language is readily apparent and claim construction will involve little more that "the application of the widely accepted meaning of commonly understood words." *Id.* at 1314. In other cases, claim terms have a specialized meaning and it is necessary to determine what a person of ordinary skill in the art would have understood the disputed claim language to mean by analyzing "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, as well as the meaning of technical terms, and the state of the art." *Id.* (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)).

The claims themselves provide substantial guidance as to the meaning of disputed claim language. *Id.* "[T]he context in which a term is used in the asserted claim can be highly instructive." *Id.* Likewise, other claims of the patent at issue, "both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term." *Id.* (citation omitted).

With respect to claim preambles, a preamble may limit a claimed invention if it: (i) recites essential structure or steps; or (ii) is "necessary to give life, meaning, and vitality" to the claim. *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003) (citations omitted). The Federal Circuit has explained that a "claim preamble has the import that the claim as a whole suggests for it. In other words, when the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects." *Id.* (quoting *Bell Commc'ns*

Research, Inc. v. Vitalink Commc'ns Corp., 55 F.3d 615, 620 (Fed. Cir. 1995)). When used in a patent preamble, the term "comprising" is well understood to mean "including but not limited to," and thus, the claim is open-ended. *CIAS, Inc. v. Alliance Gaming Corp.*, 504 F.3d 1356, 1360 (Fed. Cir. 2007). The patent term "comprising" permits the inclusion of other unrecited steps, elements, or materials in addition to those elements or components specified in the claims. *Id.*

In cases where the meaning of a disputed claim term in the context of the patent's claims remains uncertain, the specification is the "single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1321. Moreover, "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Id.* at 1316. As a general rule, however, the particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Id.* at 1323.

The prosecution history may also explain the meaning of claim language, although "it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Id.* at 1317. The prosecution history consists of the complete record of the patent examination proceedings before the U.S. Patent and Trademark Office ("USPTO"), including cited prior art. *Id.* It may reveal "how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.*

If the intrinsic evidence is insufficient to establish the clear meaning of a claim, a court

may resort to an examination of the extrinsic evidence.[21] *Zodiac Pool Care, Inc. v. Hoffinger Indus., Inc.*, 206 F.3d 1408, 1414 (Fed. Cir. 2000). Extrinsic evidence may shed light on the relevant art, and "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Phillips*, 415 F.3d at 1317. In evaluating expert testimony, a court should disregard any expert testimony that is conclusory or "clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent." *Id.* at 1318. Expert testimony is only of assistance if, with respect to the disputed claim language, it identifies what the accepted meaning in the field would be to one skilled in the art. *Symantec Corp. v. Comput. Assocs. Int'l, Inc.*, 522 F.3d 1279, 1289 n.3., 1290-91 (Fed. Cir. 2008). Testimony that recites how each expert would construe the term should be accorded little or no weight. *Id.* Extrinsic evidence is inherently "less reliable" than intrinsic evidence, and "is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence." *Phillips*, 415 F.3d at 1318-19.

VII. LEGAL STANDARDS

A. Infringement

1. Direct Infringement

"Determination of infringement is a two-step process which consists of determining the scope of the asserted claim (claim construction) and then comparing the accused product . . . to the claim as construed." *Certain Sucralose, Sweeteners Containing Sucralose, and Related Intermediate Compounds Thereof*, Inv. No. 337-TA-604, Comm'n Opinion at 36 (U.S.I.T.C.,

[21] "In those cases where the public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996).

April 28, 2009) (citing *Litton Sys., Inc. v. Honeywell, Inc.*, 140 F.3d 1449, 1454 (Fed. Cir. 1998)).

An accused device literally infringes a patent claim if it contains each limitation recited in the claim exactly. *Litton*, 140 F.3d at 1454. Each patent claim element or limitation is considered material and essential. *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed. Cir. 1991). In a Section 337 investigation, the complainant bears the burden of proving infringement of the asserted patent claims by a preponderance of the evidence. *Enercon GmbH v. Int'l Trade Comm'n,* 151 F.3d 1376, 1384 (Fed. Cir. 1998). If any claim limitation is absent, there is no literal infringement of that claim as a matter of law. *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000).

2. Indirect Infringement

a) Induced Infringement

"Whoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b). A patentee asserting a claim of inducement must show (i) that there has been direct infringement[22] and (ii) that the alleged infringer "knowingly induced infringement and possessed specific intent to encourage another's infringement." *Minnesota Mining & Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1304-05 (Fed. Cir. 2002). With respect to the direct infringement requirement, the patentee "must either point to specific instances of direct infringement or show that the accused device necessarily infringes the patent in suit." *ACCO Brands, Inc. v. ABA Locks Mfrs. Co., Ltd.*, 501 F.3d 1307, 1313 (Fed. Cir. 2007) (citation omitted). This requirement may be shown by circumstantial evidence. *Vita-Mix Corp. v. Basic Holding, Inc.*, 581 F.3d

[22] *See also Limelight Networks, Inc. v. Akamai Technologies, Inc.*, 134 S.Ct. 2111, 2117 (2014).

1317, 1326 (Fed. Cir. 2009). "[A] finding of infringement can rest on as little as one instance of the claimed method being performed during the pertinent time period." *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1317 (Fed. Cir. 2009).

The specific intent requirement for inducement necessitates a showing that the alleged infringer was aware of the patent, induced direct infringement, and that he knew that his actions would induce actual direct infringement. *Commil USA, LLC v. Cisco Systems, Inc.*, 720 F.3d 1361, 1367 (Fed. Cir. 2013), *aff'd and vacated in-part on other grounds*, 135 S.Ct. 1920, 1926-28 (2015); *Global-Tech Appliances, Inc. v. SEB S.A.*, 131 S.Ct. 2060, 2068-70 (2011) (holding that willful blindness may be sufficient to meet specific intent requirement). Willful blindness, which will also constitute such "knowledge," has two basic requirements: "(1) the defendant must subjectively believe that there is a high probability that a fact exists"; and "(2) the defendant must take deliberate actions to avoid learning of that fact." *Global-Tech*, 131 S.Ct. at 2070. The intent to induce infringement may be proven with circumstantial or direct evidence and may be inferred from all the circumstances. *Commil*, 720 F.3d at 1366; *Global-Tech*, 131 S.Ct. 2071-72.

The Federal Circuit has upheld the Commission's authority to cover "goods that were used by an importer to directly infringe post-importation as a result of the seller's inducement." *Suprema Inc. v. Int'l Trade Comm'n*, 796 F.3d 1338, 1352-53 (Fed. Cir. 2015).

b) Contributory Infringement

35 U.S.C. § 271(c) sets forth the rules for contributory infringement:

> Whoever offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination, or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a

> staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer.

35 U.S.C. § 271(c). Specifically, with respect to Section 337 investigations, the Federal Circuit has held that "to prevail on contributory infringement in a Section 337 case, the complainant must show inter alia: (1) there is an act of direct infringement in violation of Section 337; (2) the accused device has no substantial non-infringing uses; and (3) the accused infringer imported, sold for importation, or sold after importation within the United States, the accused components that contributed to another's direct infringement." *Spansion, Inc. v. Int'l Trade Comm'n*, 629 F.3d 1331, 1353 (Fed. Cir. 2010). "[N]on-infringing uses are substantial when they are not unusual, far-fetched, illusory, impractical, occasional, aberrant, or experimental." *Vita-Mix*, 581 F.3d at 1327. To determine whether a use is substantial, an Administrative Law Judge may evaluate "the use's frequency, . . . the use's practicality, the invention's intended purpose, and the intended market." *i4i Ltd. Partnership v. Microsoft Corp.*, 598 F.3d 831, 851 (Fed. Cir. 2010). Section 271(c) also requires knowledge of the existence of the patent that is infringed. *Global-Tech*, 131 S.Ct. at 2068.

To satisfy contributory infringement's knowledge requirement, it is necessary to establish that "the accused contributory infringer knows that its component is included in a combination that is patented and infringing." This requires knowledge of the patent. *Global-Tech Appliances*, 131 S.Ct. at 2068. In addition, the Federal Circuit has held that it is not sufficient to know of the patent and the relevant acts, but must also know that "these acts constituted infringement." *Fujitsu Ltd. v. LG Elecs.*, 620 F.3d 1321, 1320 (Fed. Cir. 2010). For purposes of contributory infringement, such knowledge is inferred where the article at issue has no substantial non-infringing uses. *See Certain Semiconductor Chips with Minimized Chip Package*

Size and Prods. Containing Same, Inv. No. 337-TA-605, 2009 WL 8144934, at *28, Comm'n Determination (June 3, 2009).

Where infringement allegations address a "separate and distinct" feature of a product, the contributory infringement analysis (for example, with respect to the existence of non-infringing uses) may address the particular feature in question rather than the product as a whole. *See i4i Partnership v. Microsoft Corp.*, 598 F.3d 831, 849 (Fed. Cir. 2010); *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1320-21 (Fed. Cir. 2009); *Ricoh Co. Ltd. v. Quanta Comput. Inc.*, 550 F.3d 1325, 1338 (Fed. Cir. 2008).

B. Validity

Patent claims are presumed valid. 35 U.S.C. § 282. A respondent that has raised patent invalidity as an affirmative defense must overcome the presumption by "clear and convincing" evidence of invalidity. *Checkpoint Sys., Inc. v. U.S. Int'l Trade Comm'n*, 54 F.3d 756, 761 (Fed. Cir. 1995). Further, as stated by the Federal Circuit in *Ultra-Tex Surfaces, Inc. v. Hill Brothers Chemical Co.*:

> when a party alleges that a claim is invalid based on ***the very same references*** that were before the examiner when the claim was allowed, that party assumes the following additional burden:
>
> When no prior art other than that which was considered by the PTO examiner is relied on by the attacker, he has the added burden[23] of overcoming the deference that is due to a qualified government agency presumed to have properly done its job, which includes one or more examiners who are assumed to have some expertise in interpreting the references and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents.

Ultra-Tex Surfaces, Inc. v. Hill Bros. Chem. Co., 204 F.3d 1360, 1367 (Fed. Cir. 2000)

[23] This is not an added burden of proof but instead goes to the weight of the evidence. *Sciele Pharma v. Lupin Ltd.*, 684 F.3d 1253, 1260-61 (Fed. Cir. 2012). New evidence not considered by the USPTO may carry more weight than evidence previously considered by the USPTO. (*Id.*).

(emphasis added) (quoting *Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir. 1984)).

1. Anticipation

A determination that a patent is invalid as being anticipated under 35 U.S.C. § 102 requires a finding, based upon clear and convincing evidence, that each and every limitation is found either expressly or inherently in a single prior art reference. *See, e.g.*, *Celeritas Techs. Inc. v. Rockwell Int'l Corp.*, 150 F.3d 1354, 1361 (Fed. Cir. 1998). Anticipation is a question of fact, including whether a limitation, or element, is inherent in the prior art. *In re Gleave*, 560 F.3d 1331, 1334-35 (Fed. Cir. 2009). The limitations must be arranged or combined the same way as in the claimed invention, although an identity of terminology is not required. *Id.* at 1334 (noting that "the reference need not satisfy an *ipsissimis verbis* test"); MPEP § 2131.

In addition, the prior art reference's disclosure must enable one of ordinary skill in the art to practice the claimed invention "without undue experimentation." *Gleave*, 560 F.3d at 1334-35. A prior art reference that allegedly anticipates the claims of a patent is presumed enabled; however, a patentee may present evidence of nonenablement to overcome this presumption. *Impax Labs., Inc. v. Aventis Pharms. Inc.*, 468 F.3d 1366, 1382 (Fed. Cir. 2006). "[W]hether a prior art reference is enabling is a question of law based upon underlying factual findings." *Gleave*, 560 F.3d at 1335.

2. Derivation

Under 35 U.S.C. § 102(f), a person is not entitled to a patent if he derived conception of the invention from any other source or person. 35 U.S.C. § 102(f); *Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372, 1381 (Fed. Cir. 2000). In order to prove derivation, "'the party asserting invalidity must prove both prior conception of the invention by another and communication of

that conception to the patentee' by clear and convincing evidence." *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1344 (Fed. Cir. 2003) (citing *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1576 (Fed. Cir. 1997)). Furthermore, "[t]he communication [of the prior conception] must be sufficient to enable one of ordinary skill in the art to make the patented invention." *Id.*; *see also Hedgewick v. Akers*, 497 F.2d 905, 908 (C.C.P.A. 1974) (mere proof that a defendant had access to a third-party's invention is insufficient to prove derivation).

3. Written Description and Enablement

The first paragraph of Section 112 says: "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same. . . ." 35 U.S.C. § 112. "[T]his statutory language mandates satisfaction of two separate and independent requirements: an applicant must both describe the claimed invention adequately and enable its reproduction and use." *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003) (citing *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991)).

To comply with the written description requirement, a patent applicant must "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the [claimed] invention." *Vas-Cath*, 935 F.2d at 1563-64 (emphasis omitted). "The form and presentation of the description can vary with the nature of the invention[.]" *In re Skvorecz*, 580 F.3d 1262, 1269 (Fed. Cir. 2009). "[T]he applicant [for a patent] may employ 'such descriptive means as words, structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention.'" *Id.* (citing *In re Alton*, 76 F.3d 1168, 1172 (Fed. Cir. 1996)). The adequacy of the description depends on content, rather than length. *In re Hayes Microcomputer*

Prods., Inc. Patent Litigation, 982 F.2d 1527, 1534 (Fed. Cir. 1992). "Specifically, the level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1352 (Fed. Cir. 2010) (en banc).

Compliance with the written description requirement is a question of fact, and in order to overcome the presumption of validity, a party must set forth clear and convincing evidence. *Centocor Ortho Biotech, Inc. v. Abbott Labs.*, 636 F.3d 1341, 1347 (Fed. Cir. 2011). The Federal Circuit has also held with respect to the written description requirement that "[a] claim will not be invalidated on section 112 grounds simply because the embodiments of the specification do not contain examples explicitly covering the full scope of the claim language." *Falko-Gunter Falkner v. Inglis*, 448 F.3d 1357, 1366 (Fed. Cir. 2006) (quoting *LizardTech, Inc. v. Earth Resource Mapping, PTY, Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005).).

To comply with the enablement requirement, the Federal Circuit has set forth the following:

> Enablement is determined as of the effective filing date of the patent's application. To be enabling, the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.' Whether undue experimentation would have been required to make and use an invention, and thus whether a disclosure is enabling under 35 U.S.C. § 112, ¶ 1, is a question of law that we review de novo, based on underlying factual inquiries that we review for clear error. Because patents are presumed valid, lack of enablement must be proven by clear and convincing evidence.

ALZA Corp. v. Andrx Pharms., LLC, 603 F.3d 935, 940 (Fed. Cir. 2010) (internal citations and quotations omitted). Factors that should be considered with respect to this inquiry into whether a disclosure requires undue experimentation ("*Wands* factors") are as follows:

(1) the quantity of experimentation necessary, (2) the amount of direction or

> guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

Id. (citing *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988)).

4. Indefiniteness

A patent specification must "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as [the] invention." 35 U.S.C. § 112, ¶ 2. In 2014, the Federal Circuit had held that a patent claim is not indefinite "so long as the claim is amenable to construction, and the claim, as construed, is not insolubly ambiguous." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). The U.S. Supreme Court subsequently determined that this standard lacks precision. *Id.* at 2130. Instead, the Supreme Court held:

> we read § 112, ¶ 2 to require that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty. The definiteness requirement, so understood, mandates clarity, while recognizing that absolute precision is unattainable. The standard we adopt accords with opinions of this Court stating that "the certainty which the law requires in patents is not greater than is reasonable, having regard to their subject-matter."

Id. at 2129 (citations omitted). To date, no Federal Circuit opinion has issued to provide more guidance.[24] A party seeking to invalidate a patent claim must do so by clear and convincing evidence. *See, e.g., Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1327 (Fed. Cir. 2008) (citing *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1375 (Fed.Cir.1986)).

[24] The Federal Circuit in *Augme Technologies, Inc. v. Yahoo! Inc.*, 755 F.3d 1326, *11 (Fed. Cir. 2014) repeats the new standard without elaboration.

VIII. THE CURE DOSE PATENTS

A. Infringement Overview of Respondent MUV's Accused Coating and Respondent OFS' Accused Fibers

Complainants have accused Respondent MUV'S [ ] coating and Respondent OFS' single-mode and multi-mode coated optical fibers ("Accused OFS Fibers"), which Respondent OFS manufactures and sells with the [ ] coating, of directly infringing claims 20, 21, and 22 of the '508 patent and claims 1-10 and 13-15 of the '103 patent. (CBr. at 12.). Each of these claims is directed to an "inner primary coating composition." (JX-0001 at 13:1–14:10; JX-0003 at 13:17–14:13, 14:20-39.).

In addition, Complainants have accused Respondent OFS' single-mode coated optical fiber products ("Accused OFS Single-Mode Fibers"), which Respondent OFS also manufactures and sells with the [ ] coating, of directly infringing claims 1-8, 11-15, and 18-19 of the '508 patent. (CBr. at 12.). Each of these claims is directed to a "coated optical fiber." (JX-0001 at 12:2-36, 12:43-55, 12:60-67.).

As discussed in greater detail below, Complainants have met their burden and proven by a preponderance of evidence that the [ ] coating includes each and every claim limitation recited in claims 20, 21, and 22 of the '508 patent and claims 1-10 and 13-15 of the '103 patent and infringes these claims. Additionally, Complainants have proven that the two (2) Accused OFS Single-Mode Fibers that Complainants tested, AllWave®+ Zero Water Peak (ZWP) Single-Mode Optical Fiber and AllWave® FLEX+ Zero Water Peak (ZWP) ("Tested OFS Single-Mode Fibers"), include each and every claim limitation recited in claims 1-8, 11-15, and 18-19 of the '508 patent, and infringe these claims.

However, the evidence does not establish that the Tested OFS Single-Mode Fibers are

representative of all of the Accused OFS Single-Mode Fibers. (*See* App. B (list of all Accused OFS Single-Mode Fibers).). Thus, Complainants failed to show by a preponderance of evidence that the Accused OFS Single-Mode Fiber, other than the Tested OFS Single-Mode Fibers, infringe claims 1-8, 11-15, and 18-19 of the '508 patent.

Moreover, because Respondents have proven by clear and convincing evidence that claims 1-8, 11-15, 18-20, and 22 of the '508 patent are invalid, Respondent MUV's [ ] coatings cannot, by operation of law, directly infringe these claims. *See, e.g., Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920, 1929 (2015) ("[A]n act that would have been an infringement or an inducement to infringe pertains to a patent that is shown to be invalid, there is no patent to be infringed . . . . Invalidity is an affirmative defense that 'can preclude enforcement of a patent against otherwise infringing conduct.'"); *ePlus, Inc. v. Lawson Software, Inc.*, 790 F.3d 1307, 1309 (Fed. Cir. 2015) ("[I]f the patent is indeed invalid, and shown to be so under proper procedures, there is no liability.") (quoting *Commil*, 135 S. Ct. at 1929)).

Complainants also failed to show by a preponderance of evidence that Respondent MUV indirectly infringes, by way of inducing infringement or contributing to infringement, claims 1-8, 11-5, and 18-19 of the '508 patent. *Minnesota Mining*, 303 F.3d at 1304-05 (a finding of inducement requires, *inter alia*, a showing of direct infringement); *Spansion*, 629 F.3d at 1353 (contributory infringement requires, *inter alia*, direct infringement).

In addition, Complainants failed to show by a preponderance of evidence that the Accused OFS Fibers infringe claims 20, 21, and 22 of the '508 patent and claims 1-10 and 13-15 of the '103 patent because these fibers do not have "an inner primary coating composition."

B. Relevant Claim Terms

The following constructions of the claim terms recited in the asserted claims of the '508 and '103 patents have been agreed upon by the Parties or adopted by this Court.

Chart No. 6: Constructions of Claim Terms Relevant to the Cure Dose Patents

Claim Term	Construction
"coated optical fiber" (claims 1-8, 10-15, and 18-19 of the '508 patent)	Fiber through which light signals are transmitted on which at least one curable coating composition has been applied and cured. (*Markman* Order, App. A at 43)
"primary coating" (claim 1 of the '508 patent; claims 1-3, 9, 12, 16-18, 21)	A cured coating in direct contact with an optical fiber. (*Id.* at 44)
"secondary coating" (claim 1 of the '508 patent)	A cured coating surrounding the primary coating. (*Id.*)
"reactive diluents" (claims 1 and 8 of the '103 patent)	Polymerizable vinyl or acrylate monomers. (*Id.*)
"cure dose to attain 95% of the maximum attainable modulus" (claims 1, 20, and 22 of the '508 patent; claim 1 of the '103 patent)	The dose at which 95% of the maximum attainable secant modulus of a coating composition is attained, determined using dose vs. modulus curve analysis. (*Markman* Order at 1-2.).
"modulus retention ratio after hydrolytic aging; modulus retention ratio (after cure) of at least [stated value] after hydrolytic aging" (claims 1, 20, and 22 of the '508 patent; claim 1 of the '103 patent)	Ratio of the equilibrium modulus after aging for 8 weeks at 85° C and at 85% relative humidity to the initial equilibrium modulus after cure. (*Id.* at 5-6.).
"in-situ modulus" (claims 2, 3, 20, and 22 of the '508 patent; claims 1, 13-15 of the '103 patent)	The modulus of the coating after it has been cured on the optical fiber, corrected for stretch of the glass and thickness of the coating. (*Id.* at 7.).

Claim Term	Construction
"optical fiber" (claims 1-8, 10-15, and 18-19 of the '508 patent)	Fiber through which light signals are transmitted. (*Id.* at 10.).
"primary coating composition" (claims 20 and 22 of the '508 patent; claim 1 of the '103 patent)	A curable primary coating composition that has not been applied to an optical fiber. (*Id.* at 11-12.).
"glass transition temperature (T_g)" (claims 1 and 18 of the '508 patent)	The temperature at which a material transitions from its rubbery state to its glassy state. (*Id.* at 15.).
"secant modulus" (claim 18 of the '508 patent)	The slope of a line drawn from the origin to a point on the stress-strain curve. (*Id.* at 18.).
"elongation at break" (claim 18 of the '508 patent)	Ratio between the changed length and the initial length at breakage of a test specimen. (*Id.* at 22.).
"oligomer" (plural or singular) (claims 5, 6, 21 of the '508 patent; claim 1 of the '103 patent)	Molecules composed of repeating structural units, wherein the molecules must include acrylate or methacrylate. (*Id.* at 23-24.).

C. Summary of Complainants' Testing Procedures

The issues of infringement and the technical prong of the domestic industry with regard to the Cure Dose Patents involve measurements of physical properties that were performed in order to determine if the various accused and DI products meet the limitations of the claims. The testing procedures are central to the issues disputed between the Parties.

In their Pre- and Post-Hearing Briefs, the Parties disputed the legitimacy of testing methods used to establish or rebut the presence of the following four (4) claim limitations: (i) "cure dose to attain 95% of the maximum attainable modulus"; (ii) "modulus retention ratio after hydrolytic aging"; (iii) "in-situ modulus"; and (iv) attenuation increase of less than 0.650 dB/km

at 1550 nm."

As discussed in greater detail below, Complainants provided sufficient evidence that their testing procedures were consistent with the relevant disclosures in the specification of the Cure Dose Patents, and that the results of their testing are reliable.

In contrast, the evidence shows that Respondents did not perform their testing in accordance with the procedures explained in the Cure Dose Patents, and that their ensuing results present serious questions with respect to the accuracy of their measurements.

1. "Cure dose to attain 95% of the maximum attainable modulus"

Claims 1, 20, and 22 of the '508 patent, and claim 1 of the '103 patent, all recite a primary coating composition having "a cure dose to attain 95% of its maximum attainable modulus." The '508 and '103 patents disclose the following test method for determining the cure dose of certain compositions described in the patent specifications. (JX-0001 at 7:51-53; JX-0003 at 9:23-25.).[25]

> [Six] radiation-cured sample films of each composition were prepared, with each sample film being obtained by applying an approximately 75 microns thick composition layer on a plate and subsequently curing the composition layer. Each composition layer was cured with a different dose: 0.2, 0.3, 0.5, 0.75, 1.0, and 2.0 J/cm^2 respectively. Six specimens were cut from the center portion of each prepared sample film. A Universal Testing Instrument, INSTRON Model 4201 equipped with a suitable personal computer and software "Series IX Materials Testing System" was used to measure the modulus of each specimen. The modulus measurements were then entered into the software package and the calculations were automatically performed with a determination of the average modulus for each film sample. The dose-modulus curve was then created by plotting the modulus values vs. the dose and by fitting a curve through the data points. The "cure dose" of the coating composition was determined to be the dose at which 95% of the ultimate secant modulus is attained.

[25] The '508 and '103 patents share the same specification.

(JX-0001 at 7:51–8:52; JX-0003 at 9:23-44.).

Ms. Loretta Lawrence,[26] Complainants' employee who performed the cure dose testing on the accused and DI coatings, testified that she "first reviewed the ['508] patent," "followed the ['508] patent," and then followed certain "internal procedures." (Tr. (Lawrence) at 368:8-12, 368:17-18.). In explicit detail, Ms. Lawrence explained the four (4) steps she carried out to conduct the testing, which entailed: (i) "draw[ing] the liquid film on a glass plate"; (ii) "cur[ing] the liquid film"; (iii) "prep[ping] the cured film"; and (iv) "run[ning] the cured film on the tensile machine." (*Id.* at 369:12-15.).

> Q: Okay. So let's walk through each of those steps. So in that first step, can you explain how you did the sample drawdown?
>
> A: Sure. We obtain a glass plate. We put it on what we call the -- what the official title is a byko-drive drawdown machine. We place a Bird bar on top of the plate in front of a drive bar that's on top. And then apply the liquid film and draw down an even film.
>
> Q: What is a Bird bar?
>
> A: A Bird bar is a piece of equipment used in the industry to draw down an even layer of film. It's got a small gap on the bottom that applies an approximate thickness for what you're looking for.
>
> * * *
>
> Q: Now, after the sample drawdown is done, what do you do next?
>
> A: We prepare the sample for cure on the UV fusion unit or UV processor. So we go set the belt speed on the UV processor to the dose that you're required, for example 0.2 joules. We validate that we have the correct dose using a radiometer,

[26] When she testified during the evidentiary hearing on August 1, 2017, Ms. Loretta Lawrence was a Senior Laboratory Specialist as well as the Site Safety and Security Officer at DSM in Elgin, Illinois. (Tr. (Lawrence) at 366:22–367:2; CPSt. at 3.). Ms. Lawrence's primary lab role was to perform tensile testing. (Tr. (Lawrence) at 367:17-19.). For this Investigation, she was asked to perform dose cure and MRR testing for Complainants' DI coatings, DP-1017 and DP-1032, and the accused PHY3 and PHY4 coatings. (*Id.* at 368:8-12.). Ms. Lawrence was called to testify about matters related to testing of the DI and accused coatings. (CPSt. at 3-4.).

we repeat that three times to make sure we have the correct dose dialed in.

* * *

Q: And then after the sample is cured, what do you do next?

A: I wrap all the plates -- repeat it for all the other doses, and then I wrap them with aluminum foil and place them into our temperature and humidity controlled room.

Q: And then what happens next?

A: And then I prep the cured films.

Q: And once the -- how do you prep the cured films?

A: Well, according to the patent, we prepped eight strips off of each plate. So, for example, I'll use the .2 joules. I cut eight strips perpendicular to the – along the long length of the draw. They are 5 inches long and half-inch wide.

Q: And do you measure the thickness of these films?

A: Yes, I do, with a micrometer.

* * *

Q: Now, what happens next once the thickness and the width of measurements are done?

A: And then I loaded -- I run the tensile test for the secant modulus on the tensile tester.

* * *

Q: And then what do you do with the data that is generated?

A: After I get all of -- I repeat that until I get all the doses are completed, and then I place those into the Excel spreadsheet that we have to calculate cure dose.

Q: And then is there any curve fitting that is done with those data points?

A: Yes. We call up the add-in solver that comes with Microsoft Excel, and we just hit calculate and it does it for you.

(*Id.* at 369:16–374:13.).

Complainants provided a photograph of the curing belt and bulb that was used to cure

samples of the accused and DI coatings for the cure dose test.

[ ]

[ ]

Complainants also provided a photograph of the INSTROM machine that was used to determine the modulus of each of the accused and DI coatings cured on a glass plate.

[ ]

[ ]

Complainants' expert, Dr. Christopher N. Bowman,[27] confirmed that Complainants' efforts to carry out the cure dose testing "were extremely appropriate" and that the data generated from the testing was "well-conceived and well-implemented." (Tr. (Bowman) at 445:8-20, 446:10-15 ("I think that [Complainants'] efforts and the curve fit that they chose to use were extremely appropriate. And I have confidence in the data that they have produced, that it was done correctly, the thickness was correct, they systematically varied the doses that were used according to the patent, measured the modulus, had very good data analysis in terms of standard

[27] When he testified during the evidentiary hearing on August 1, 2017, Dr. Christopher N. Bowman was a Distinguished Professor and the James and Catherine Patten Endowed Chair of Chemical and Biological Engineering at the University of Colorado. (CPst. at Ex. A; Tr. (Bowman) at 434:22–435:7.). Complainants retained Dr. Bowman as an expert witness in chemistry and materials science. (CPSt. at 1.). He provided testimony regarding, *inter alia*, the modulus retention ratio, cure dose, in-situ modulus, and all chemical composition elements related to the Cure Dose Patents. (*Id.* at 1-2.). Dr. Bowman also provided testimony with respect to the calculated volumetric thermal expansion coefficient, α_{23}, and all chemical composition elements related to the Cavitation Patent. (*Id.* at 2.).

deviations, et cetera, used the fits that were present in the literature at the time of the invention, and in the intrinsic evidence from the IPRs."); *see also id.* at 445:24–446:9 ("I think Ms. Lawrence, you know, obviously has done -- has a great deal of experience. She's extremely capable in running these experiments. She understands the importance of how to handle samples, how to measure their properties. And, in fact, her ability to measure samples with excellent repeatability has been something that's critical to getting good data in these measurements.").

Complainants obtained an average secant modulus at each cure dose from the secant modulus measurements provided by the Instron machine. (CPBr. at 16.). Complainants created dose-modulus curves by fitting the average secant modulus-cure data points to the exponential curve-fitting model, below:

$$\text{Modulus} = K1 \times [1 - e^{(K2 \times \text{dose})}]$$

(CPBr. at 16.).

After a least-squares fit, Complainants calculated the cure dose to attain 95% of the maximum attainable modulus from the following equation:

$$X_{M95\%} = - (\ln 0.05)/b + c$$

(*Id.*).

Complainants pointed out that this model was used exclusively in the Corning IPRs, by Corning and its experts, and Complainants and their experts. (CX-1115.0016-17 (Corning Expert's Decl. in IPR); CX-1117.0052-53 (Bowman Decl. in IPR).). Moreover, as Dr. Bowman testified, the exponential curve-fitting model has been repeatedly and consistently used in the prior art. (Tr. (Bowman) at 448:13–449:25; CX-1058C.0021 (WO 01/70642); CX-1092.0008 (U.S. Patent No. 5,977,202); CX-1102.0030 (WO 99/15473).).

Respondents argued, primarily through cross-examination and without testimony from their expert witnesses, that a Michaelis/Menten model should have been used instead of the exponential model to curve fit the dose vs. modulus data. (*See* ROPBr. at 14; Tr. (Satyen Sarmah)[28] at 331:23–340:7; Tr. (Classey) at 977:8–979:9.).

Mr. Jeff Classey,[29] an employee of Respondent MUV responsible for generating the curve dose curves for samples of Respondent MUV's coatings, fit the curves using the Michaelis-Menten equation because he got the "best fits . . . with the Michaelis-Menten equation." (Tr. (Classey) at 979:3-5.). However, as Complainants noted, there is no evidence of the Michaelis/Menten model being used in the prior art for this purpose, and Respondents presented no such evidence. (CBr. at 25.). Dr. Bowman testified that the Michaelis/Menten model does not properly describe the process of photopolymerization and the development of cross-linking as a function of dose, whereas the exponential model does. (Tr. (Bowman) at 450:1–452:9.). Mr. Bob Overton,[30] Respondents' expert, did not provide any opinion on which equation to use, and Mr. Classey admitted that he is not an expert on curve fitting, and did not

[28] When he testified during the evidentiary hearing on July 31, 2017 and August 1, 2017, Dr. Satyen Sarmah was Complainants' R&D Manager for the 3-D Printing Materials Development Group. (Tr. (Sarmah) at 232:5-9.). Complainants identified Dr. Sarmah as a fact witness to provide testimony about Complainants' testing that was performed on accused infringing coatings, as well as on the technical prong of the domestic industry. (CPSt. at 3.).

[29] When he testified during the evidentiary hearing on August 3, 2017, Mr. Jeff Classey was the Site Manager and a Senior Researcher for Respondent MUV Coatings Shanghai. (Tr. (Classey) at 970:17-19.). Respondents identified Mr. Classey as a fact witness to provide testimony about testing of the accused coatings, testing of the prior art coatings, and sample preparation. (RPSt. at 2.).

[30] When he testified during the evidentiary hearing on August 3, 2017 and August 4, 2017, Mr. Bob Overton was the President of Lenoir Material Sciences. (RPSt. at 2; Tr. (Overton) at 1091:9-14.). Respondents identified Mr. Overton as an expert witness to provide testimony about infringement and invalidity of the Asserted Patents, as well as the testing of coatings at issue this Investigation. (RPSt. at 2; Tr. (Overton) at 1090:5-7, 19-21.).

submit an expert report in this Investigation. (Tr. (Classey) at 979:18–980:1.). Thus, Dr. Bowman's expert testimony stands unrebutted, and Complainants' application of the exponential equation was proper.

Respondents also contended that the theoretically determined maximum from the dose vs. modulus curve fitting analysis should not be taken as the claimed "maximum attainable modulus," but that the actual value of the measured modulus at 2.0 J/cm^2 should be used instead. The Cure Dose Patents clearly disclose that the "maximum attainable modulus" is determined using a dose vs. modulus analysis, not by an experimental measurement. (*See* JX-0001 at 7:67–8:52 ("The dose-modulus curve was then created by plotting the modulus values vs. the dose and by fitting a curve through the data points. The 'cure dose' of the coating composition was determined to the be the dose at which 95% of the ultimate secant modulus is attained."); JX-0003 at 9:40-44; *see also* Staff Claim Br. at 9 ("the 100% reference value for the 95% cure dose is the ultimate point on the dose-modulus curve (i.e. the point where 'the ultimate secant modulus of a coating composition is attained' on the dose-modulus curve) and not a value attained in a laboratory setting."). Complainants' use of the dose vs. modulus analysis in determining the maximum attainable modulus was appropriate here.

Respondents argued that there was an error in the spreadsheets used to calculate the R^2 value in the curve fitting analysis. (*See* RMBr. at 27-28; Tr. (Bowman) at 517:6–522:20.). Dr. Bowman, Complainants' expert, testified that it made absolutely no difference to the determined 95% cure dose. Specifically, he testified that: (1) the (0,0) point was not used in the curve fitting to the exponential equation (*id.* at 517:21-23); (2) the error "doesn't change the curve at all nor the dose for 95% cure" (*id.* at 520:11-14, 521:19, 522:2-5); (3) the dose vs. modulus "data are exactly the same" (*id.* at 521:24); and (4) "the goodness of fit of the curve is exactly the

same" (*id.* at 522:19-20). Dr. Bowman pointed out that the only difference the error made was in the R^2 values, which came down between 2%-11%. (*Id.* at 522:14-16.). One of the R^2 values dropped "from .9985 to .8824," which, Dr. Bowman testified, "still represents a much better fit than the Corning issue, which was closer to .5." (*Id.* at 520:22–521:3.).

Respondents alleged that the Cure Dose Patents disclose nothing more than a "summary test method" that "doesn't have all of the relevant information," and thus, is "incomplete." (RMBr. at 25 (citing Tr. (van Eekelen) at 175:16–177:13)).).

To the contrary, this Court has previously established "there is a specific test method contained in both the '103 and '508 Patents [for 95% cure dose]." (*Markman* Order, App. A at 4.). In addition, Corning's scientists and experts were able to understand and follow the modulus retention ratio and 95% cure dose test methods described in the specification. *Corning Inc. v. DSM IP Assets B.V.*, IPR2013-00043, 2013 WL 8595401, *8 (Patent Tr. & App. Bd. May 13, 2013). (CX-1115.0014-17 (Kouzmina Decl. in IPR2014-00043); RX-2974.0034-35 (Winningham Decl. in IPR2013-00044).). Thus, Respondents are incorrect. The specification's test methods are sufficiently detailed for persons of ordinary skill to follow. Moreover, Ms. Lawrence testified credibly that she followed references in the Cure Dose Patents but also referred to internal, confidential DSM test protocols, which does not necessarily suggest that she "strayed from the teachings of the specification," as Respondents argued. (RMBr. at 27 (citing Tr. (Lawrence) at 382:6-11, 389:17–390:11; CX-0471C (DSM's cure dose protocol).).

Respondents also contended that Complainants' cure dose testing is not trustworthy because it was performed by biased individuals. (RMBr. at 26.). Respondents asserted that the

individuals who prepared the samples, Ms. Lawrence and Dr. Satyen Sarmah,[31] were involved in the Corning IPRs and "had incentive bonuses tied to how they and the company performed in those proceedings."[32] (*Id.* (citing RX-0080C ("Incentive Bonus"); Tr. (Sarmah) at 318:13–319:22).).

[

[31] Dr. Sarmah testified that he "reviewed the patents, and then after consultation with attorneys, decided what tests need to be done, what parameters need to be followed, all the procedures, and made sure the quality of the sample preparation and test results are good." (Tr. (Sarmah) at 233:10-14.). He also testified that he did not perform any of the tests. (*Id.* at 234:1-3.).

[32] In its Response to the Complaint and NOI, Respondent MUV alleged that Complainants committed inequitable conduct during two (2) IPR proceedings instituted in 2012 (IPR Nos. 2013-00043, -00044), by non-party Corning Incorporated ("Corning") ("Corning IPRs"), challenging the Cure Dose Patents asserted in this Investigation. (MUV Resp. at ¶¶ 14-15 (Sixth Affirmative Defense).). Respondent MUV used the information from the PTAB's Final Decision in the Corning IPRs, and the testing data that Complainants had submitted to the PTAB to allege that Complainants made "material misrepresentations" to the PTAB, which included "misrepresenting how to properly measure the Cure Dose Limitation of a coating as required by the '508 and '103 Patents" and "the submission of testing data performed on a sample that was approximately twice the thickness of the samples identified in the '508 and '103 Patents." (*Id.* at ¶ 15.). The PTAB Final Decision that issued on May 1, 2014 addressed whether two (2) of DSM's prior art coating compositions met a claim limitation concerning the dose of radiation needed to cure 95% of the compositions. (*See* Order No. 9 at 2-3 (Mar. 27, 2017) (citations omitted).). Both Complainants and Corning submitted testing to the PTAB. (*Id.* at 3 (citations omitted).). The PTAB Final Decision upheld the validity of the '508 and '103 patent claims at issue based upon its finding that ***Corning*** had failed to meet ***its*** burden to prove that the compositions disclosed in a prior art patent reference (WO 98/21157 to Szum et al.) met the claim limitation of "a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2." (*Id.* (citations omitted).). On March 7, 2017, Complainants moved to strike Respondent MUV's affirmative defense of inequitable conduct. (Motion Docket No. 1031-003 (Mar. 7, 2017).). On March 17, 2017, Respondent MUV filed its opposition to Complainants' motion to strike. (Doc. ID No. 605839 (Mar. 17, 2017.)). On the same day, 2017, Staff filed a response in support of Complainants' motion to strike. (Doc. ID No. 605816 (Mar. 17, 2017).). On March 27, 2017, an Order issued granting Complainants' motion to strike, and Respondent MUV's affirmative defense of inequitable conduct was stricken. (Order No. 9 at 11-12 (Mar. 27, 2017).).

[33] RX-0080C was withdrawn. The same document has been admitted as CX-0095C.

[34] When he testified during the evidentiary hearing on July 31, 2017, Mr. Robert Crowell was the Chief Commercial Officer of Engineering Plastics at DSM, Elgin. (Tr. (Crowell) at 67:3-8.). At that time, Mr. Crowell had worked at DSM for 27 years, and for the last 3.5 years, was President of the Functional

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As Complainants maintained, this 2015 retention bonus has nothing to do with this Investigation. Moreover, Dr. Sarmah testified credibly that no financial incentives from Complainants influenced his decisions with regard to testing, and that there was no bonus for him that was contingent in any way on the outcome of the testing. (Tr. (Sarmah) at 234:17-25, 350:13-15.).

Materials division before moving to his current position. (*Id.* at 11-16.). Complainants identified him as a fact witness to provide testimony about matters related to Complainants' domestic industry, standing, economic prong, remedy, bond, and public interest. (CPSt. at 3.).

Ms. Lawrence and Dr. Sarmah also testified that they did not know whether any sample they tested was an accused product or alleged prior art.[35] (Tr. (Sarmah) at 235:1-9 ("Q: So you understand that certain samples that DSM tested were provided to you by Finnegan attorneys; right? A: Yes. Q: Can you describe how those samples were received by DSM? A: The samples were labeled, PHY001, 003 and 004. Q: Sitting here today, do you know the identity of those samples? A: No."); Tr. (Lawrence) at 368:8-14 ("Q: And which -- which fiber-optic coatings did you test? A: Our domestic industry DSM coatings, DP-1017 and DP-1032, and then two coatings from the accused, PHY3 and PHY4. Q: And do you know the identity of PHY3 and PHY4? A: No, I don't."). Based on the evidence to the contrary, Respondents' assertion that there was bias on the part of Complainants' lab technicians is unsupported. The witnesses who testified were credible and deflected successfully the criticisms lodged against Complainants' testing. Moreover, since samples were masked during the testing process, the outcomes of the testing were unlikely to have been biased.

For the foregoing reasons, Complainants' testing was carried out in accordance with the disclosures in the Cure Dose Patents and yielded valid, reliable test results.

2. "Modulus retention ratio after hydrolytic aging"

Claims 1, 20, and 22 of the '508 patent, and claim 1 of the '103 patent, all recite a primary coating having a "modulus retention ratio." In order to measure the modulus retention ratio, the '508 and '103 patents disclose the following:

[T]est samples were prepared by casting a film of the material, having a thickness

[35] Complainants explained that the MUV samples Ms. Lawrence and Ms. Liu tested, including alleged prior art, were all labeled "PHY" followed by an arbitrary number. Thus, Ms. Lawrence, Ms. Liu, and Dr. Sarmah who supervised the testing, knew the accused [ ] samples only as "PHY3" and "PHY4" respectively, and the alleged prior art [ ] samples only as "PHY1." (*See, e.g.*, Tr. (Sarmah) at 235:4-9; Tr. (Lawrence) at 368:13-14; Tr. (Liu) at 409:21-23.).

> in the range of 0.02 mm to 0.4 mm, on a glass plate. The sample film was cured using a UV processor. A specimen approximately 35 mm (1.4 inches) long and approximately 12 mm wide was cut from a defect-free region of the cured film.
>
> * * *
>
> [T]he cured film was aged for 8 weeks at a temperature of 85°C at 85% relative humidity. The equilibrium modulus E_0 was determined as the minimum value of E' in the rubbery region of the curve. The ratio of the equilibrium modulus after aging to the equilibrium modulus prior to aging is reported as the modulus retention ratio after hydrolytic aging.

(JX-0001 at 10:24-64, 11:46-54; JX-0003 at 11:41–12:14, 12:62–13:2.).

Ms. Caroline Liu, Complainants' employee who conducted the modulus retention ratio testing for the accused coatings (Tr. (Liu) at 409:17-20), provided the following description of the modulus retention ratio test.

> Q: . . . Can you, just to reorient us, explain at a basic level what that test is?
>
> A: Yes. So modulus retention ratio, basically you have a liquid coating, and you cure that to -- onto the substrate, which in this case is a glass plate. And about the thickness of like my fingernail. And you cut the sample to the desired geometry, measure the modulus of those samples.
>
> And at the same time, the same sample, other samples that are on the same plate, once they are cut to the geometry get aged in this, we call it, 85/85 chamber, which is 85 degrees C, I think 185 degree F, and 85 percent humidity chamber, aged for eight weeks.
>
> After that you take that sample out, and then you again do the modulus testing using DMA. And then you ratio the two before and after aging, that is the modulus retention ratio.

(*Id.* at 410:4-21.).

Ms. Liu's testimony is consistent with the testimony provided by Ms. Lawrence, who performed the MRR testing on the DI coatings. (Tr. (Lawrence) at 378:24–379:15 ("Q: And how do you do [the modulus retention ratio] test? A: We prepare the samples similar to how we prepared the tensile sample. So you draw a liquid film, you cure the liquid film and then you

prep a sample from that plate of the cured film. We would run an initial equilibrium modulus, and then we would age the sample -- some samples in our 85/85 chamber. And then we would run an age sample after eight weeks."); *see also id.* at 379:16-18 ("Q: Now, you mentioned an 85/85 chamber. What does 85/85 refer to? A: 85 degrees Celsius and 85 percent humidity.").

With regard to the actual testing of the accused samples, Ms. Liu testified in explicit detail how the modulus retention ratio testing was performed on the accused coatings, in accordance with the teachings in the Cure Dose patents.

> Q: . . . Regarding curing the samples, how much dose did you cure the samples with?
>
> A: The dose is 1 joule per centimeter squared.
>
> Q: And what thickness were the samples at?
>
> A: The thickness is 75 micron.
>
> Q: Was that measured pre cure or post cure?
>
> A: Post cure.
>
> * * *
>
> Q: And why was 75 microns your target value?
>
> A: It's mentioned in the patent.
>
> Q: How about the thickness? What was your target value for the – I'm sorry, for the width. What was your target value for the width of the samples?
>
> A: It's about 12 millimeter.
>
> Q: Where did that come from?
>
> A: Again, from the patent.
>
> Q: And what was the width that you actually measured?
>
> A: About 12 millimeter, kind of like my fingernail width, this much (indicating).
>
> * * *

> Q: After you measure the modulus of the samples initially, you mentioned the aging process. Can you just explain in a little more detail how that aging process takes place.
>
> A: Yeah. So we have a temperature humidity control chamber that is set at 85 degrees C and 85 percent humidity. And so once you -- like the plate that I cured, I cut six specimen out of it. Three of them that I measure the dimension with [sic] do the initial modulus testing, the other three, they are aged in this chamber for eight weeks. So you record the time, take them out, and then you load them after that eight weeks.

(Tr. (Liu) at 410:24–413:23; *see also id.* 409:17-23, 410:4-415:22, 420:1–421:5; Tr. (Lawrence) 378:24-380:19.).

Complainants provided a photograph of the machine that was used to age the samples for eight (8) weeks in an 85°C and 85% humidity environment.

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Complainants' explained that: (1) the elastic modulus E' curves for the unaged and aged specimens were determined using a Rheometrics Solids Analyzer dynamic mechanical analysis (DMA) instrument; (2) the equilibrium modulus for each specimen was identified by

determining the minimum value of E' in the rubbery region of the elastic modulus E' curve; and (3) the ratio of the equilibrium modulus after aging to the equilibrium modulus prior to aging was reported as the "modulus retention ratio after hydrolytic aging." (CPBr. at 19-20.).

Respondents argued that Complainants failed to present any reliable evidence that the MRR limitation is satisfied. (*See* RMBr. at 22.). Namely, Respondent OFS contended that the modulus retention ratio that Complainants measured was on a glass film or plate and not on fiber. (ROBr. at 21-23.). Respondents' expert, Dr. John Ballato,[36] opined that a person of ordinary skill in the art cannot determine the modulus retention ratio of a primary coating on fiber based upon tests performed on a sample film cast on a glass plate. (Tr. (Ballato) at 1567:4-9.).

However, as Complainants pointed out and Staff agreed, the modulus retention ratio is described in the patent as being measured on a plate, not on a fiber. (*See* CBr. at 46; CRBr. at 40; SBr. at 35 ("the patent specifically instructs that the modulus retention ratio and cure dose testing is to be done on a composition cured on a ***glass slide***") (emphasis added).). The specification of the Cure Dose Patents specifically states, under the heading "Modulus Retention Ratio After Hydrolytic Aging," that the modulus curves are determined according to method (iv) in the patent. (JX-0001 at 11:45-48.). Method (iv) is described in the specification as being a measurement of "samples [] prepared by casting a film of the material . . . on a ***glass plate***." (*Id.* at 10:33-35 (emphasis added); *see also id.* at 7:48–8:51 ("sample films . . . were prepared, which

[36] When he testified during the evidentiary hearing on August 14, 2017, Dr. John Ballato was a Professor of Materials Science and Engineering and held the J. E. Sirrine Endowed Chair in Optical Fiber at Clemson University. (RPSt. at 5; *see also id.* at Ex. 5.). Respondents identified Dr. Ballato as an expert witness to provide testimony about the design, manufacture, testing and characteristics of optical fibers and their coatings, and about testing of the products under the Asserted Patents. (*Id.* at 3.).

each sample film being obtained by applying an approximately 75 microns thick composition layer on a ***plate***") (emphasis added).).

Mr. Kariofilis Konstadinidis,[37] Respondent OFS' Senior R&D Engineer and Respondents' fact witness, confirmed that the modulus testing described in the '508 patent, that is, on a slide, is different from the in-situ[38] modulus that refers to the modulus on a fiber. (Tr. (Konstadinidis) at 1381:5-20 ("Q: Now, again, just so we're totally clear, the hydrolytic aging that we're talking about here is the aging not of coating on a slide but of coating on fiber; right? A: Yes, it's the in situ modulus, a coated fiber. Q: It's like an in situ modulus retention ratio? A: Pretty much, yes. Q: You read through the '508 patent, you agree with me that that's different than the modulus retention ratio discussed in the '508 patent? A: Yes."); *see also id.* at 1382:16–1383:5.).

Respondents also argued that test protocols were not followed properly. (RMBr. at 23.). Specially, Respondents asserted that Ms. Liu did not condition the samples for at least 40 hours as required by the ASTM[39] D5026-95a standard,[40] which is recited in certain claims of the '659

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[37] When he testified during the evidentiary hearing on August 4, 2017, Mr. Kariofilis Konstadinidis was a Senior R&D Engineer and a distinguished member of the technical staff of OFS Fitel, LLC. (Tr. (Konstadinidis) at 1323:6-8.). Respondents identified Mr. Konstadinidis as a fact witness to provide testimony with regard to the history Respondent OFS' products; prior art OFS products; the manufacture, design, testing, characteristics and qualification testing of OFS products; and testing of products under the Asserted Patents. (RPSt. at 2-3.).

[38] In-situ (i.e., in place) is an instrument, in this case, a coating, that is in place, in this case, on an optical fiber. (Comp'ls Claim Br. at 18; Tr. (Sarmah) at 249:17-20.). The in-situ modulus is the modulus of a coating as measured on an optical fiber, as opposed to on a glass plate. (Tr. (van Eekelen) at 133:19–134:3; *see also* Tr. (Sarmah) at 249:11–250:4; Comp'ls Claim Br. at 18.).

[39] Organized in 1898, ASTM International is an international standards-developing organization. *See, e.g.*, https://www.astm.org/ABOUT/factsheet.html (last visited Feb. 6, 2018).

[40] ASTM D5026-95a is the "Standard Test Method for Measuring the Dynamic Mechanical Properties of

patent and described in the specification of the '659 patent, or the ASTM D638M standard[41] disclosed in the Cure Dose Patents. (*Id.*).

With regard to the ASTM D5026-95a standard and the 40-hour conditioning period, the "modulus retention ratio" is a claim term in the Cure Dose Patents, not the '659 patent relating to cavitation. Thus, such a conditioning period is not germane to the testing of the "modulus retention ratio" claimed in the Cure Dose Patents.

Moreover, Respondents conceded that "the Cure Dose Patents do not claim a particular ASTM standard be used," and that the ASTM D638M standard is simply an "exemplary one disclosed in the specification." (*Id.* (citing JX-0003 at 9:50-51; RX-0352.005 at 9.1).). Since the Cure Dose Patents do nothing more than disclose that the ASTM D638M standard was followed, without any description of the steps involved in performing the standard, Respondents relied on RX-0352. As Complainants pointed out, RX-0352 is not admitted into evidence. (*See* CRBr. at 9.). Thus, there is no evidence as to what ASTM D638M actually says regarding conditioning time.

In addition, Ms. Liu testified that she conditioned the samples for 16 to 24 hours in all of the modulus retention ratio tests. (*See* Tr. (Liu) at 425:10-12.). Dr. Bowman opined that the conditioning performed was appropriate. (Tr. (Bowman) at 503:22–504:17.). None of Respondents' experts testified to the contrary. Thus, Dr. Bowman's testimony is unrebutted.

Respondents relied upon a single test that was performed, but without any conditioning.

Plastics in Tension." (*See, e.g.*, JX-0004 at 22:47-52.).

[41] ASTM D638M is the "Standard Test Method for Tensile Properties of Plastics (Metric)." (*See, e.g.*, Respondents' Final Exhibit List (Doc. ID No. 621366 (Aug. 28, 2017)) at 17 (citing RX-0352, which was withdrawn).).

(RMBr. at 23 (citing Tr. (Liu) at 431:6-8).). This was a test that Ms. Liu performed following the specification of the ***Cavitation Patent***, and only for [ ] (not the accused product [ ]), which is no longer asserted as alleged prior art. (*See id.* at 22-23 (citing Tr. (Liu) at 431:25-432:15).). However, Ms. Liu testified that she performed this test as a something of a rush project during the expert discovery period, because Respondents presented Complainants with last-minute test results for [ ] (after the close of fact discovery) that contradicted their own earlier testing. (*See* Tr. (Liu) at 427:10-18; *compare* RX-0221C.0004, June 30, 2016 Intertek[42] report (stating [ ] equilibrium modulus of [ ], outside claimed range in the Cavitation Patents) *with* RX-1319C.0005, Apr. 20, 2017 Intertek report (stating [ ] equilibrium modulus of [ ], within claimed range in the Cavitation Patents); *see also* Motion Docket No. 1031-016 and Order No. 24.). This test has no relevance to the modulus retention ratio testing.

Respondents contended that the Cure Dose patents do not specify the belt speed or the lamp intensity. (*See* RMBr. at 24.). Respondents acknowledged that the Cavitation Patent, whose disclosure is incorporated by reference into the Cure Dose Patents, teaches that a 1 J/cm^2 dose is achieved with a belt speed of 20.1 m/min when using a Fusion F600W UV-lamp system with a D bulb. (*See id.* (citing JX-0004 at 22:41-44).). Respondents argued that "[t]hat [1 J/cm^2] cure dose is only possible at that belt speed if the lamp is at low power, but DSM has no evidence to show what lamp power and belt speed was used to get 1 J/cm^2." (*Id.* (citing Tr. (Liu) 425:19–426:8).).

[42] Intertek is third-party, ISO17025-certified company that provides testing, inspection, and certification services. (Tr. (Vratsanos) at 984:23–986:14.)

Although Ms. Liu, the DSM employee who performed the MRR testing of the [ ] samples, testified that she did not necessarily remember the value of the belt speed or change the power setting on the lamp when performing the tests, she unequivocally confirmed that she "set the belt speed to get 1 joule per centimeter squared dose." (Tr. (Liu) 425:19-21 ("Q: And you set the belt speed to get a 1 joule per centimeter squared dose? A: Yes, that is correct.").). She also testified that "we keep running through the radiometer[43] through . . . to get to the ideal . . . dose, 1 joule per centimeter squared." (*Id.* at 426:5-8.). This is consistent with Ms. Lawrence's testimony that part of the process of "prepar[ing] the sample for cure on the UV fusion unit or UV processor" involves "set[ting] the belt speed on the UV processor to the dose that you're required." (Tr. (Liu) at 371:3-6; *see also id.* at 397:1-8 ("Q: Do you recall how -- at what speed the film and the plate was moving under the lamp when you did your testing? A: I don't remember speed. I rely on the Light Bug to tell me what the output is. Or the Light Bug -- sorry, I rely on the radiometer. Q: The radiometer. A: To tell me what the dose is.").). Ms. Lawrence explained that "[w]e validate that we have the correct dose using a radiometer, we repeat that three times to make sure we have the correct dose dialed in." (*Id.* at 371:6-8.). Tellingly, Respondents never argued that Complainants' samples for the modulus retention ratio testing were cured at any dose other than 1 J/cm^2. (*See* RMBr. at 18-25.).

Moreover, Dr. Bowman testified that the teaching in the Cavitation Patent provides sufficient disclosure to a person of ordinary skill in the art to cure samples using a UV processor. (*See* Tr. (Bowman) at 502:6-13.). Dr. Bowman also testified that the evidence proffered by Mr.

[43] A radiometer measures the dose from the lamp of the UV fusion unit or UV processor. (Tr. (Lawrence) at 371:9-11.).

Overton shows that "intensity is not a significant factor," that "there's no change in the properties as we change the light intensity in this range," and that "[i]n fact, the only evidence we have in the record when the dose is the same and intensity is changed is that there isn't a significant difference." (*Id.* at 1696:20–1699:19 (discussing RDX-0004.23 (Mr. Overton's slides used during the evidentiary hearing (citing RX-1377-0009 (Overton Decl.)).).

Respondents reported that prior to the aging of the samples, Ms. Liu and Ms. Lawrence laid the samples on acid-free paper rather than exposing all of their surfaces to the environment, as Mr. Classey, an MUV employee who was responsible for hydrolyically aging the samples (Tr. (Classey) at 972:24–973:2), had done. (RMBr. at 24 (citing Tr. (Liu) at 426:25–427:2; Tr. (Lawrence) at 379:25–380:11).). Mr. Classey testified, and Mr. Overton confirmed, that each of the samples for hydrolytic aging were hung on a "special rack" and placed in an environmental chamber, "so that every surface is exposed to the environment in the chamber. (Tr. (Classey) at 974:14-24; Tr. (Overton) at 1258:18–1259:5 ("As [Mr. Classey] demonstrated to me, each – each film in its frame was suspended from two points from a rod near the top of the chamber. Q: And how were those films actually attached to the rod? A: Well, the rod was -- or the films themselves were not directly in contact with the rod, but wire hangers were inserted through the polypropylene frames and -- well, they didn't -- they were -- the polypropylene frames were held together with small binder clips. There's actually two square polypropylene frames to either side of the edges of the rectangular film, held together with binder clips, and wire from the binder clips up over the rods.").).

Without any supporting evidence, Mr. Overton merely speculated that the use of different handling methods could explain the difference in the MRR results between the Parties. (Tr. (Overton) at 1110:11-19 ("As [Mr. Classey] explained, therefore, the entire film, front and back,

was totally exposed to the accelerated aging conditions. Q: Now, in your opinion, could this explain the difference in the MMR -- or MRR results between the parties? A: Well, it certainly could. And in the lack of any other obvious feature that could explain the difference, that's what I suspect.").).

Mr. Overton also testified that there were air currents in the chamber, which may have subjected the samples to additional mechanical forces during the 8-week aging period, as Complainants pointed out. (Tr. (Overton) at 1257:24–1258:3, 1259:6-10.). Such unequal treatment over a prolonged period of experimentation makes any sort of meaningful comparison of the aged and unaged samples unfeasible. (*Id.*; *see also id.* at 1258:4-1259:5.).

Complainants' technicians, on the other hand, treated their aged and unaged samples equally, except that one was in the hot, humid oven. Whether inside or outside the aging chamber, Complainants' samples were supported on a glass substrate. (Tr. (Lawrence) at 380:7-15; RX-1424C (Sarmah Dep. Tr.) at 187:14–190:5.). To prevent the air circulation in the chamber from mechanically affecting the aging samples, Complainants' samples were placed in an open envelope, to minimize mechanical forces. (RX-1424C (Sarmah Dep. Tr.) at 189:13–190:5.).

Respondents also alleged that Complainants' MRR testing is not trustworthy because it was performed by biased individuals. (RMBr. at 22.). For the same reasons discussed in Section VIII.C.1 above, Respondents assertion is not supported by the evidence. Ms. Liu's supervisor, Dr. Sarmah, was not swayed by any performance bonus related to the testing performed for this Investigation. Respondents' argument that a 2015 bonus given to certain of Complainants' employees created a "bias," has nothing to do with this Investigation, and is an unsupported argument lacking in merit. (*See* Tr. (Crowell) at 77:18–80:17.).

Moreover, Ms. Liu conducted the MRR testing blind. (Tr. (Liu) at 409:17-23 ("Q: What were you asked to do in relation to this case? A: Modulus retention ratio for PHY3 and 4, and equilibrium modules for PHY1. Q: You mentioned PHY3 and PHY1. As you sit here today, are you aware of the identity of those chemicals? A: No.").).

For the foregoing reasons, Complainants' testing was carried out in accordance with the disclosures in the Cure Dose Patents and yielded valid, reliable test results.

3. "In-situ modulus"

Claims 2-3, 20, and 22 of the '508 patent, and claims 1 and 13-15 of the '103 patent, recite an "in-situ modulus." In order to measure the in-situ modulus, the '508 and '103 patents disclose the following:

> A glass optical fiber was coated using a primary composition according to Table 1 and a commercial secondary composition (secant modulus 750 MPa, elongation at break 25%, glass transition temperature 55°C., coefficient of expansion in the glassy region <100 x 10^{-6}/°C.). The thus obtained coated fiber was then placed in a metal sample fixture, as schematically shown in FIG. 1: A small portion of the coating layer was stripped in the middle of the fiber; the length of the bottom part of the fiber was cut to be exactly 1 cm; the bottom of the fiber was inserted into a micro tube in the fixture; the micro tube consisted of two half hollow cylinders; its diameter was made to be the same as the fiber outer diameter; the fiber was tightly gripped after the screw was tightened; the gripping force on the secondary coating surface was uniform and no significant deformation occurred in the coating layer. The fixture with the fiber was then mounted on DMA (same instrument as used to determine the glass transition temperature). The metal fixture was clamped by the bottom grip. The top grip was tightened, pressing on the top portion of the coated fiber to the extent that it crushed the coating layer. The DMA was set to the shear sandwich mode to measure the shear modulus of the primary coating. Under the force F, the primary coating layer is sheared with a displacement D while essentially no deformation occurs in the stiff secondary coating. The test frequency used was 1.0 radian/second. The shear strain S (=D/T_p) was set to be 0.05. With this low level of strain and stress, the deformation was proven to be in the linear viscoelastic region and no delamination occurred at the interface of glass and primary coating. The shear modulus G was thus obtained (values indicated in Table 1). This shear modulus G was then corrected for stretch of the glass during measurement by the following formula:

> $1/G_{corrected} = 1/G_{measured} - 1/G_{glass}$, wherein G_{glass} is a glass stiffness factor and was take to be 0.85 MPa.
>
> $G_{corrected}$ was then further corrected by adjusting for the real thickness of the primary coating (the thickness assumed when obtaining $G_{measured}$ was always 30 micron), resulting in G. See Table 1 for the real thickness of the primary coatings. Finally, the in-situ modulus E was calculated with the following formula:
>
> $E = 2(1 + v)G = 3G$, wherein v is the primary coating Poisson ratio = 0.5.

(JX-0001 at 10:65–11:43.).

Complainants stated that for the DI Cure Dose Products, testing was performed on commercial fiber obtained from Complainants' customers, Draka and YOFC. (*See e.g.*, CPBr. at 25.). Complainants stated that for [ ], testing was performed on Respondent OFS' commercial fiber, specifically the Minicord® Allwave® Flex+ Enhanced BIF G.657.A2 Optical Cable. (*Id.*).

Mr. Jan van Eekelen,[44] one of the named inventors of the Cure Dose Patents, explained that the in-situ modulus of a fiber coating is measured by taking a thin strand of a coated optical fiber and by testing the sample in a dynamic mechanical analyzer ("DMA"). (Tr. (van Eekelen) at 133:19–134:3; *see also* Tr. (Sarmah) at 249:11–250:4.).

[44] When he testified during the evidentiary hearing on July 31, 2017, Mr. Jan van Eekelen was a Senior Quality Expert at DSM, in the Netherlands. (Tr. (van Eekelen) at 125:22-35, 126:11-19.). As of this date, Mr. van Eekelen had worked for DSM for 26 years and is a named inventor on each of the Asserted Patents. (*See* JX-0001 at (75); JX-0003 at (75); JX-0004 at (75); *see also* Tr. (van Eekelen) at 126:11-24.). Complainants identified Mr. van Eekelen as a fact witness to provide testimony about matters related to the invention, validity, and domestic industry of the Cure Dose and Cavitation Patents. (CPSt. at 4.).

[

]

Dr. Sarmah testified that the protocol (CX-0038C) that was followed for the in-situ testing is consistent with the teachings in the Cure Dose Patents, which Respondents did not dispute. (*Id.* at 250:5-16.). Additionally, Respondents did not present any counter-testing evidence or advanced any non-infringement arguments against the in-situ modulus limitation.

For the foregoing reasons, Complainants' testing was carried out in accordance with the disclosures in the Cure Dose Patents and yielded valid, reliable test results.

4. "Attenuation increase"

Claims 1 and 4 of the '508 patent recite an "attenuation increase." The specification of the Cure Dose Patents describes how to measure the attenuation increase: by measuring the attenuation before and after winding fiber on a sandpaper-covered drum. (JX-0001 at 11:55-68 ("The microbending resistance of the fiber was determined by determining the attenuation of the coated optical fiber before and after winding the fiber around a drum (diameter 600 mm) covered

with sandpaper (40 μm Alox grade by 3M™). The winding force was kept constant at 4 N."); *see also* (Tr. (van Eekelen) at 134:17-21; Tr. (Sarmah) at 253:5–261:25).).

Complainants stated that they identified two representative samples of OFS single-mode optical fibers,[45] obtained the samples from commercial sources, and sent them to Nextrom, a third-party test facility in Finland, for attenuation increase testing according to the Cure Dose Patents. (*See* Tr. (Sarmah) at 253:14-21; CX-0088C (Project Kiwi Attenuation Testing).). Dr. Sarmah explained that Nextrom was told to follow the specification outlined in the Cure Dose Patents, "which is 600 millimeter drum, fiber wand at 4 Newton, and sandpaper, which was mentioned in the patent, which is the 40 micron 3M sandpaper." (Tr. (Sarmah) at 253:25–254:5.).

Pratik Shah,[46] one of DSM's engineers, was sent to Finland from Elgin, Illinois, to confirm that the testing was conducted according to the Cure Dose Patents. (*See* CX-0290C (Nextrom Correspondence to P. Shah); *see also* Tr. (Sarmah) at 254:13–255:10 ("Pratik provided the information as specified in the patent, and he was physically there to oversee the testing."); *see also* CX-0289C (Order Confirmation from Nextrom confirming that a 600 mm drum was used); CX-0290C (instructions for testing).).

During the evidentiary hearing, Respondent OFS' expert, Dr. Ballato, challenged the accuracy of Nextrom's test results by opining that the results were "wrong" because Nextrom used an index of refraction ("IOR") value of 1.499 to calculate the attenuation values instead of

[45] The two representative single-mode fibers are Respondent OFS' AllWave®+ Zero Water Peak (ZWP) and AllWave FLEX®+ Zero Water Peak (ZWP) [ ] (*See, e.g.*, CBr. at 34; Tr. (Sarmah) at 253:22-24.).

[46] Mr. Pratik Shah did not testify during the evidentiary hearing. Dr. Sarmah described Mr. Shah as the Technical Service and Application Development Manager for DSM's Fiber-Optics Business Group in 2013, when Respondent OFS' samples were being tested by Nextrom. (Tr. (Sarmah) at 254:17-21.).

1.467 as shown on Respondent OFS' specification sheets. (Tr. (Ballato) at 1544:3-22 (stating the IOR input value should have been 1.46 or 1.47 and not 1.499); *id.* at 1547:11-25 (expressing opinion that 2% error in the IOR is meaningful).). Although Dr. Ballato claimed this argument "jumps out," was "egregiously wrong," and was "stunning" (Tr. (Ballato) 1544:14-22), this argument was not expressed in his expert report or in Respondent OFS' Pre-Hearing Brief. Respondent OFS' Pre-Hearing Brief does not mention index of refraction outside the context of "refractive index profile," which is a different issue from the one Dr. Ballato addressed that is discussed here.

Moreover, Complainants' expert, Dr. Erol Sancaktar,[47] was able to recalculate the attenuation increase parameter using the corrected index of refraction, and identified that it made "a difference of ***0.01 decibel per kilometer***, which is ***negligible*** as far as the attenuation increase that's under consideration. So [the tested OFS fiber] still infringed, the values are valid." (Tr. (Sancaktar) at 1774:7-18 (emphases added).).

Aside from being outside the scope of his report, Dr. Ballato's argument does not make logical sense. If the index of refraction was incorrect, in this instance, by about 2.1%, both the pre-winding attenuation ***and*** the post-winding attenuation would have been affected in the same way, and therefore the ***difference*** would not be affected. The analogy Dr. Ballato himself suggested demonstrates why this is true. (Tr. (Ballato) at 1546:15-17 ("It's like -- it's like the speedometer in your car is off. Then, by definition your odometer is off too, right.").).

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[47] When he testified during the evidentiary hearing on August 1-2, 2017 and August 14, 2017, Dr. Erol Sancaktar was a Professor of Mechanical Engineering at the University of Akron. (CPSt. at 2; *see also id.* at Ex. B; Tr. (Sancaktar) at 558:7-10.). Complainants identified Dr. Sancaktar as an expert witness to provide testimony regarding, *inter alia*, the attention increase claimed in the Cure Dose Patents, and the equilibrium modulus, storage modulus, cavitation strength and strain energy release rate claimed in the Cavitation Patent. (CPSt. at 2.).

The measurement at issue here, that is, the "attenuation increase," is a measure of ***differences*** between two "speeds." Thus, referring in-part to Dr. Ballato's example, Complainants explained that if the speedometer of a car is off by 10 mph, but the relevant question is how much slower one traveled on a dirt road than on a highway, the fact that the car's highway speed measurement was 10 mph over would not affect this assessment. (CBr. at 38.). Although both readings are technically incorrect, all that matters is the relative difference in speed that the car traveled over the different terrains. (*Id.*). In other words, for purposes of this measurement, the speedometer's technical inaccuracy by a number of mph does not have a direct bearing on the measurement regarding to the difference between the two speeds. (*Id.*). This is confirmed by Dr. Sancaktar's recalculated results using the corrected index of refraction. (Tr. (Sancaktar) at 1774:7-18.).

In addition, Respondents did not submit any counter-testing evidence showing that the tested AllWave®+ Zero Water Peak (ZWP) and the AllWave FLEX®+ Zero Water Peak (ZWP) fibers do not meet the claim requirement for "attenuation increase." Thus, the purported testing issues raised by Respondent OFS fail to show that one would expect to obtain different test results exceeding the claim limitation if an input without the alleged calibration error (i.e. correction of the approximately 2% error in the IOR value) was used for the tested fibers.

For the foregoing reasons, the weight of the evidence supports a finding that Complainants' testing was carried out in accordance with the disclosures in the Cure Dose Patents and yielded reliable test results.

D. Respondent MUV's Accused [ ] Coating Infringes Claims 20-22 of the '508 Patent and Claims 1-10 and 13-15 of the '103 Patent

1. Claims 20 and 22 of the '508 Patent

a) "An inner primary coating composition having"

The term "inner primary coating composition" was construed to mean a "curable primary coating composition that has not been applied to an optical fiber." (*Markman* Order at 11-12.). Respondent MUV did not dispute that the [ ] coating is a primary coating composition in its liquid state. (See RMPBr. at 28-30, 42.).

Thus, Complainants have met their burden and proven by a preponderance of evidence that the [ ] coating meets the preamble of claim 20 of the '508 patent.

b) "an in-situ modulus (after cure) of less than 0.6 MPa [0.56 MPa]"

Complainants submitted evidence demonstrating that the [ ] coating has an in-situ modulus after cure of approximately [ ], which is less than 0.6 MPa, as required by the claim 20, and 0.56 MPa, as required by claim 22. (*See* CX-0425C; CX-0427C; CX-0528C; CX-0529C.).

As discussed in Section VIII.C above, Complainants submitted substantial evidence that their testing procedures were performed in accordance with the teachings disclosed in the Cure Dose Patents and yielded valid, reliable results.

Complainants have proven by a preponderance of evidence that the [ ] coating meets these claim limitations recited in claims 20 and 22 of the '508 patent.

c) "a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2"

Complainants presented evidence demonstrating that the [ ] coating has "a cure dose" of approximately [ ], which is substantially lower that the claim requirement of "less than 0.65 J/cm^2," recited in claim 20, and "less than 0.56 J/cm^2," recited in claim 22. (*See* CX-0424C; CX-0522C; CX-0523C; CX-0524C; CX-0508C; CX0509C; CX-0510C.).

Complainants also provided substantial evidence that their testing procedures were performed in accordance with the instructions disclosed in the Cure Dose Patents and yielded valid, reliable results. (*See* Section VIII.C, *supra.*).

Complainants have proven by a preponderance of evidence that the [ ] coating meets this claim limitation of claim 20 of the '103 patent.

d) "a modulus retention ratio (after cure) of at least 0.6 [0.5] after hydrolytic aging."

Complainants submitted evidence showing that the [ ] coating has a modulus retention ratio of approximately [ ], which substantially exceeds the claim requirements "of at least 0.6" and "of at least 0.5" after hydrolytic aging. (*See* CX-0426C; CX-0530C.).

The "modulus retention ratio" limitation calls for aging the cured film for eight (8) weeks at a temperature of 85°C and a relative humidity of 85%, and determining the ratio of the equilibrium modulus after aging to the equilibrium modulus prior to aging. (*See* JX-0001 at 11:45-54.). As discussed in Section VIII.C, the testing performed by Complainants was done in accordance with the relevant disclosures in the specification of the Cure Dose Patents and yielded reliable test results.

In an attempt to prove non-infringement, Respondent MUV submitted counter-testing for the modulus retention ratio limitation that yielded values less than the claim limitation. (*See* RX-0213C.). The evidence adduced in this Investigation: (1) supports a finding that Respondent MUV did not perform this testing correctly; and (2) supports a finding that Respondent MUV's resulting measurements are questionable both in their accuracy and reliability.

To begin with, Respondent MUV's samples passed through the hands of many different individuals who did not directly follow at least the implicit instructions disclosed in the Cure

Dose Patents. The Cure Dose Patents require that the equilibrium modulus be determined using the ***same*** sample immediately "***prior*** to aging" and then again immediately "***after*** aging" for the specified eight-week time-period under the specific accelerated temperature and humidity conditions. (*See* JX-0001 at 11:45-54.).

Contrary to the teachings of the Cure Dose Patents, the initial equilibrium moduli were not measured at the time the sample films were first prepared, under the supervision of Dr. Grace Cao[48] in Shanghai, China. (Tr. (Cao) at 954:23–955:2, 965:3-13; Tr. (Overton) at 1261:1-14; Tr. (Bowman) at 455:2-7.). The initial equilibrium moduli were not measured by Mr. Classey, after he received the samples from Dr. Cao, or by anyone else at Respondent MUV's North Carolina facility as required by the Cure Dose Patents. (*See, e.g.*, Tr. (Overton) at 1260:1-3, 1261:10-14.). The first time the equilibrium moduli of the ***unaged*** samples were measured was done by Intertek, at the same time the ***aged*** samples were measured, which was ***months*** after the samples were initially cured. (*Id.* at 1260:16-20; *see also* Fig. No. 7, *infra*, MUV-Intertek MRR Testing Timeline.).

Mr. Classey testified that after receiving the samples, he "took a portion of the films for the hydrolytic aging step," and placed the "other portion . . . into a dark drawer in the lab in ambient conditions." (Tr. (Classey) at 974:13-17; *see also* Tr. (Overton) at 1257:14–1258:3 ("And some of these films, they were – or actually one batch was -- of these cured films, those were aged in an environmental chamber for eight weeks from September 4, 2015 and October

[48] When she testified during the evidentiary hearing on August 3, 2017, Dr. Yanping (Grace) Cao was an Account Manager and Manager of the Quality Control Department at MUV Coatings (Shanghai). (Tr. (Cao) at 927:13-15, 927:25–928:2.). Respondents identified Dr. Cao as a fact witness to provide testimony about Respondent MUV's business operations, as well as testing of various coatings. (CPSt. at 1.).

31, 2015 in North Carolina; is that correct? A: Yes. Q: And then another batch of those films, those were kept separately in a drawer while the other set was aging; is that correct? A: Yes, it's another set of film, the same batch of coating.).).

Thus, based on Mr. Classey's and Mr. Overton's testimony, it is clear that the measurement for the initial equilibrium modulus "prior to aging," as conducted by Intertek, was not by determined by testing the same sample but, by testing a different sample film ("a control sample") that had not been exposed to the accelerated "aging" conditions in the environmental chamber set at 85°C and 85% relative humidity. (*See* JX-0001 at 11:45-54; Tr. (Classey) at 1111:19-23.). Mr. Overton also testified that the initial equilibrium modulus was not measured at a reasonable time after the samples were initially cured, but rather, was measured months later. (*Id.* at 1260:16-20.).

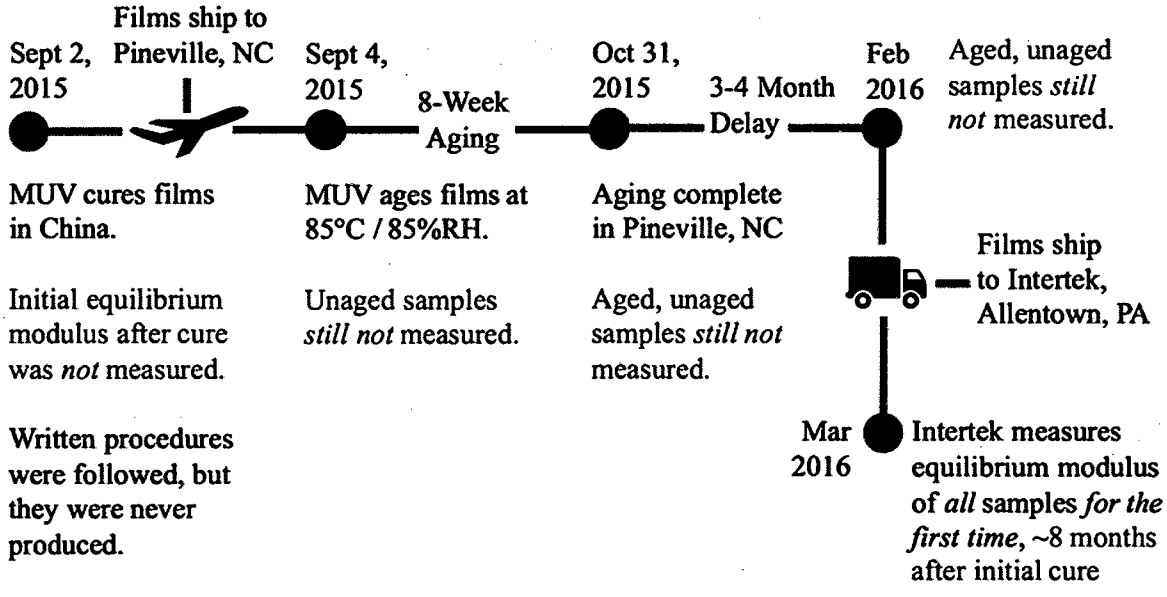
Moreover, Mr. Classey explained that at the end of the specified eight-week aging period, he took the samples out of the environmental chamber, placed them "back into their original papers," and held onto them for about "three months to four months," before the samples were sent to Intertek for testing to determine the equilibrium modulus. (Tr. (Classey) at 975:11-19, 981:13-17; *see also* Tr. (Overton) at 1260:12-15.).

Mr. Classey's testimony, which was evaluated by Mr. Overton, demonstrates that the "equilibrium modulus after aging" was never tested until Intertek first measured the modulus of the "aged" sample several weeks after the high temperature and humidity "aging" process had been completed. During cross-examination, Respondents' expert, Mr. Overton, acknowledged that removing an "aged," or substantially degraded, sample from a relative humidity of 85% and a temperature of 85°C (approximately 185°F) and then, without drying the sample, placing the aged sample back in its original papers at room temperature for several weeks is likely to result

in continued aging at a substantially greater rate than an unaged control. (*See* Tr. (Overton) at 1305:9–1308:14 ("That would be something to investigate, yes.").

The sequence of events that transpired during the flawed MUV-Intertek testing ("MUV-Intertek MRR Testing Timeline") is illustrated in the graphic below, including unaccounted for and inappropriate months-long delays before measurements were taken:

Figure No. 7: MUV-Intertek MRR Testing Timeline



(*See* Tr. (Overton) at 1256:3–1261:19; *see also* CBr. at. 28.).

Instead of measuring "the ***initial*** equilibrium modulus after cure," the unaged samples were measured only about ***7 months after*** they were cured.

Also problematic was the manner in which Respondent MUV handled the unaged and aged samples. The unaged samples were stored in a drawer on a flat substrate. (Tr. (Overton) at 1257:24–1258:3.). By contrast, the aged samples were hung from a rack, and suspended from two points from a rod, using wire hangers. (*Id.* at 1258:4–1259:5.). Mr. Overton testified, based upon his review of the testing protocol, that there were air currents in the environmental

chamber, which may have subjected the aged samples to additional mechanical forces during the aging period. (*Id.* at 1259:6-10.).

Additionally, it appears that the paper in which Respondent MUV packaged the samples and sent to Intertek stuck to the samples. According to an "Analytical Report" prepared by Intertek, its technicians "peeled" the samples from the paper. (CX-0254C.0003.). Dr. Menas Vratsanos,[49] one of the Intertek scientists who conducted the testing of the MRR of the MUV samples and a contributor to the Analytical Report, acknowledged during cross-examination, that anything "sticking" to the samples could result in "excessive deformation," which Complainants argued would affect their thickness uniformity. (Tr. (Vratsanos) at 1021:8–1022:1; CBr. at 30.).

As Complainants pointed out, the Cure Dose Patents require that "[t]he thickness cannot vary by more than 0.01 mm over this [about 1.4 inches] length." (JX-0001 at 10:33-45.). If this condition is not met, the patents specifically teach that another specimen needs to be taken. (*Id.*). Given Dr. Vratsanos' testimony that no thickness uniformity check was performed after the samples were peeled from the sticky paper (Tr. (Vratsanos) at 1023:15–1024:5), it is very possible that the sample geometry in the MUV-Intertek testing does not satisfy the requirements of the Cure Dose Patents.

Thus, credible evidence, including that of someone who participated in the testing, reflects that Respondent MUV's modulus retention ratio measurements are unreliable and insufficient to show non-infringement.

For the foregoing reasons, Complainants have proven by a preponderance of evidence

[49] When he testified during the evidentiary hearing on August 3, 2017, Dr. Menas Vratsanos was a Chief Scientist at Intertek. (Tr. (Vratsanos) at 984:23-24.). Respondents identified Dr. Vratsanos as a fact witness to provide testimony regarding the testing of the accused and prior art coatings. (RPSt. at 2.).

that the [ ] coating meets this claim limitation and infringes claims 20 and 22 of the '508 patent. However, because Respondents have proven by clear and convincing evidence that these claims are invalid, the [ ] coating cannot, by operation of law, directly infringe the claims. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

2. Claim 21 of the '508 Patent

a) "The composition of claim 20, wherein said composition comprises a radiation-curable oligomer selected from the group consisting of: (i) radiation-curable oligomers having a backbone derived from one or more polyether polyols; and (ii) radiation-curable oligomers having a backbone derived from one or more polyether polyols in combination with one or more polyester polyols."

The term "oligomer" was construed to mean "molecules composed of repeating structural units, wherein the molecules must include acrylate or methacrylate." (*Markman* Order at 23-24.). The evidence establishes that the [

] (*See* CX-0302C (MUV Resp. to RFA Nos. 19-21, 33); CX-0375C; CX-0506C; CX-1095C; CDX-0112C.).

Complainants have proven by a preponderance of evidence that the [ ] coating meets these additional claim limitations and infringes claim 21 of the '508 patent.

3. Claim 1 of the '103 Patent

a) "An inner primary coating composition having: (a) an in-situ modulus (after cure) of less than 0.6 MPa; (b) a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2; and a modulus retention ratio (after cure) of at least 0.6 after hydrolytic aging"

For the reasons discussed in Sections VIII.D.1 above with regard to, *inter alia*, claim 20 of the '508 patent, the [ ] coating is an inner primary coating composition having an in-situ modulus of approximately [ ], a "cure dose" of approximately [ ], and a

modulus retention ratio of approximately [ ]. (CX-0425C; CX-0427C; CX-0528C; CX-0529C; CX-0424C; CX-0522C; CX-0523C; 0524C; CX-0508C; CX-0509C; CX-0510C; CX-0426C; CX-0530C.).

In each case, Complainants provided substantial evidence that their testing procedures were performed in accordance with the instructions disclosed in the Cure Dose Patents and yielded valid, reliable results. (*See* Section VIII.C, *supra.*).

Complainants have proven by a preponderance of evidence that the [ ] coating meets these limitations of claim 1.

b) "wherein said composition comprises: (i) 20-98 wt. % relative to the total weight of the composition of a radiation curable urethane (meth)acrylate oligomer having polyether polyol backbone; (ii) 0-80% wt. % [sic] relative to the total weight of the composition of one or more reactive diluents; (iii) 0.1-20 wt. % relative to the total weight of the composition of one or more photoinitiators; and (iv) 0-5 wt. % relative to the total weight of the composition of additives"

The evidence adduced in this Investigation demonstrates that the [ ] coating is approximately [

] (*See* CX-0302C (MUV Resp. to RFA No. 33); CX-1095C.).] In addition, the evidence establishes that the [ ] coating includes a number of [reactive diluents, approximately 5% by weight of photoinitiator compounds, and less than 5% by weight of silane compounds and other additives.] (*See* CX-1095C.).

Complainants have proven by a preponderance of evidence that the [ ] coating meets these claim limitations and infringes claim 1 of the '103 patent.

4. Claims 2 and 3 of the '103 Patent

a) "The composition according to claim 1, wherein the number average molecular weight of said urethane (meth)acrylate is

from about 1,200 g/mol [2,200 g/mol] to about 20,000 g/mol [10,000 g/mol]."

Credible evidence reflects that the [ ] in the [ ], which meets both of the claim limitations recited in these claims. (*See* CX-0242C; CX-0246C; CX-0484C; CDX-0046C.).

Complainants have proven by a preponderance of evidence that the [ ] coating meets these additional claim limitations and infringes claims 2 and 3 of the '103 patent.

5. Claims 4-6 of the '103 Patent

a) "The composition according to claim 1, wherein the number average molecular weight of said polyether polyol is from about 500 g/mol [1,500 g/mol] to about 15,000 g/mol [6,000 g/mol]." (Claims 4 and 5)

b) "The composition according to claim 5, wherein said polyether polyol is polypropylene glycol." (Claim 6)

Credible evidence reflects that the [ ], which falls into the ranges recited in claims 4 and 5. (*See* CX-0375C.0002; CX-0506C.0004.).

Complainants have proven by a preponderance of evidence that the [ ] coating meets these additional claim limitations and that the Accused Cure Dose Products infringe claims 4-6 of the '103 patent.

6. Claims 7 and 8 of the '103 Patent

a) "The composition according to claim 1, wherein said one or more reactive diluents are selected from the group consisting of alkoxylated alkyl substituted phenol acrylates, alkoxylated aliphatic polyacrylates, and alkoxylated bisphenol A diacrylates." (Claim 7)

b) "The composition according to claim 1, wherein said one or more reactive diluents comprise one or more aromatic rings." (Claim 8)

The evidence adduced in this Investigation establishes that the [

]

(CX-0302C (MUV Resp. to RFA No. 44); CX-0428C; CX-1095; Tr. (Bowman) at 466:3–467:7; CX-0239; CDX-0061C; CDX-0062C; CDX-0063C; CDX-0064C; CDX-0065C.).

Complainants have proven by a preponderance of evidence that the [ ] coating meets these additional claim limitations and infringes claims 7 and 8 of the '103 patent.

7. Claim 9 of the '103 Patent

a) "The composition according to claim 1, wherein said one or more photoinitiators contain a phosphorous, sulfur or nitrogen atom."

The evidence reflects that the [

]

(*See* CX-0239C.005; CX-0302C.0048 (MUV Resp. to RFA No. 47); CX-0428C; CX-1095C.).

Complainants have proven by a preponderance of evidence that the [ ] coating meets this additional claim limitation and infringes claim 9 of the '103 patent.

8. Claim 10 of the '103 Patent

a) "The composition according to claim 1, wherein said one of said additives is a silane coupling agent."

The evidence reflects that the [

], which is a silane coupling agent. (*See* CX-0239C.0005; CX-0302C.0054-55 (MUV Resp. to RFA No. 54); CX-1095C.).

Complainants have proven by a preponderance of evidence that the [ ] coating meets this additional claim limitation and infringes claim 10 of the '103 patent.

9. Claims 13-15 of the '103 Patent

a) "The composition according to claim 1, wherein said composition has an in-situ modulus (after cure) of less than 0.56 MPa [0.54MPa/0.52 MPa]."

As discussed in Sections VIII.D.1 and VIII.D.3, Complainants presented evidence that the [ ] coating has an in-situ modulus (after cure) of approximately [ ], which is less than 0.56 MPa, 0.54 MPa, and 0.52 MPa recited in claims 13, 14, and 15, respectively.

Complainants also provided substantial evidence that their testing procedures were performed in accordance with the instructions disclosed in the Cure Dose Patents and yielded reliable results. (*See* Section VIII.C, *supra.*).

Complainants have proven by a preponderance of evidence that the [ ] coating meets these additional claim limitations and infringes claims 13-15 of the '103 patent.

E. Respondent OFS' Single-Mode and Multi-Mode Coated Optical Fibers ("Accused OFS Fibers") Do Not Infringe Claims 20-22 of the '508 Patent and Claims 1-10 and 13-15 of the '103 Patent

Complainants asserted that the Accused OFS Fibers infringe claims 20-22 of the '508 patent and claims 1-10 and 13-15 of the '103 because these fibers are manufactured using the [ ] coating. (*See, e.g.*, CBr. at 12.).

The referenced claims in this Section are directed to an "inner primary coating composition." This term was construed to mean "a curable primary coating composition that has ***not been applied to an optical fiber***." (*Markman* Order at 39-40 (emphasis added).).

Therefore, claims 20-22 of the '508 patent and claims 1-10 and 13-15 of the '103 patent

only cover curable "primary coating composition[s]" that have "not been applied to an optical fiber." (*Id.*). In other words, these claims to "inner primary coating composition[s]" only cover the uncured chemical "primary coating composition" products that are used to manufacture coatings for optical fibers. These claims do not encompass primary coatings located on coated optical fibers. (*See id.*).

Although the Accused OFS Fibers are downstream products that are ultimately manufactured with the [ ], these coated optical ***fibers*** (and their corresponding primary coating) are not an "inner primary coating composition," and therefore, cannot infringe claims 20-22 of the '508 patent or claims 1-10 and 13-15 of the '103 patent.

F. Respondent OFS' AllWave®+ Zero Water Peak (ZWP) Single-Mode Coated Optical Fiber and AllWave® FLEX+ Zero Water Peak (ZWP) ("Tested OFS Single-Mode Fibers") Infringe Claims 1-8, 11-15, and 18-19 of the '508 Patent

1. Claim 1 of the '508 Patent

a) "A coated optical fiber comprising: (i) an optical fiber; (ii) a primary coating; and (iii) a secondary coating"

Respondent OFS did not dispute that the Accused OFS Single-Mode Fibers include a coated optical fiber comprising an optical fiber, a [ ] primary coating, and a [ ] coating. (*See, e.g.*, CX-0304C (OFS Resp. to Requests for Admission ("RFAs")); CDX-0081C.).

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet the preamble and the referenced claim limitations.

b) "said coated optical fiber has an attenuation increase of less than 0.650 dB/km at 1550 nm"

i. Tested OFS Single-Mode Fibers Infringe

Complainants submitted valid test results obtained by third-party Nextrom which reflect

that OFS' AllWave®+ Zero Water Peak (ZWP) Single-Mode Optical Fiber has an attenuation increase of approximately 0.429 dB/km at 1550 nm, and that OFS' AllWave® FLEX+ Zero Water Peak (ZWP) has an attenuation increase of approximately 0.135 dB/km at 1550 nm. (*See* CX-0081C; CX-0553C; CX-0560C; CX-0561C; CX-0566C; CX-0567C.). The referenced measurements are substantially lower than the claim requirement for a coated optical fiber with "an attenuation increase of less than 0.650 dB/km at 1550 nm."

Moreover, Complainants provided substantial evidence that the testing performed by Nextrom to obtain these measurements were carried out in accordance with the teachings disclosed in the Cure Dose Patents and yielded valid, reliable results. (*See* Section VIII.C, *supra.*). Respondent OFS did not submit any counter-testing to rebut that the attenuation increase of these fibers exceeds 0.65 dB/km.

Complainants have proven by a preponderance of evidence that the Tested OFS Single-Mode Fibers meet this claim limitation.

ii. Accused OFS Single-Mode Fibers Do Not Infringe; Tested OFS Single-Mode Fibers Are Not Representative of All Accused OFS Single-Mode Fibers

Complainants asserted that all the Accused OFS Single-Mode Fibers satisfy this claim limitation because the Tested OFS Single-Mode Fibers are representative of all the Accused OFS Single-Mode Fibers. (*See* CBr. at 33.). Although all of the Accused OFS Single-Mode Fibers use the same [ ] primary coating and [ ] coating, persuasive evidence was provided that "attenuation increase" varies depending on both the identity of the coating and the composition and numbers of strands of the glass optical fiber that is used. (*See, e.g.*, Tr. (Ballato) at 1564:14–1566:8, 1635:5–17, 1639:14–1640:10.).

The evidence and testimony adduced during the evidentiary hearing failed to establish

any clear linkage between the two (2) Tested OFS Single-Mode Fibers and the lengthy list of the Accused OFS Single-Mode Fibers that OFS sells, when both of the fibers that were tested satisfy different versions of the most recent G.657 glass standards[50] and had demonstrably different "attenuation increase" values. (*See generally* Tr. (Ballato) at 1565:1-4 (stating that the "bend insensitive" 657 standards originated in 2006); CDX-0204; CX-088C.).

Although all of the Accused OFS Single-Mode Fibers have glass standards between G.652 and G.657 (*see* CX-0192C), during the evidentiary hearing, Complainants' expert, Dr. Sancaktar, was unable to identify any affirmative evidence in the relevant glass standards or elsewhere that served as a factual basis for his opinion that the Tested OFS Single-Mode Fibers (which both satisfy at least one of the G.657 standards) were representative of all of the Accused OFS Single-Mode Fibers. (*See* Tr. (Sancaktar) at 755:10–757:25).

By contrast, Respondent OFS' expert, Dr. Ballato, testified that while "attenuation losses" do have some correlation with the MAC value[51] of an optical fiber, one would still "have to go and test every single [fiber]" in order to be able to determine its "attenuation increase." (Tr. (Ballato) at 1637:9-10, 1638:12–1639:17.).

Even though Respondent OFS did not present persuasive evidence affirming that the

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[50] These standards refer to the glass type of single-mode optical fiber, and are set by the International Telecommunication Union ("ITU"). (Tr. (Sancaktar) at 595:5-10, 662:6-18; CX-1140.0003.).). The ITU is the United Nations specialized agency in the field of telecommunications, information and communication technologies. (CX-1140.0004.). The standards describe the geometrical, mechanical, and transmission attributes of single-mode optical fibers. (*Id.* at 1140.0003.). G.652 is the oldest standard; G.657 is the newest generation of the ITU standard. (Tr. (Sancaktar) at 595:5-10.).

[51] The "MAC value" is "an empirical parameter that correlates to the bending performance of a fiber." (Tr. (Konstadinidis) at 1349:13-16.). It is a glass property of the fiber. (*Id.* at 1359:24-25, 1361:8-13 ("Q: Phil, what part of the coated optical fiber is being measured by its MAC value? A: It's the glass. Q: And does it have anything to do with the coatings? A: No, it does not.").). "[T]he lower the MAC value, the better the bending performance . . . ." (*Id.* at 1360:5-8.).

untested products do not infringe, Complainants bear the burden of proving that the testing for the "attenuation increase" of the Tested OFS Single-Mode Fibers was representative of the "attenuation increase" value that would be expected for *all* of the Accused OFS Fibers.

Because Complainants have not met their burden of proof, the Accused OFS Single-Mode Fibers that are not the AllWave®+ Zero Water Peak (ZWP) and the AllWave® FLEX+ Zero Water Peak (ZWP) do not satisfy this claim limitation.

c) "said primary coating has a modulus retention ratio after hydrolytic aging of at least 0.5 and/or a glass transition temperature (T_g) below -35° C"

The Accused OFS Single-Mode Fibers include an optical fiber that has been coated with [ ] as its primary coating and [ ] coating. (*See* CX-0304C (OFS Resp. to RFA Nos. 166-275); *see also* Tr. (Oliviero) at 1428:2-4.). The evidence also reflects that the [ ] coating has a modulus retention ratio after hydrolytic aging of [ ] exceeds the claim requirement of "at least 0.5." (*See* CX-0426C; CX-0530C.).

Complainants provided substantial evidence that their testing procedures were performed in accordance with the instructions disclosed in the Cure Dose Patents and yielded valid, reliable results. (*See* Section VIII.C, *supra.*).

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet this claim limitation.

d) "said primary coating is obtained by curing a primary coating composition having a cure dose to attain 95% of the maximum attainable modulus of less than 0.65 J/cm^2"

Complainants presented evidence that demonstrated that the [

] lower that the claim requirement of "less than 0.65 J/cm^2," recited in claim 1, and "below 0.55 J/cm^2," recited in claim 15. (*See* CX-0424C.).

Complainants also provided substantial evidence that their testing procedures were performed in accordance with the instructions disclosed in the Cure Dose Patents and yielded valid, reliable results. (*See* Section VIII.C, *supra.*).

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet this claim limitation.

However, because Complainants failed to prove that the Tested OFS Single-Mode Fibers, AllWave®+ Zero Water Peak (ZWP) Single-Mode Optical Fiber and AllWave® FLEX+ Zero Water Peak (ZWP), are representative of the other Accused Single-Mode Optical Fibers, only the Tested OFS Single-Mode Fibers infringe claim 1 of the '508 patent. Because Respondents have proven by clear and convincing evidence that this claim is invalid, the Tested OFS Single-Mode Fibers cannot, by operation of law, directly infringe the claim 1. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

2. Claims 2 and 3 of the '508 Patent

a) "The coated optical fiber of claim 1, wherein said primary coating has an in-situ modulus of less than 0.60 [0.56] MPa."

Complainants submitted evidence, and Respondents did not dispute, that the in-situ modulus of the [ ] coating on the Accused OFS Single-Mode Fibers was approximately [ ], which is less than 0.6 MPa, as required by claim 2 of the '508 patent, and less than 0.56 MPa, as required by claim 3 of the '508 patent. (*See* CX-0425C; CX-0427C; CX-0528C; CX-0529C; CDX-0083C.).

As discussed in Section VIII.C above, Complainants' testing procedures were performed

in accordance with the teachings disclosed in the Cure Dose Patents and yielded valid, reliable results.

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet the additional claim limitations. However, for the reasons discussed in Section VIII.F.1 above, only the Tested OFS Single-Mode Fibers infringe claims 2 and 3 of the '508 patent. Because Respondents have proven by clear and convincing evidence that these claims are invalid, the Tested OFS Single-Mode Fibers cannot, by operation of law, directly infringe the claims. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

3. Claim 4 of the '508 Patent

a) "The coated optical fiber of claim 1, wherein said attenuation increase is less than 0.5 dB/km."

As discussed above in Section VIII.C, Complainants submitted test results prepared by third-party Nextrom that reflected that Respondent OFS' AllWave®+ Zero Water Peak (ZWP) Single-Mode Optical Fiber has an attenuation increase of approximately 0.429 dB/km at 1550 nm, and that OFS' AllWave® FLEX+ Zero Water Peak (ZWP) has an attenuation increase of approximately 0.135 dB/km at 1550 nm, which meet this claim limitation. (*See* CX-0081C; CX-0553C; CX-0560C; CX-0561C; CX-0566C; CX-0567C.).

Complainants presented substantial evidence that Nextrom's testing procedures were conducted in accordance with the teachings disclosed in the Cure Dose Patents and yielded valid, reliable results. (*See* Section VIII.C, *supra.*).

Complainants have proven by a preponderance of evidence that the Tested OFS Single-Mode Fibers infringe claim 4 of the '508 patent. However, for the reasons discussed in Section VIII.F.1 above, only the Tested OFS Single-Mode Fibers infringe claims 2 and 3 of the '508

patent. Because Respondents have proven by clear and convincing evidence that this claim is invalid, the Tested OFS Single-Mode Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

4. Claim 5 of the '508 Patent

a) "The coated optical fiber of claim 1, wherein said primary coating composition comprises an ethylenically unsaturated oligomer."

The evidence reflects that the [ ] coating used to coat the Accused OFS Single-Mode Fibers includes [ ] (*See* CX-0302C (MUV Resp. to RFA Nos. 18, 26-27, 29); CX-0375C–0381C.).

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet the additional claim limitation. However, for the reasons discussed in Section VIII.F.1 above, only the Tested OFS Single-Mode Fibers infringe claim 5 of the '508 patent. Because Respondents have proven by clear and convincing evidence that this claim is invalid, the Tested OFS Single-Mode Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

5. Claims 6-8 and 11 of the '508 Patent

a) "The coated optical fiber of claim 5, wherein said oligomer is prepared by reacting the following components: (1) one or more polyisocyanates; (2) one or more polyols; and (3) one or more hydroxyfunctional (meth)acrylates." (Claim 6)

b) "The coated optical fiber of claim 6, wherein said one or more polyols includes [consists essentially of] polypropylene glycol." (Claims 7 and 8)

c) "The coated optical fiber of claim 6, wherein said one or more hydroxyfunctional (meth)acrylates includes hydroxyethyl acrylate." (Claim 11)

Complainants presented evidence that the [ ] coating on the

Accused OFS Single-Mode Fibers is prepared by [

] (*See* CX-0985C; CX-0375C–0381C.). [ ] (*See* CX-0506C.0004; *id.*). The polyol and polypropylene glycol (PPG) claim limitations are likewise met because the [ ] (*See id.*). The hydroxyfunctional (meth)acrylate claim limitations are met because [

] (*See id.*).

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet these claim limitations. However, for the reasons discussed in Section VIII.F.1 above, only the Tested OFS Single-Mode Fibers infringe claims 6-8 and 11 of the '508 patent. Because Respondents have proven by clear and convincing evidence that these claims are invalid, the Tested OFS Single-Mode Fibers cannot, by operation of law, directly infringe the claims. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

6. Claims 12-14 of the '508 Patent

a) "The coated optical fiber of claim 1, wherein said primary coating composition comprises one or more monomers." (Claim 12)

b) "The coated optical fiber of claim 12, wherein said one or more monomers includes an alkoxylated [aliphatic poly]acrylate monomer." (Claims 13 and 14)

The evidence confirms that the [ ] coating on the Accused OFS Single-Mode Fibers includes [

] (*See* CX-0239C.0005; CX-0302; CX-1095C.). The [ ] meets the claim 13 limitation for an alkoxylated acrylate monomer. (CX-0239C.0005; CX-0302; CX-1095C; Tr. (Bowman) at 477:4-11.). The [

] meets the claim 14 limitation for an alkyoxylated aliphatic polyacrylate monomer. (*See* CX-0239C.0005; CX-0302; CX-1095C; Tr. (Bowman) at 477:12-19.).

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet these additional claim limitations. However, for the reasons discussed in Section VIII.F.1 above, only the Tested OFS Single-Mode Fibers infringe claims 12-14 of the '508 patent. Because Respondents have proven by clear and convincing evidence that these claims are invalid, the Tested OFS Single-Mode Fibers cannot, by operation of law, directly infringe the claims. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

7. Claim 15 of the '508 Patent

a) "The coated optical fiber of claim 1, wherein said cure dose is below 0.55 J/cm^2."

As discussed above in Section VIII.D.1, the evidence shows that the [ ] coating on the Accused OFS Single-Mode Fibers has a tested cure dose of [ ], which satisfies the claim limitation. (*See* CX-0424C; CX-0522C–0524C; CX-0508C–CX-0510C.).

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet this additional claim limitation. However, for the reasons discussed in Section VIII.F.1 above, only the Tested OFS Single-Mode Fibers infringe claim 15 of the '508 patent. Because Respondents have proven by clear and convincing evidence that this claim is invalid, the Tested OFS Single-Mode Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

8. Claim 18 of the '508 Patent

a) "The coated optical fiber of claim 1, wherein said secondary coating has: (a) a T_g of at least 40° C; (b) a secant modulus of at least 400 MPa; and (c) an elongation at break of at least 10%."

The Accused OFS Single-Mode Fibers use [ ] coating. (*See* CX-0304C (OFS Resp. to RFA Nos. 166-275); *see also* Tr. (Oliviero) at 1428:2-4.). The evidence demonstrates that [ ] (CX-0194C; CX-1103; CX-1096C; CX-1097C; CX-1098C; CDX-0103C; CDX-0104C; CDX-0105C.). Respondents did not submit evidence to the contrary.

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet these additional claim limitations. However, for the reasons discussed in Section VIII.F.1 above, only the Tested OFS Single-Mode Fibers infringe claim 18 of the '508 patent. Because Respondents have proven by clear and convincing evidence that this claim is invalid, the Tested OFS Single-Mode Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

9. Claim 19 of the '508 Patent

a) "The coated optical fiber of claim 1, wherein said an optical fiber is an optical glass fiber."

The Accused OFS Single-Mode Fibers include an optical glass fiber. (CX-0304C; CDX-0107C.).

Complainants have proven by a preponderance of evidence that the Accused OFS Single-Mode Fibers meet this additional claim limitation. However, for the reasons discussed in Section VIII.F.1 above, only the Tested OFS Single-Mode Fibers infringe claim 19 of the '508 patent.

Because Respondents have proven by clear and convincing evidence that this claim is invalid, the Tested OFS Single-Mode Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

10. Respondent MUV Does Not Indirectly Infringe Claims 1-8, 11-5, and 18-19 of the '508 Patent

Respondent OFS [

] (*See* CX-0304C (OFS Resp. to RFA Nos. 166-275); *see also* Tr. (Oliviero) at 1428:2-4.).

With respect to the issue of induced infringement, there was no evidence adduced in Investigation that proved that [ ] coating to Respondent OFS with any knowledge or specific intent as to the particular OFS optical fiber to which its coating is applied. Induced infringement under 35 U.S.C. § 271(b) requires that the accused infringer must have had both knowledge and specific intent to encourage another's direct infringement. *E.g.*, *Toshiba Corp. v. Imation Corp.*, 681 F.3d 1358, 1363 (Fed. Cir. 2012).

Because Respondents' testimony was persuasive that there is a broad array of coated optical fibers that can be manufactured using the [ ] coating that have not been proven to infringe directly, a showing of indiscriminate knowledge and intent by Respondent MUV that the [48] coating will generally be used by Respondent OFS for manufacturing coated optical fibers does not establish induced infringement of claims 1-8, 11-15, and 18-19 of the '508 patent. (*See* CX-0304C (OFS Resp. to RFA Nos. 166-275); *see also* Tr. (Oliviero) at 1428:2-4.).

There is no evidence that Respondent MUV had the requisite knowledge and specific intent to induce Respondent OFS to specifically use the [ ] coating with either of the two fibers, AllWave®+ Zero Water Peak (ZWP) and the AllWave FLEX®+ Zero Water Peak (ZWP), that have been shown to infringe claims 1-8, 11-15, and 18-19 of the '508 patent. Thus, Complainants have not proven by a preponderance of evidence that Respondent MUV induced infringement of claims 1-8, 11-15, and 18-19 of the '508 patent.

With respect to the issue of contributory infringement, Respondent OFS' multi-mode fibers which also use the [ ] coating have not even been accused of infringement of claims 1-8, 11-15, and 18-19 of the '508 patent. (*See* CPBr. at 11-12; CX-0304C (OFS Resp. to RFA Nos. 166-275); *see also* Tr. (Oliviero) at 1428:2-4 ("Claim 1 of the '508 patent includes an 'attenuation increase' limitation which is only satisfied by the single-mode fibers, not multimode.").). Therefore, the use of the [ ] coating at least in the manufacture of Respondent OFS' multi-mode optical fibers is a substantial non-infringing use with respect to the asserted claims 1-8, 11-15, and 18-19 of the '508 patent.

A substantial non-infringing use is an absolute defense to contributory infringement under 35 U.S.C. § 271(c). *See Toshiba*, 681 F.3d at 1363. Because there are uses of the [ ] coating with both single-mode and multi-mode fibers that do not involve the two particular optical fibers, AllWave®+ Zero Water Peak (ZWP) and the AllWave FLEX®+ Zero Water Peak (ZWP), that have been demonstrated to infringe, Complainants have not proven by a preponderance of evidence that Respondent MUV contributed to infringement of claims 1-8, 11-15, and 18-19 of the '508 patent.

G. Validity

1. None of the Asserted Claims Are Invalid as Anticipated[52]

In their Pre-Hearing Briefs, Respondents raised a number of prior art references and argued that they anticipated certain claims of the Cure Dose Patents under 35 U.S.C. § 102(b) and § 102(e). (RMPBr. at 39-40, 47; ROPBr. at 19, 36-37.). None of these of these prior art references were discussed in their Post-Hearing Briefs. (*See* RMBr. at 29-43; ROBr. at 34-38.) Thus, any references to prior art references that were not stricken by Order No. 21 or discussed in Respondents' Post-Hearing Briefs are deemed waived. (*See* Ground Rule 10.1.).

Additionally, in its Post-Hearing Brief, Respondent OFS argued for the first time that claims 1-4, 15, 18, and 19 of the '508 patent are anticipated under 35 U.S.C. § 102(b) by WO 00/18696 to Snowwhite (RX-2188). (*See* ROBr. at 34-38.). Respondent OFS did not raise this defense in its Pre-Hearing Brief, and the defense is therefore deemed abandoned or withdrawn. (*See* Ground Rule 7.2; *see also* SRBr. at 16.).

2. None of the Asserted Claims Are Invalid as Obvious

In their Pre-Hearing Briefs, Respondents raised a number of prior art references and argued that they rendered obvious certain claims of the Cure Dose Patents under 35 U.S.C. § 103(a). (RMPBr. at 40; ROPBr. at 19-27.). None of these of these prior art references were discussed in their Post-Hearing Briefs. (RMBr. at 29-43; ROBr. at 38-42.). Thus, any arguments with respect to the prior-art references that were not addressed in Respondents' Post-

[52] Complainants filed a motion seeking to strike and preclude, *inter alia*, Mr. Overton's invalidity opinions with respect to anticipation by U.S. Patent Nos. 5,352,712 ("Shustack '712 patent"); 5,664,041 ("Szum '041 patent"); and 6,339,666 ("Szum '666 patent"). (Motion Docket No. 1031-014 (May 3, 2017).). This aspect of Complainants' motion was granted, and Mr. Overton's opinions with regard to anticipation by the Shustack '712 patent, the Szum '041 patent, and the Szum '666 patent were stricken. (*See* Order No. 21 (May 24, 2017).).

Hearing Briefs are deemed waived. (*See* Ground Rule 10.1.).

Additionally, in its Post-Hearing Brief, Respondent OFS asserted that claims 1-4, 15, 18, and 19 of the '508 patent are invalid as obvious under 35 U.S.C. §103 over Snowwhite in view of U.S. Patent No. 7,174,079 to Abel (RX-2163) ("Abel"). (*See* ROBr. at 34-42.). Respondent OFS did not raise this defense in its Pre-Hearing Brief, and is thus deemed abandoned or withdrawn. (*See* Ground Rule 7.2; *see also* SRBr. at 16.).

3. Written Description and Enablement

a) Claims 21 of the '508 Patent and Claims 1-10 and 13-15 of the '103 Patent Are Not Invalid for Lack of Written Description or Enablement

The evidence adduced in this Investigation does not clearly and convincing demonstrate that claim 21 of the '508 patent and claims 11-10 and 13-15 of the '103 patent are invalid for lack of written description or enablement under 35 U:S. § 112.

These claims are limited to primary coating compositions that are based on a radiation-curable (meth)acrylate oligomer having a particular backbone (*see* JX-0001 at 13:7–14:3 (claim 21)), and specific in-situ modulus, cure dose, and modulus retention ratio properties (*see* JX-0003 at 13:17-32 (claim 1)). Claim 21 of the '508 patent requires that the oligomer have a backbone derived from either "one or more polyether polyols" or "one or more polyether polyols in combination with one or more polyester polyols." (*See* JX-0001 at 13:7–14:3 (claim 21).). Claims 1-10 and 13-15 of the '103 patent all specifically require a urethane acrylate oligomer having a polyether polyol backbone. (*See* JX-0003 at 13:17-32 (claim 1).).

Respondents' expert, Mr. Overton, testified that by the time of the claimed invention, the chemistry of formulating coating compositions based on acrylate oligomers was well-known and fairly predictable. (Tr. (Overton) at 1314:5–1315:9 ("Q: Acrylate chemistry was very well

developed by 2002; right? A: Yes, I would say so. . . . Q: There had been a number of urethane acrylate-based coatings on the market by 2002? A: Yes, I think a fair number were commercialized by then.").). Mr. Overton also testified that the chemical components that were being used to make such compositions were well-known. (*See id.* at 1308:15–1315:9.).

Moreover, the patent specification of the Cure Dose Patents provide specific instructions on how to manufacture the (meth)acrylate oligomer and examples of "suitable" "polyether polyols" and polyether polyols "in combination with polyester polyols." (*See* JX-0001 at 3:24-4:7.). The specification also lists of examples of reactive diluents, photoinitiators, and additives that can be used in the coating formulation along with the oligomer. (*See id.* at 4:22-5:17.). Additionally, the Cure Dose Patents include specific examples of representative formulations with the claimed properties. (*See id.* at columns 5-8 (Examples).).

For the foregoing reasons, Respondents have failed to show by clear and convincing that the full scope of the particular (meth)acrylate oligomer-based compositions claimed in claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent is not adequately described in the patent specification of the Cure Dose Patents.

Similarly, the evidence adduced in this Investigation also does not clearly and convincingly demonstrate that claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are invalid for lack of enablement. All of the referenced claims provide a combination of both structural and functional limitations.

As explained above, the art of acrylate-based primary coating compositions was fairly predictable by the time of the invention. Moreover, there are specific examples provided in the patent specification of the Cure Dose Patents so that a person using the known sets of ingredients for manufacturing urethane (meth)acrylate oligomers and working off of the specific examples in

the patent specification would be able to achieve the full set of the claimed compositions. *See, e.g.*, *Johns Hopkins Univ. v. CellPro, Inc.*, 152 F.3d 1342, 1360 (Fed. Cir. 1998) ("The test [for undue experimentation] is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed to enable the determination of how to practice a desired embodiment of the claimed invention.") (quoting *PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1564 (Fed. Cir. 1996).

For the foregoing reasons, Respondents have not proven by clear and convincing evidence that claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are invalid for lack of enablement.

b) Claims 1-8, 11-15, 18-20, and 22 of the '508 Patent Are Invalid for Lack of Written Description and Enablement

Contrary to claim 21 of the '508 patent and claims 1-10 and 13-15 of the '103 patent, the evidence adduced in this Investigation clearly and convincingly reflects that claims 1-8, 11-15, 18-20, and 22 of the '508 patent are invalid for lack of written description and enablement.

i. Claims 20 and 22 of the '508 Patent

The scope of claims 20 and 22 of the '508 patent encompasses an extremely broad genus of widely-variant chemical species. (*See, e.g.*, JX-0001 at 2:25-50, 2:66-5:17; Tr. (Overton) at 1143:13-1144:5; Tr. (Bowman) at 1711:21.). Claims 20 and 22 are directed to primary coating compositions having the following ranges of three physical properties: (1) in-situ modulus (after cure) of "less than 0.6 MPa [0.56 MPa]"; (2) modulus retention ratio after hydrolytic aging of "at least 0.6 [0.5]"; and (3) cure dose to attain 95% of the maximum attainable modulus of "less than

0.65 J/cm^2." (JX-0001 at 13:1-7, 14:4-9.). These claims are not limited to any particular materials. Rather, they are claimed entirely by functional claim limitations. Thus, claims 20 and 22 encompass any material(s) that could be formulated as a primary coating with the claimed sets of properties. (*See* Tr. (Overton) at 1143:23–1144:5 ("What is the full scope of claims 20 and 22, in your opinion? A: It's hard -- I don't even know, because it is a primary coating composition, but nothing is given about the scope of the composition. Only performance attributes. So apparently, any material that has these attributes is within the scope of the claims.").).

There is a wide range of different materials that could be used to prepare primary coating compositions that meet these purely functional claim limitations. (*See, e.g.*, *id.* at 1143:23–1146:3.). As Staff pointed out, the record includes examples of materials other than acrylate oligomers that can be used to prepare curable primary coating compositions. For example, U.S. Patent No. 5,744,514 (Shustack), which is prior art to the Cure Dose Patents, discloses primary coating compositions based on mercapto-functional oligomers. (*See* CX-1135.).

Another prior art reference, WO 00/18696 (DSM N.V.) discloses that radiation-curable compositions can, instead of acrylate oligomers, be based on oligomers with reactive groups that are "vinyl ether, vinyl, acrylamide, maleate, fumarate, and the like." (RX-2188 at 7:11-15.). Complainants' expert, Dr. Bowman, testified that his laboratory works on curable compositions based on thiolenes. (*See* Tr. (Bowman) at 1751:11-21.). Respondents' expert, Mr. Overton, mentioned epoxy acrylate and silicones as other examples of possible coating materials. (*See* Tr. (Overton) at 1315:10-20.).

However, the specification of the Cure Dose Patents discloses only a limited set of compositions that are all based on urethane acrylate oligomers. (*See* Tr. (Overton) at 1315:21-24

("The specification only discusses acrylate chemistry."). This was confirmed by Mr. van Eekelen's testimony, one of the inventors of the Cure Dose Patents. (Tr. (van Eekelen) at 180:23–181:6 ("Q: The coatings that you invented, they always use an oligomer that's urethane acrylate. Do I have that correct? A: For primary coatings we use urethane acrylate as oligomer, correct." Q: Do any of the primary coatings that are described in the '508 or '103 patent use an oligomer that's not a urethane acrylate? A: I have to check, but I don't think so").). In addition, there are only one or two working examples explicitly disclosed in the patent specification that meet all of the limitations of claims 22 and claim 20, respectively. (*See* JX-0001 at Table 2, Examples 4 and 7.).

The patent specification does not describe or otherwise convey possession of the full set of primary coating compositions based on all of the possible materials that could come within the scope of these claims. Moreover, a person of skill in the art would not be able to make and use the full range of primary coating compositions based on all of the possible materials that are covered by the stated claims without undue experimentation.

In rebuttal, Complainants maintained that because claims 20 and 22 recite a "primary coating composition" in the preamble, the claims are limited to compositions containing ***(meth)acrylate oligomers***, ***acrylate or vinyl functional group reactive diluents***, photoinitiators, and additives, based on the constructions of the terms "oligomer," which was construed to mean "[m]olecules composed of repeating structural units, wherein the molecules must include acrylate or methacrylate," and "reactive diluents," which the Parties agreed means "polymerizable vinyl or acrylate monomers." (CBr. at 73-74; Tr. (Bowman) at 1678:4-13; *Markman* Order, Attach. at 24-25, 44.).

The term "primary coating composition" was construed to mean "[a] curable primary

coating composition that has not been applied to an optical fiber," and was ***not*** found to be restricted to a composition that includes (meth)acrylate oligomers and acrylate or vinyl functional group reactive diluents. (*Markman* Order, Attach. at 11-12; *see also* JX-0001 at 3:11-23 (stating that "[t]he primary coating composition of the present invention ***generally comprises***" ranges of the stated ingredients) (emphasis added).).

This claim interpretation is also redundant with claim 1 of the '103 patent and its dependent claims, which separately recite limitations for broad ranges of oligomers, reactive diluents, photoinitiators, and additives, in addition to reciting a "primary coating composition" in the preamble. (*See* JX-0003 at 13:17-32.).

Complainants had an opportunity to make this argument during the *Markman* proceedings, but chose not do so. Instead, Complainants argued that the term "primary coating composition" means "a composition for a coating used in direct contact with an optical fiber." (*Markman* Order, App. A at 11-12.). Complainants' attempt to re-argue—and essentially narrow—the construction of "primary coating composition," for the sole purpose of contending these claims are fully supported by the more narrow disclosure in the specification, is inappropriate, and thus fails.

Complainants also asserted that deference should be given to the patent examiner's decision to allow the claims. (CBr. at 61-62.). However, during prosecution, the patent examiner never expressly addressed the issues of whether the full scope of the claimed compositions is adequately described by the patent specification. (*See* JX-0005.). Moreover, courts have invalidated patent claims for failure to meet the written description and enablement requirements, despite the fact they were allowed by the USPTO. *See, e.g.*, *AbbVie Deutschland GmbH v. Janssen Biotech, Inc.*, 759 F.3d 1285 (Fed. Cir. 2014) (holding claims invalid for lack

of written description); *Wyeth & Cordis Corp. v. Abbott Labs.*, 720 F.3d 1380 (Fed. Cir. 2013) (holding claims invalid for lack of enablement); *ALZA Corp. v. Andrx Pharms., LLC*, 603 F.3d 935 (Fed. Cir. 2010) (holding claims invalid for lack of enablement).

For the foregoing reasons, Respondents have met their burden and proven by clear and convincing evidence that claims 20 and 22 of the '508 patent are invalid for lack of written description and enablement.

ii. Claims 1-8, 11-15, and 18-19 of the '508 Patent

Claims 1-8, 11-15, and 18-19 of the '508 patent are directed to coated optical fibers having "an attenuation increase of less than 0.650 dB/km" that depends on the combination of the optical fiber and the coating system. (JX-0001 at 12:2-16.). The claimed fibers are defined by two additional limitations that affect the primary coating: (1) a limitation that "said primary coating has a modulus retention ratio after hydrolytic aging of at least 0.5 and/or a glass transition temperature (T_g) below -35° C"; and (2) an additional limitation that "said primary coating is obtained by curing a primary coating composition having a cure dose to attain 95% of the maximum attainable modulus of less than of less than 0.65 J/cm^2." (*Id.*).

However, the limitations on the characteristics of the primary coating are not themselves novel. Prior art adduced in this Investigation discloses primary coating compositions that meet the cure speed and glass transition temperature limitations. (*See, e.g.*, CX-0163 (WO 02/055613 (DSM N.V.)) at Table 1: Examples I and II; *see also* JX-0001 at Table 1 (Comparative Examples).). Thus, the attenuation increase limitation is the purported point of novelty for the claimed invention.

During the evidentiary hearing, Respondent OFS' expert, Dr. Ballato, testified that the claimed "attenuation increase" limitation is not based solely on the primary coating but instead

on the combination of the optical fiber and the coating system. (*See, e.g.*, Tr. (Ballato) at 1564:14–1566:8; 1635:5-17; 1639:14–1640:10.). Dr. Ballato's testimony was corroborated by results of Nextrom's testing of the Tested OFS Single-Mode Fibers.

Nextrom's testing results reflected that: (i) the AllWave®+ Zero Water Peak (ZWP) has an "attenuation increase" of ***0.426 dB/km*** at 1550 nm; and (ii) the AllWave® FLEX+ Zero Water Peak (ZWP) has an "attention increase" of ***0.135 dB/km*** at 1550 nm. (*See* CX-0088C; CX-0532C; CX-0535C; CX-0566C; CX-0567C; CX-0560C; CX-0561C; Tr. (Sarmah) at 253:14–260:10.). Dr.Ballato offered a persuasive opinion that the almost "threefold difference" in the attenuation increase values for the two tested fibers when used with the same coating confirms the substantial role that the glass core can have in reducing attenuation losses.

> If you set that aside for the time being, then what I have -- my opinion is that the fact that you have that threefold difference, roughly threefold difference, in the attenuation increase between the AllWave+ and the Flex+, because they have the same coatings. I mean, if there's anything that compares or contrasts the role of the glass, you know, the core, to the role of the coating, it's that. They have the exact same coatings. So why -- and the mode fields are not terribly different. They are a little bit different. The MAC values are therefore going to be different.
>
> But it is the fact that the one is the A2 versus the A1 compliant, which means that it is more bend-sensitive. So again, all of that is self-consistent and explains why you have this market difference in the bend-induced attenuation for what otherwise would be considered to be more or less similar fibers except for the fact that the cores and the core distributions are different.

(Tr. (Ballato) at 1583:24–1584:10, 1634:2–1635:17.).

The only disclosure relating to optical fibers that is provided in the patent specification is to one, generic form of single-mode fiber. (*See* JX-0001 at 11:55-67.). The specification provides four (4) examples of primary coating compositions (Examples 1, 4, 5, and 7) that meet the claim limitations when used with the one disclosed form of single-mode optical fiber. (*See id.* at Table 2.). The "attenuation increase" measurements of these four (4) examples, shown in

Table 2 of the '508 patent, appear to have been derived from testing results of these primary coating formulations with this one fiber. (*See* JX-0001.). The lowest attenuation increase disclosed in Table 2 is 0.365 dB/km at 1550 nm. (*Id.* at Table 2 (Example 1).). There is no other disclosure in the specification pertaining to the characteristics of optical fibers, or the relationship between the optical fiber and the coating, and how that can affect attenuation losses. (*See id.* at 11:55-67.).

Although Complainants contended that the invented coatings play a role in reducing attenuation, the patent specification discloses a wide range of coatings that can be used to meet the claim limitations, and that a skilled artisan would have known how to draw the coatings of the invention on an optical fiber. (CBr. at 74-79). The persuasive arguments support a conclusion that only part of the scope of claims 1-8, 11-55, and 18-19 of the '508 patent is described and enabled. *See, e.g., Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371, 1378-80 (Fed. Cir. 2007) (claims were invalid for lack of enablement where patent specification only described subject matter of injectors with pressure jackets but claims covered injectors both with and without pressure jackets).

Dr. Ballato's discussion of the evidence during his testimony was largely uncontradicted that bend-insensitive fiber such as the AllWave® FLEX+ Zero Water Peak (ZWP) fiber could be used with less effective coatings that were not contributed by the patent inventors and still come within the outer boundaries of claim requirements. (*See* Tr. (Ballato) at 1564:14–1566:8, 1593:16–1594:21, 1639:18–1640:10.).

Thus, the scope of the claimed subject matter covered by claims 1-8, 11-15, and 18-19 of the '508 patent impermissibly encompasses reduced attenuation losses that are attributable to the engineering of the core of the optical fiber, which the patent inventors did not invent or describe

in the '508 patent. *See, e.g.*, *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1349-50 (Fed. Cir. 2010) (en banc) ("an adequate written description of a claimed genus requires more than a generic statement of an invention's boundaries"); *Sitrick v. Dreamworks, LLC*, 516 F.3d 993, 999, (Fed. Cir. 2008) ("The scope of the claims must be less than or equal to the scope of the enablement to ensure that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims.").

Additionally, the teachings disclosed in the specification of the Cure Dose Patents do not enable the recent innovations in engineering bend insensitivity into the core of the glass optical fiber such that a skilled artisan would not be able to make any of the coated optical fiber that have attenuation losses below 0.365 dB/km at 1550 nm (*see* JX-0001 at Table 2 (Example 1)), without undue experimentation. *See Magisil Corp. v. Hitachi Global Storage Techs., Inc.*, 687 F.3d 1377, 1379-80 (Fed. Cir. 2012) (claims held invalid where "the specification enabled a marginal advance over the prior art, but did not enable at the time of filing a tunnel junction of resistive changes reaching even up to 20%, let alone the more recent achievements about 600%").

For the foregoing reasons, Respondents have met their burden and proven by clear and convincing evidence that claims 1-8, 11-15, and 18-19 of the '508 patent are invalid for lack of written description and enablement.

4. Indefiniteness

a) None of the Asserted Claims of the Cure Dose Patents Are Indefinite

Respondents have not proven by clear and convincing evidence that claims 1-8, 11-15, and 18-22 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are indefinite under 35

U.S.C. § 112. The functional limitations recited in the asserted claims of the Cure Dose Patents are all based on testing that was previously known in the art and also described in detail in the patent specification. (*See* JX-0001 at 7:48-11:67 ("Test Methods" section); JX-0003 at 9:20-13:15 ("Testing Methods" section); *see also* CX-0199C; (U.S. Patent No. 5,977,202); CX-1102 (WO 99/15473); CX-1058 (WO 01/70642 A2).). Contrary to Respondents' assertions, the omission of certain details that would nonetheless be reasonably certain to one skilled in the art does not amount to indefiniteness under 35 U.S.C. § 112.

For example, Respondents argued that the "modulus retention ratio" limitation is indefinite because the specification of the Cure Dose Patents does not set forth the specific UV curing settings that must be used and also because the Parties obtained different results in their efforts to conduct this test. (ROBr. at 24-25.). Assuming one would know to use a properly cured sample, the evidence does not establish that the particulars of the UV curing instrumentation matter to the determination of the modulus retention ratio of a sample after hydrolytic aging. (*See* JX-0001 at 11:45-54; JX-0003 at 12:61–13:2.).

The fact that Respondent MUV obtained a different modulus retention ratio result from Complainants is not necessarily relevant—let alone dispositive—to this issue. Although the Cure Dose Patents do not expressly state that the aged equilibrium modulus measurement must be obtained at the point in time when the eight-week aging process is first completed, this implicit instruction would seemingly be clear to one skilled in the art.

Moreover, Respondent MUV failed to provide a plausible reason why it waited three (3) to four (4) months before performing its own measurement of the aged equilibrium modulus. (*See* JX-0001 at 11:45-54; JX-0003 at 12:61–13:2.). Mr. Overton, Respondents' expert, acknowledged that such a delay could result in a different MRR. (Tr. (Overton) at 1307:8–

1309:9.). Thus, the fact that Respondent MUV obtained different results than Complainants, standing alone, does not mean that a person of ordinary skill in the art would be uncertain in how to determine the modulus retention ratio. (*See* Tr. (Classey) at 975:17-23; *see also* Tr. (Overton) at 1307:8-1309:9.).

Similarly, Respondents contended that the "in-situ modulus" limitation is indefinite because the Cure Dose Patents do not specify the age and storage conditions of the test samples. (ROBr. at 25.). As Staff noted, "a person of skill would presumably have the basic common sense to not use a heavily aged and degraded coating or a primary coating that has not been substantially cured." (SRBr. at 27 (citing JX-0001 at 10:65–11:44; JX-0002[53] at 6:37-41 (stating that a coating should be cured to attain at least 85% of its equilibrium modulus)); *see also* JX-0003 at 12:14-59.).

With respect to the "cure dose" limitation, the Cure Dose Patents provide specific instructions for conducting the cure dose test. (*See* JX-0001 at 7:49-8:52; JX-0003 at 9:21-44.). The instructions in the specification include a particular sample thickness of 75 microns and testing at specific doses of 0.2, 0.3, 0.5, 0.75, 1.0, and 2.0 J/cm^2. (*See* JX-0001 at 7:55-59; JX-0003 at 9:25-31.). The evidence also shows that the concept of and methods for measuring the claimed "cure dose" were previously known in the art. (*See* CX-1092(U.S. Patent No. 5,977,202); CX-1102 (WO 99/15473); CX-1058 (WO 01/70642 A2).). Complainants used a standard curve-fitting equation. (*See generally* Tr. (Bowman) at 448:13–449:25.).

With regard to Respondents' unsupported allegations that the lamp distance and belt speed used for testing are not dictated by the patent specification and could be varied, the

[53] The specification of the '564 patent was incorporated by reference by the Cure Dose Patents. (*See* JX-0001 at 1:34-37; JX-0003 at 1:39-42.).

evidence does not clearly and convincingly demonstrate that a person of ordinary skill would not use a standard instrumentation setup where the lamp distance cannot be varied or that reasonable variations in the lamp distance and belt speed alone will make a difference in the ultimate determination of the 95% cure dose measurement. (*See* Tr. (Bowman) at 1696:15-1697:23 (opining that variations in lamp power do not impact modulus measurements); Tr. (Lawrence) at 371:12-20 ("It's a fixed height and there's one power to the machine.").).

For the "attenuation increase" limitation, there is a specific winding test described in the patent specification of the Cure Dose Patents. (*See* JX-0001 at 11:55-67; JX-0003 at 13:3-15.). Evidence persuasively reflects that similar attenuation tests that involved winding an optical fiber around a drum coated with sandpaper were previously known in the art. (*See, e.g.*, CX-0199C.). The fact that there was not a single accepted test in the art does not mean that a person of skill would not be able to carry out the test that is provided in the patent.

Respondent OFS' witness, Kariofilis Konstadinidis ("Dr. Phil"), conceded that he was able to follow the test described in the specification and that the test was "fairly straightforward." (*See* Tr. (Konstadinidis) at 1391:19–1392:3 ("Q: Did you do single layer winding for the attenuation increase test? A: Yes, it was a single layer. Q: And the issues with interpreting the data aside, did you encounter any difficulties in conducting the tests described in column 11 of the '508 patent? A: After the initial test -- the initial period of, you know, building the drum and making fit our rewinder and all that, once I started, it was fairly straightforward after that.").). Moreover, although the specification does not expressly state not to use a basket weave or multiple layers of winding, Dr. Konstadinidis knew to only use single layer winding for the attenuation increase test. (*See id.* at 1391:19-21.).

For the foregoing reasons, Respondents have failed to prove by clear and convincing

evidence that the "modulus retention ratio," in-situ modulus," "cure dose," and "attenuation increase" limitations recited in claims 1-8, 11-15, and 18-22 of the '508 patent and claims 1-10 and 13-15 of the '103 patent are indefinite.

IX. THE CAVITATION PATENT

A. Overview of Complainants' Infringement Allegations and Respondents' Invalidity Allegations

1. All of the Asserted Claims of the '659 Patent Are Invalid

Each of Complainants' asserted claims from the '659 patent is invalid. As set forth below, claims 1-3, 9, 16-18 and 21 are anticipated by the sale of a prior art coating. Claims 1-3, 9, 16-18, and 21 are invalid as indefinite. Claims 1-3, 9, 16-18, and 21 (those containing "cavitation strength" limitations) are invalid for lack of enablement, while claims 12 and 30 survive Respondents' enablement challenge. None of the asserted claims is invalid due to derivation. Finally, all of the asserted claims are invalid for lack of written description.

Chart No. 7: Invalidity Findings for Asserted Claims of '659 Patent

Asserted	Anticipated	Indefinite	Lack of Enablement	Derivation	Lack of Written Description
Claims 1-3	X	X	X		X
Claims 9 & 21	X	X	X		X
Claims 16-18	X	X	X		X
Claims 12 & 30					X

2. Certain of Respondent MUV's Accused Coatings and Respondent OFS' Accused Coated Optical Fibers Infringe Claims 1-3, 9, 12, 16-18, 21, 30 of the '659 Patent

Complainants asserted that [ ] infringes claims 1-3, 9, 12, 16-18, 21, and 30 of the '659 patent, and that [ ] infringes claims 1-3, and 9. (CBr. at 83-84.). Complainants also contended that Respondent OFS' Accused Fibers infringe claims 1-3, 9, 12, 16-18, 21, and 30 of the '659 patent, because these products are manufactured using [ ] (*See id.* at 84.).[54] Staff articulated a slightly different view, arguing that the evidence reflects that Respondent MUV's [ ] coating infringes claims 1-3 and 16-18 of the '659 patent, that Respondent MUV's [ ] coating infringes claims 1-3 of the same patent, and that claims 9, 12, 21, and 30 of the '659 patent are infringed by Respondent OFS' Accused Fibers because these fibers use [ ] for their primary coating. (SBr. at 61-62.). Respondents contended that no asserted claims are infringed by the accused products. (RMBr. at 44; ROBR at 43.).

As an initial matter, claims 1-3 and 16-18 of the '659 patent cover only "primary coating composition[s]." In contrast, claims 9, 12, 21, and 30 cover only "primary coating[s]." The disputed claim term "primary coating composition" was construed to mean "a curable primary coating composition that has not been applied to an optical fiber." (Order No. 17 (May 10, 2017) at 39-40.). The claim term "primary coating" was construed to mean "a cured coating in direct contact with an optical fiber." (*Id.* at 44.). Consequently, claims to "primary coating compositions" and claims to "primary coatings" cover mutally exclusive structures. Therefore, in this Investigation, "primary coating compositions" claims can read only on Respondent

[54] Complainants did not accuse Respondents of indirectly infringing the '659 patent. (CPBr. at 78-84.).

MUV's Accused Coatings and not on Respondent OFS' Accused Fibers. Inversely, "primary coatings" claims can read only on Respondent OFS' Accused Fibers and not on Respondent MUV's Accused Coatings.[55]

However, because Respondents have proven by clear and convincing evidence that the asserted claims of the '659 patent are invalid, [ ] cannot, by operation of law, directly infringe the claims. *See, e.g., Commil*, 135 S. Ct. 1929; *ePlus*, 790 F.3d at 1309.

B. Relevant Claim Terms

The following constructions of the claim terms recited in the asserted claims of the '659 patent have been agreed upon by the Parties or adopted by this Court.

No. 7: Constructions of Claim Terms Relevant to the Cavitation Patent

Claim Term	Construction
"primary coating" (claims 1-3, 9, 12, 16-18, 21, and 30 of the '659 patent)	A cured coating in direct contact with an optical fiber. (*Markman* Order, App. A at 44.).
"rate of about 1.10^{-5} s^{-1} or less" (claims 9 and 21 of the '508 patent)	Rate of about 1×10^{-5} s^{-1} or less. (*Id.* at 28.).
"cavitation strength at which a tenth cavitation	Stress at which the tenth cavitation[56] becomes

[55] Complainants argued that "MUV directly infringes when it cures the liquid primary coating composition on to a glass plate for characterization and testing purposes in its Pineville, North Carolina lab." (CBr. at 91 (citing Tr. (Overton) at 1853:9-12; Tr. (Sancaktar) at 1757:10–1758:19).). Yet, as explained above, the term "primary coating" was construed to required "direct contact with an optical fiber," and a glass plate is not an optical fiber. Thus, testing that Respondent MUV conducted in Pineville, North Carolina, did not amount to infringement of the asserted "primary coating" claims.

[56] Defects or ruptures within the primary coating are called cavitations or cavities. (*See, e.g.*, '659 patent at 2:18-24; *see also* Comp'ls Claim Br. at 41 ("'Cavitation' is a phenomenon whereby cavities form in a material. . . . In the context of optical fiber coatings, cavitation is an undesirable phenomenon because it is

Claim Term	Construction
appears (σ^{10}_{cav}) of at least 1.0 MPa as measured at a deformation rate of 0.20% min^{-1}" (claims 1 and 16 of the '659 patent)	visible when measured in a tensile testing machine at a pulling speed of 20 μm/min for a 100 μm thin layer (or 20% per min) when observed at a magnification of about 20x, of at least about 1.0 MPa. (*Id.* at 29-30.).
"strain energy release rate G_0" (claim 21 of the '659 patent)	Energy required per 1 m^2 of crack surface in a test specimen of the cured coating initially containing a small crack equal to the slit length b as defined in International Standard norm (ISO) 816. (*Id.* at 31-32.).
"equilibrium modulus" (claims 1, 9, 12, 16, 21, and 30 of the '659 patent)	The lowest value in the temperature range between 10 and 100 °C on the storage modulus curve measured by dynamic mechanical thermal analysis (DMTA) in tension according to ASTM D5026-95a. (*Id.* at 33.).
"storage modulus at 23° C" (claims 1, 2, 16, and 17 of the '659 patent)	The value at 23 °C on the storage modulus curve measured by dynamic mechanical thermal analysis (DMTA) in tension according to ASTM D5026-95a. (*Id.* at 34-35.).
"oligomer (plural or singular)" (claims 16 and 30 of the '659 patent)	Molecules composed of repeating structural units, wherein the molecules must include acrylate or methacrylate. (*Id.* at 23-24, 35-36.).
"molecular weight"[57] (claims 16 and 30 of the '659 patent)	Number average molecular weight. (Comm'n Opinion at 17, Doc. ID No. 620093 (Aug. 16, 2017).).
"primary coating composition"	A curable primary coating composition that

a symptom of the material degrading due to stress/strain on the material, that results in the loss of performance of the coated optical fiber in the transmission of light. When the stress exceeded the strength of the material, a rupture, or cavitation, appeared.").).

[57] This term was originally construed as meaning "[t]he sum of the atomic weights of the atoms in the molecule." (*Markman* Order, App. A at 38-39.). On July 6, 2017, an initial determination issued that found claims 16-18, 21, and 30 of the '659 patent to be invalid for indefiniteness under 35 U.S.C. § 112. (*See* Order No. 33 (July 6, 2017).). On review, the Commission reversed and remanded, holding that the "molecular weight" claim term should be construed as "number average molecular weight." (*See* Comm'n Opinion, Doc. ID No. 620093 (Aug. 16, 2017).).

Claim Term	Construction
(claims 1-3 and 16-18 of the '659 patent)	has not been applied to an optical fiber. (*Markman* Order, App. A at 39-40.).
"about 1.2 MPa," "about 1.0 MPa," "about 1.4 times said/the storage modulus at 23°C" (claims 1, 2, 9, 12, 16, 17, 21, 30)	Approximately. (*Id.* at 40-42.).

C. Summary of Complainants' Testing Procedures

With respect to the '659 patent, Complainants contended that they conducted testing in their Elgin, Illinois facility and in the Netherlands, to demonstrate Respondents' infringement of the '659 patent, Complainants' proof of a domestic industry, and to rebut Respondents' invalidity defenses. (CPBr. at 70.).

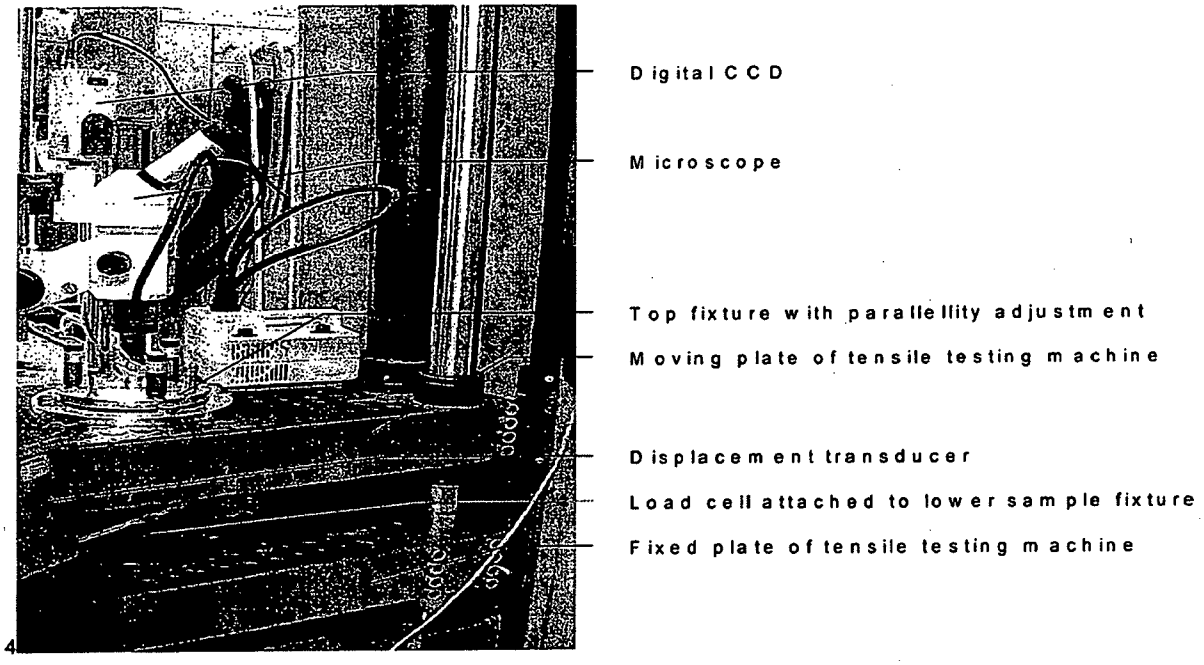
Respondents asserted, and Complainants did not challenge, that much of Complainants' testing was performed by Marcel Teeuwen, a DSM employee in the Netherlands who did not testify during this Investigation. (RMBr. at 45, 50 (citing Tr. (Sarmah) 326:3-7).). Mr. Teeuwen generated data for Complainants at the direction of, and in response to a request from Dr. Satyendra Sarmah, another DSM employee, who did testify in this Investigation. (*Id.*; CPBr. at 59 ("We [i.e., Mr. Teeuwen and Dr. Sarmah] had many, many phone discussions, just to make sure he was following the specification on test conditions as outlined in the patent, and he is a well-trained test specialist. He knows what to do. So I have full trust in his work.").). In arriving at his opinions, Complainants' expert Dr. Sancaktar also relied on Mr. Teeuwen's testing. (CRBr. at 61 ("Dr. Sancaktar and Dr. Sarmah had extensive conversations with Mr. Teeuwen before submitting the initial expert report to confirm that the testing was performed according to the patents.") (citing Tr. (Sarmah) at 326:8-16; Tr. (Sancaktar) at 690:9-20).).

Against this backdrop, Respondents attempted to impeach the testimony of Dr. Sancaktar and Dr. Sarmah. They protested the lack of evidence that Complainants' testifying witnesses "ever traveled to the Netherlands to inspect the equipment used to perform the testing for this investigation," characterizing the testimony as hearsay. (RMBr. at 53.). Complainants retorted that "Dr. Sancaktar and Dr. Sarmah had extensive conversations with Mr. Teeuwen before submitting the initial expert report to confirm that the testing was performed according to the patents and that "[t]here is no requirement that Dr. Sancaktar perform the test or observe the test himself personally." (CRBr. at 61 (citing Tr. (Sarmah) at 326:8-16, Tr. (Sancaktar) at 690:9-20).). Additionally, according to Respondents, test results reported by Dr. Sarmah were biased because he received a "15 percent special bonus" in related proceedings to obtain a favorable result." (RMBr. at 50 (citing RX-0080C.0001 (R&D Retention & Incentive Bonus 2015); Tr. (Sarmah) at 317:5–318:18).). Complainants challenged that representation, asserting that Mr. Teeuwen tested "blind [accused product] samples" labeled PHY3 and PHY4, "the bonus offered to Dr. Sarmah in the Corning case . . . is completely unrelated to this matter," and there is "no evidence that Mr. Teeuwen was even eligible to receive any bonus." (CPBr. at 54.).

In their Pre- and Post-Hearing Briefs, the Parties disputed the legitimacy of testing methods used to establish or rebut the presence of three (3) claim limitations: (i) cavitation strength; (ii) equilibrium modulus; and (iii) calculated volumetric thermal expansion coefficient α_{23}. Testing of each is addressed in turn, with a section at the end for overall impressions regarding the differential evidentiary weight accorded to the Parties' respective testing results

1. **"Cavitation strength"**

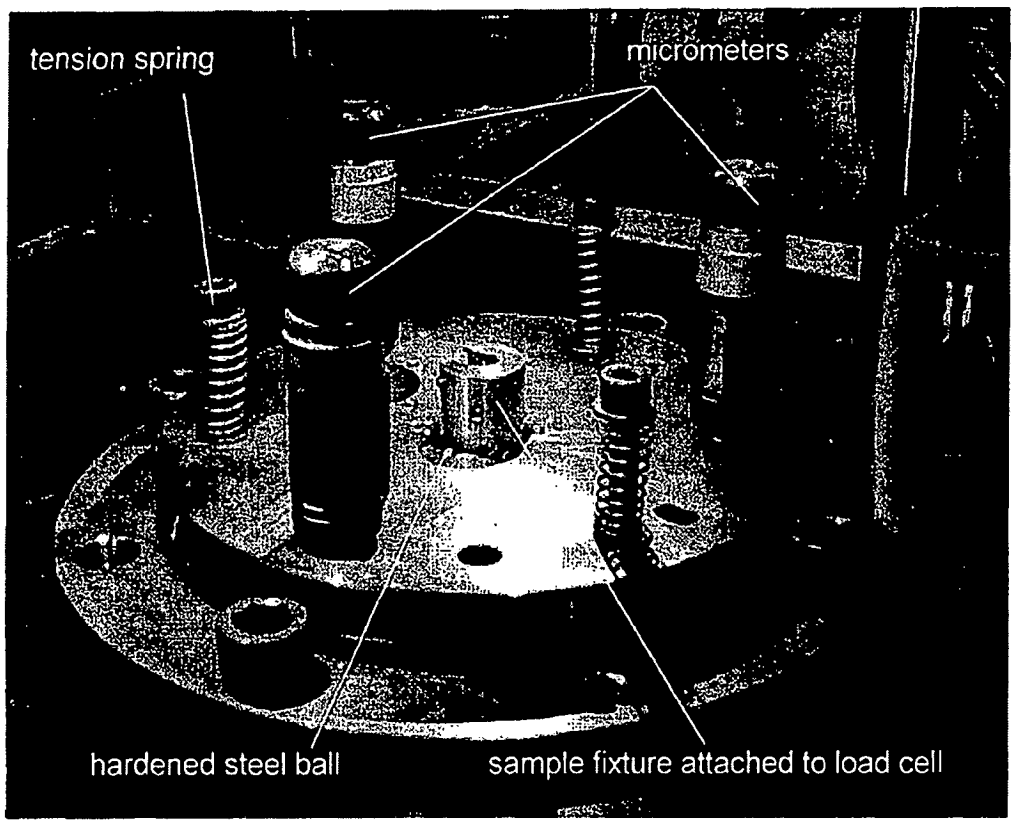
Figure No. 8: Machine for Measuring Cavitation Strength



(JX-0004 Photograph 1 (machine taught by the '659 patent for measuring cavitation strength).).

Complainants submitted that they performed their testing for this Investigation in conformance with the '659 patent. (CPBr. at 70.). According to Complainants, when conducting the cavitation strength tests, a coating specimen was "sandwiched between two glass plates and cured using a 1 J/cm^2 dose of energy." (*Id.* (referencing JX-0004 at 22:11-23).). Complainants also contended that "[p]arallelity between the two plates is achieved using a parallel plate micrometer, which is a standard measuring device where two parallel plates can be set to precise parallel distances (100 μm, per the patents)." (*Id.* at 70-71 (referencing JX-0004 at 21:32-39).).

Figure No. 9: Top Fixture of the Cavitation Strength Measuring Machine



(JX-0004 Photograph 2 (mechanism used to achieve parallelity).).

Complainants asserted that "[e]ach cured sample was then placed in a ZWICK tensile testing machine and the two glass plates were slowly pulled apart, effectively stretching the primary coating sandwiched between them. The deformation rate was 20% min-1." (*Id.* at 71.). Complainants continued: "[a] camera pointed down into the 'sandwich' records the appearance of cavitations as additional stress is applied. The stress and the video is recorded." (*Id.* (citing language from the '659 patent's specification).). Finally, according to Complainants' testing regimen, the "stress at which the tenth cavitation appears is recorded as the 'cavitation strength.'" (*Id.*).

Yet, Respondents claimed that Complainants provided *no* evidence demonstrating "that

Mr. Teeuwen followed any of the test procedures in the '659 patent." (RMBr. at 52.). That was an overstatement that is simply not true. Instead, Respondents contended that the record lacks evidence that certain testing details were not provided: (1) how Mr. Teeuwen allegedly identified and counted "cavitations" when measuring Respondent MUV's accused products; (2) whether cured samples were 100 μm thick or pulled at a speed of 20 μm/min; or (3) how Complainants transported the liquid samples of Respondent MUV's products from the United States to the Netherlands. Respondents' criticisms of this aspect of Complainants' testing also included the storage conditions endured by the liquid samples during transport and prior to preparation, and the length of time Complainants exposed the coatings to transportation conditions. (*Id.* at 51-52.).

Moreover, Respondents asserted that the samples Complainants tested almost certainly were not exactly 100 μm thick because Complainants measured the thickness of the coating before but not after curing, a process that causes the coating to shrink. (*Id.* at 51 (citing Tr. (Sancaktar) at 707:12-19; CX-0117C.0008 (Lab Notebook) (showing in column 5 "post cure" thicknesses that are 15-10% less than the thickness before cure)).).

Complainants responded that Respondents failed to show that such shrinkage "would create any significant changes in the cavitation strength." (CRBr. at 63.).

Pointing to Complainants' testing results in this Investigation, and internal competitive analyses characterizing "cavitation strength" as "high scatter," Respondents suggested that the property, as measured pursuant to the teachings of the '659 patent, is "unreasonably variable and therefore unreliable." (RMBr. at 56 (citing CX-0119C.0004 (cavitation strength results)).). Specifically, Respondents asserted that "DSM's measurements for this investigation are significantly higher than Mr. Overton's [its own expert's] measurements and DSM's pre-suit

measurements for the same coatings." (*Id.* at 55.). Complainants countered that Respondents compared apples to oranges, wrongly equated pre-suit values "from samples that DSM acquired from unknown non-US sources" and values "based on samples that DSM acquired from a recycling center in China" with values obtained from "the sample that MUV provided directly to DSM (i.e., the only reliable tested sample)." (CBr. at 62-63.).

Chart No. 8: Cavitation Measurements Pre- and Post-Complaint

(RMBr. at 55 (showing variation in cavitation strength results) (citations omitted).).

Finally, Respondents reported that error "arise[s] from the misalignment of the testing apparatus. (RMBr. at 56 (citing Tr. (Overton) at 1127:17–133:9; RDX-0004.16-20; RX-1124C (images of cavitation results)).).

Respondents contended that the first image below (PHY003.02), featuring Complainants' test results of [ ], reflect two (2) alignment errors in Complainants' testing equipment: (i) the glass plates are not parallel; and (ii) the glass plate and the steel plate are not parallel as required by the '659 patent specification. (*Id.*) From their briefs and corresponding argument on this issue, Respondents omit the second image below (PHY004.02), featuring the test results of [ ], which reveals a more uniform cavitation (or fracture) pattern.[58]

[58] "Moreover, as with the testing performed in Elgin, Mr. Teeuwen performed the testing blind, referring to the tested samples only as PHY3 or PHY4." (CRBr. at 58.).

[

]

Complainants retorted that Respondents failed "to establish that the tests DSM performed were done at anything other than a sufficiently parallel arrangement" and that, according to Mr. Overton, Respondents' expert, the alleged parallelity problem would result in lower cavitation strength testing results, putting the "true" cavitation strength "more safely" within "the infringing range" set forth in the asserted claims of the '659 patent. (CRBr. at 63 (citing Tr. (Overton) at 1129:3-16; RDX-0004.18 (indicating that imperfect parallelity reduces cavitation strength).).

While Complainants tacitly acknowledged that they did not perform perfect cavitation strength tests, they provided more persuasive cavitation strength evidence than did Mr. Overton. He encountered several problems testing cavitation strength, including breakage of the glass plates. (Tr. (Overton) at 1128:3–1133:9, 1165:15–1166:8; *see also* Tr. (Nairn) at 1055:13–1060:9.). As Mr. Overton testified, after 6 months of working, he had failed to replicate the cavitation strength test. (Tr. (Overton) at 1231:19–1232:6.).

2. "Equilibrium modulus"

Respondents, in return, characterized Complainants' equilibrium modulus testing results as "unreliable." (RMBr. at 44.). Under the Court's construction, the claimed "equilibrium modulus" must be measured according to ASTM D5026-95a," which requires, among other things, conditioning test samples for no less than 40 hours. (*Markman* Order, App. A at 33; RMBr. at (citing Tr. (Sancaktar) at 693:20-25).). Just as they did in the context of cavitation strength, Complainants relied on testing by Mr. Teeuwen for "equilibrium modulus" results. (CRBr. at 58.). Yet, Respondents asserted that Complainants offered *no* evidence demonstrating that Mr. Teeuwen followed any of the other requirements in ASTM D5026-95a and, instead, provided a "single spreadsheet" of results that "identifies only the type of machine Mr. Teeuwen used (an RSA-G2), the raw data generated by that machine, and graphs of that raw data." (RMBr. at 46 (citing CX-0412C).).

Complainants noted that Dr. Sarmah testified repeatedly that the testing was performed according to the patents, and that Complainants followed all procedures and parameters set forth in the patents. (CRBr. at 59 (citing Tr. (Sarmah) at 326:12-16 ("We [i.e., Mr. Teeuwen and Dr. Sarmah] had many, many phone discussions, just to make sure he was following the specification on test conditions as outlined in the patent, and he is a well-trained test specialist. He knows what to do. So I have full trust in his work.").). Moreover, Complainants contended that, notwithstanding Respondents' provision of only one equilibrium modulus test result per accused product, they performed "two tests of the equilibrium and storage modulus for [

], and identified extremely similar results for both tests." (*Id.* at 60 (citing CX-0413C (showing PHY003.02, and "PHY003.02 duplo," i.e., duplicate).).

Respondents also argued that Complainants' reliance on the equilibrium modulus testing

of Ms. Liu was misplaced because she did not perform the test according to the patent. (RMBr. at 47 (Tr. (Liu) at 431:6-11 (confirming that Ms. Liu conditioned the sample for zero hours, instead of 40 hours).). Respondents argued that Ms. Liu tested the sample after its retest date. (*Id.* (comparing CX-1462C ("Date: 5/10/2017") with RPX-0007-8 ("RETEST DATE 2016/12/03"); citing Tr. (Liu) at 427:16-25 (confirming test date); Tr. (Sancaktar) at 695:6-10 (agreeing that the age of the sample should be less than its indicated retest date).) In rebuttal, Complainants asserted that Ms. Liu made that mistake "[ ], the alleged prior art coating, and not the coatings at issue for infringement." (CRBr. at 60.).

Finally, Respondents' argued that "there is a large discrepancy between Complainants' equilibrium modulus measurements of [ ] for the Cure Dose patents and Complainants' equilibrium modulus measurement of the same product for the '659 patent." (RMBr. at 48). Complainants challenged Respondents' characterization of this discrepancy as a "glaring inconsistency" by explaining that "[a]lthough they use the same name, they [equilibrium modulus measurements within each patent] are tested differently with different frequencies and different temperature ramp rates according to the different patents, and so it is no surprise that they yield different values." (CRBr. at 61 (citing Tr. (Sancaktar) at 696:15–697:22, 1768:9–1769:1).).

Once again, while Complainants tacitly acknowledged that they did not perform perfect equilibrium modulus tests, by following the ASTM D5026-95a standard and testing multiple samples to confirm their results, they provided more persuasive equilibrium modulus evidence than did Respondents. (CRBr. at 59 (citing Tr. (Sarmah) at 326:12-16), 60 (citing CX-0413C).).

3. "Calculated volumetric thermal expansion coefficient α_{23}"

Respondents critiqued Complainants' use of Synthia software to calculate volumetric

thermal expansion coefficients as biased and flawed. (RMBr. at 58.). Respondents contended that the calculations of Complainants' expert, Dr. Bowman, were biased because "DSM told him how to do the calculations; he allowed DSM to train him on the software; and he allowed DSM to enter the chemical structures into the software." (*Id.* (citing (Tr. (Bowman) at 498:16–499:4, 1652:5-10, 1745:3-16.)).). In response, Complainants argued that "Dr. Bowman personally performed each and every simulation that resulted in reported values for the calculated volumetric thermal expansion coefficient α_{23}," enlisting a DSM employee's help only to perform ministerial tasks. (CRBr. at 64 (citing Tr. (Bowman) at 485:5–486:16, 487:10-15, 1650:17–1652:10; CX-0578C).).

Respondents also argued, that based on consultation with Dr. Bicerano, the author of Synthia software, that Complainants' calculations are flawed for two reasons. (RMBr. at 59-60.). The first flaw, according to Respondents, was that, instead of using a chemical monomer structure as input for Synthia software to calculate α_{23}, Complainants used "an oligomer as input." (*Id.* at 59 (citing (Tr. (Bowman) at 487:16–488:12, 499:5-19; CX-0578C (summary of Synthia calculations); CX-0576C (same).).

The second purported flaw Respondents highlight is that, when using Synthia software, which permits the entry of the amount of each component as mass fractions or mole fractions, Complainants improperly entered the amount of each component as a mass fraction, not a mole fraction. (*Id.* at 60.). According to Respondents, without any reference to the teaching of the '659 patent, Dr. Bicerano recommended using mole fractions. (*Id.*).

In rebuttal, Complainants contended that before performing volumetric thermal expansion coefficients for this Investigation, "Dr. Bowman first validated that he was performing the Synthia simulations correctly by verifying that he could recreate the simulation results

provided in the '659 Patent" and "obtained simulation results that showed remarkable consistency (less than 1% difference in all cases) with the results disclosed in the '659 Patent." (CBr. at 87 (citing Tr. (Bowman) at 485:5–486:16, 487:10-15, 1650:17–1652:10; CX-0578C).).

Figure No. 11: Initial Verification Simulations

Formulation ('659 Patent, Table 1)	α_{23} in '659 Patent ($\times 10^{-4} K^{-1}$)	Dr. Bowman's Calculated α_{23} ($\times 10^{-4} K^{-1}$)
V	6.71	6.73
W	7.04	7.06
Z	7.35	7.36

(*Id.* at 88 (citing CDX-0118C; CDX-0158C; CX-0578C).).

Complainants argued that, from the verification simulations, which Respondents did not perform, "Dr. Bowman learned that the correct use of the Synthia software required entering mass fractions, not mole fractions" and "that only polymerizable [oligomer] molecules should be included." (*Id.* (citing Tr. (Bowman) at 1651:16-1652:4); *see also* Tr. (Overton) at 1846:9-18 (Respondents did not perform verifciation simulations) ("Q: So you did not recreate the numbers that are in the patent; correct? A: I –I did not, no.").

While Respondents asserted that Complainants' verification was based on values for secondary coatings and that the '659 patent says "nothing about how the values provided for primary coatings [the type of coatings at issue in this Investigation] were calculated," Complainants rebutted that "the '659 Patent is clear that the calculation methodology does not vary between secondary coatings and primary coatings." (RMBr. at 59-60; CRBr. at 65 (citing JX-0004 at 17:66–18:6 ("The thermal expansion coefficient α_{23} for several coating systems

[referring to combinations of primary and secondary coatings] can be predicted on the basis of chemical structural information by using commercial software packages: the module Synthia of MSI. . . .")).).

Yet again, Complainants provided more persuasive evidence than did Respondents, this time for simulated volumetric thermal expansion coefficients. Importantly, Complainants' expert, Dr. Bowman, validated that he was performing the Synthia simulations correctly by confirming his results with those provided in the '659 Patent. (CBr. at 87 (citing Tr. (Bowman) at 485:5–486:16, 487:10-15, 1650:17–1652:10; CX-0578C).). Respondents did not.

4. Overall Impressions Regarding Testing Results

On balance, with respect to the '659 patent, Respondents have failed to impugn testing procedures Complainants used to calculate cavitation strength, equilibrium modulus, and calculated volumetric thermal expansion coefficient α_{23}.

While the evidence suggests that Complainants' testing was far from perfect, with the exception of Ms. Liu's failure to conduct equilibrium modulus testing on prior art samples in conformance with the '659 patent, the weight of the evidence shows that Complainants testing conforms with the teachings of the '659 patent. (RMBr. at 47 (citing Tr. (Liu) at 427:16-25, 431:6-11), 56 (citing Tr. (Overton) at 1127:17–133:9); RDX-0004.16-20; RX-1124C (images of cavitation results); CPBr. at 59 (citing Tr. (Sarmah) at 326:12-16), 60 (citing CX-0413C), 70-77, 87 (citing Tr. (Bowman) at 485:5–486:16, 487:10-15, 1650:17–1652:10; CX-0578C).).

The same is not true of Respondents' test results, which are neither consistent with Complainants' results (in the case of equilibrium modulus) nor tethered to the teachings of the '659 patent. (CBr. at 88 (citing Tr. (Bowman) at 1651:16–1652:4); *see also* Tr. (Overton) at 1128:3–1133:9, 1165:15–1166:8, 1846:9-18; Tr. (Nairn) at 1055:13–1060:9.). Although, as

discussed in Sections IX.C.1-3, *infra*, testing-related shortcomings of the '659 patent, including the demonstrated variability of certain test results, and the lack of specific guidance on the proper protocol for conducting certain tests, are separate reasons to give pause in this Investigation.

Respondents have not demonstrated that Complainants' test results are inaccurate or biased. Based on the weight of the evidence, relying on these results does not distort the conclusions reached here in Complainants' favor in any way, such that the Accused Products appear more likely to infringe or the prior art appear less likely to invalidate. For these reasons, the infringement analysis in Section IX.D, and the invalidity analysis in Section IX.E, of this Initial Determination rely upon Complainants' valid test results.

D. Respondent MUV's [ ] Coatings Infringe Claims 1-3, and 16-18 of the '659 Patent; Respondent OFS' Accused Coated Optical Fibers Infringe Claims 9, 12, 21, and 30 of the '659 Patent

1. Claim 1 of the '659 Patent

The preponderance of the evidence proves that Respondent MUV's [ ] satisfy all of the limitations of claim 1. (CDX-0213C–CDX-0216C; CX-0409C, CX-0410C; CX-0412C.). However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the Accused MUV Coatings and the Accused OFS Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

a) "Primary coating composition"

There is no dispute that [ ] is a "primary coating composition." Respondent OFS' Accused Fibers do not infringe claim 1 of the '659 patent because an optical fiber is not a "primary coating composition," as that term has been construed in this Investigation.

b) "when cured having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less"

Complainants submitted evidence that the [ ] coating has an equilibrium modulus of about [ ], and the [ ] coating has an equilibrium modulus of about [ ]. (CX-0412C.). In each case, the equilibrium modulus satisfies the claim limitation "of about 1.2 MPa or less."

c) "a storage modulus at 23° C. (E'_{23}) and a cavitation strength at which a tenth cavitation appears (σ^{10}_{cav}) of at least about 1.0 MPa as measured at a deformation rate of 0.20 min^{-1}"

Complainants also submitted evidence that the [ ], had an average "cavitation strength" of [ ], and that the [ ], had an average "cavitation strength" of [ ]. (CX-0409C-0410C.).

While cavitation strength measurements are highly variable, as addressed in the invalidity Section IX.E below, both of these average measurements [ ] exceed the claim requirement for a "cavitation strength" of "at least about 1.0 MPa," and the vast majority of the individual measurements that Complainants obtained for each of the tested coatings also exceed the claim limitation. (*See id.*).

d) "said cavitation strength being at least about 1.4 times said storage modulus at 23° C"

Complainants submitted evidence that the [ ] coating has a storage modulus of about [ ], and that the [ ] coating has a storage modulus of about [ ]. (CX-0412C.). This means that the cavitation strength of the [ ], and that the cavitation strength of the [ ]. In each case, this number is [ ] larger

than the claim requirement that the cavitation strength is "at least about 1.4 times said storage modulus."

Complainants have proven by a preponderance of evidence that Respondent MUV's Accused Coatings satisfy all of the limitations in claim 1 and, therefore, infringe that claim. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the Accused MUV Coatings cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

2. Claim 2 of the '659 Patent

a) "Primary coating composition according to claim 1"

As set forth above, each of Respondent MUV's Accused Coatings is a "[p]rimary coating composition according to claim 1." Claim 2 is not infringed by Respondent OFS' Accused Fibers because an optical fiber is not a "primary coating composition," as that term has been construed in this Investigation.

b) "wherein the cavitation strength σ^{10}_{cav} is at least about 1.5 times the storage modulus at 23° C"

Complainants submitted evidence showing that the ratio of the cavitation strength to the storage modulus for the [

] (CDX-0216C.). These values exceed the claim limitation of "at least about 1.5 times the storage modulus." Therefore, Complainants have proven by a preponderance of evidence that the [ ] coatings satisfy all of the limitations of claim 2 and, therefore, infringe that claim. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the Accused MUV Coatings cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at

1309.

3. Claim 3 of the '659 Patent

a) "Primary coating composition according to claim 1"

As set forth above, [

] is a "[p]rimary coating composition according to claim 1." Respondent OFS' Accused Fibers do not infringe claim 3 because an optical fiber is not a "primary coating composition," as that term has been construed in this Investigation.

b) "wherein the cavitation strength σ^{10}_{cav} is at least about 1.1 MPa"

A preponderance of evidence reflects that the cavitation strength for the [

] (CDX-0213C; CX-0409C-0410C; CX-0412C.). These cavitation strength values both exceed the claim requirement that the cavitation strength "is at least about 1.1 MPa."

Complainants have proven by a preponderance of evidence that Respondent MUV's Accused Coatings satisfy all of the limitations of claim 3 and, therefore, infringe that claim. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the Accused MUV Coatings cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

4. Claim 9 of the '659 Patent

a) "Primary coating having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less according to claim 1"

Contrary to Complainants' assertion, claim 9 is not directly infringed by Respondent MUV's [ ] coating because it is not a "primary coating," as that term has been construed in this Investigation. Instead, this product is sold and imported as [

] Nevertheless, Respondent OFS' Accused Fibers bear a "primary coating" [ ] has "an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less according to claim 1." (CX-0304C (OFS Resp. to RFA Nos. 166-275); CX-0412C.).

b) "wherein said coating has a strain energy release rate G_0 of at least about 20 J/m^2 as measured at a rate of about 1.10^{-5} s^{-1} or less"

Complainants submitted persuasive evidence showing that, [ ]. (CDX-0217C; CX-0413C; CDX-0214C, CX-0412C.). These values both exceed the claim requirement of at least about 20 J/m^2.

Complainants have proven by the preponderance of evidence that Respondent OFS' Accused Fibers satisfy all of the limitations of claim 9 and, therefore, infringe that claim. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the Accused OFS Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

5. Claim 12 of the '659 Patent

a) "Primary coating having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less"

Contrary to Complainants' assertion that [ ] coating does not directly infringe claim 12 because it is not a "primary coating," as that term has been construed in this Investigation. Neverthetless, Respondent OFS' Accused Fibers [

] has "an equilibrium modulus, as measured according to ASTM D5026-95a, of about

1.2 MPa or less according to claim 1." (CX-0304C (OFS Resp. to RFA Nos. 166-275); CDX-0116–CDX-0123C; CDX-0214C, CX-0412C; CX-0218C).

b) "and a calculated volumetric thermal expansion coefficient α_{23} of about 6.85×10^{-4} K^{-1} or less"

A preponderance of evidence supports Complainants' expert, Dr. Bowman's conclusion, that the calculated volumetric thermal expansion coefficient α_{23} for [

], is less than the claim limitation of "at least about $6.85x10^{-4}$ K^{-1} or less." (CX-0576C; CX-0578C.).

While Respondents' expert, Mr. Overton, calculated values for the volumetric thermal expansion coefficient that fall outside of the claim limitation, evidence suggests that Mr. Overton may have performed the volumetric thermal expansion coefficient calculations incorrectly. (JX-0004 at 17:66–18:30; Tr. (Overton) 1887:3–1890:15.).

The patent explains that the calculated volumetric thermal coexpansion coefficient is determined by modeling the cured primary coating as a linear polymer. (JX-0004 at 18:17-30 ("So, this linear analogue, a linear statistical copolymer is constructed based on the chemical recipe of the coatings.").). The patent also teaches the use of repeating units ("monomers") of the cured primary coating composition, in calculating a volumetric thermal coexpansion coefficient. (*See, e.g.*, JX-0004 at 18:13-15 ("This methodology makes use of compositional information, i.e. the chemical monomer structure, for the prediction of polymer properties.").).

Instead of entering the structure and repeating units of the oligomer, Mr. Overton entered the original chemical building blocks that are used to synthesize the [

] (Tr. (Overton) 1887:3–1888:2.). According to Staff, Mr. Overton did this even though these

components are [

] (SBr. at 66 (citing Tr. (Overton) at 1890:8-15.).

By contrast, Complainants' expert, Dr. Bowman, testified that he expressly checked his own methodology for making the claimed calculations against the examples of calculated volumetric thermal expansion coefficients provided in the patent specification. (Tr. (Bowman) at 485:11–486:14.). Therefore, a preponderance of evidence reflects that, with respect to volumetric thermal expansion coefficients, Dr. Bowman's calculations are more reliable than Mr. Overton's.

Complainants have proven by a preponderance of evidence that Respondent OFS' Accused Fibers satisfy all of the limitations of claim 12 and, therefore, infringe that claim. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the Accused OFS Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

6. Claim 16 of the '659 Patent

a) "Primary coating composition when cured having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less, a storage modulus at 23° C. (E'_{23}) and a cavitation strength at which a tenth cavitation appears (σ^{10}_{cav}) of at least about 1.0 MPa as measured at a deformation rate of 0.20 min^{-1}, said cavitation strength being at least about 1.4 times said storage modulus at 23° C"

The functional limitations in claim 16 are identical to the limitations in claim 1. Therefore, for the same reasons as claim 1, the evidence shows that each of the functional limitations in claim 16 is met by the [ ] coating. Respondent OFS' Accused Fibers do not infringe claim 16 because an optical fiber is not a "primary coating composition," as that

term has been construed in this Investigation.

b) "wherein said primary coating composition comprises: 20-98% by wt. of at least one oligomer having a molecular weight of about 1000 or higher"

Complainants submitted evidence that the [

] (CX-0484C; CX-0239C; CX-0242C; CX-0302C; CX-0485C; CX-0506C; CDX-0145C; CDX-0235C.).

c) "0-80% by wt. of one or more reactive diluents"

Complainants submitted evidence that the [

] (CX-302C; CX-239C; CX-0242C, CX-0506C; CDX-0027C, CDX-0028C, CDX-0032C, CDX-0033C, CDX-0037C, CDX-0041C.).

d) "0.1-20% by wt. of one or more photoinitiators"

Complainants submitted evidence that the [

] (CX-302C; CX-239C; CX-0242C, CX-0506C; CDX-0027C, CDX-0028C, CDX-0032C, CDX-0033C, CDX-0037C, CDX-0041C.).

e) "0-5% by wt. of additives"

Complainants submitted evidence that the [

] (CX-302C; CX-239C; CX-0242C, CX-0506C; CDX-0027C, CDX-0028C, CDX-0032C, CDX-0033C, CDX-0037C, CDX-0041C.).

Complainants have proven by a preponderance of evidence that Respondent MUV's [ ] coating satisfies all of the limitations of claim 16, and therefore, infringes that claim. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the [ ] coating cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

7. Claim 17 of the '659 Patent

For Respondent MUV's [ ] coating, the analysis of the claim limitation added by dependent claim 17 is identical to the analysis in Section IX.D.2 above for dependent claim 2. (JX-0004 at 27:32-34, 28:58-60 ("Primary coating composition according to claim 16, wherein the cavitation strength σ^{10}_{cav} is at least about 1.5 times the storage modulus at 23° C."). Complainants have proven by a preponderance of evidence that the [ ] coating satisfies all of the limitations of claim 17, and thus, infringe that claim. (CDX-0237C.). However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the [ ] coating cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

Respondent OFS' Accused Fibers do not infringe claim 17 because an optical fiber is not a "primary coating composition," as that term has been construed in this Investigation.

8. Claim 18 of the '659 Patent

For Respondent MUV's [ ] coating, the analysis of the claim limitation added by dependent claim 18 is identical to the analysis above for dependent claim 3 as reflected in Section IX.D.3. (JX-0004 at 27:35-37, 28:61-63 ("Primary coating composition according to claim 16, wherein the cavitation strength σ^{10}_{cav} is at least about 1.1 MPa."). Complainants have proven by a preponderance of evidence that the [ ] coating satisfies all of the limitations of claim 18 and, therefore, infringes that claim. (CDX-0237C). However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the [ ] coating cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

However, Respondent OFS' Accused Fibers do not infringe claim 18 because an optical

fiber is not a "primary coating composition," as that term has been construed in this Investigation.

9. Claim 21 of the '659 Patent

For Respondent MUV's [ ] coating, the analysis of the claim limitation added by dependent claim 21 is identical to the analysis above for dependent claim 9. (JX-0004 at 27:35-37, 28:61-63 ("Primary coating composition according to claim 16, wherein the cavitation strength σ^{10}_{cav} is at least about 1.1 MPa."). Complainants have proven by a preponderance of evidence that Respondent OFS' Accused Fibers, cured with the [ ] coating, satisfy all of the limitations of claim 21 and thus infringe that claim. (CX-0304C (OFS Resp. to RFA Nos. 166-275); CDX-0237C.). However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the Accused OFS Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

However, Respondent MUV's [ ] coating does not infringe claim 21 because it is not a "primary coating," as that term has been construed in this Investigation.

10. Claim 30 of the '659 Patent

The functional limitations of claim 30 are identical to the limitations of claim 16. (JX-0004 at 28:44-56, 30:31-41 ("Primary coating having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less and a calculated volumetric thermal expansion coefficient α_{23} of $6.85\times10^{-4}\,K^{-1}$ or less, wherein said primary coating is obtained by curing a composition comprising: (a) 20-98% by wt. of at least one oligomer having a molecular weight of 1000 or higher; (b) 0-80% by wt. of one or more reactive diluents; (c) 0.1-20% by wt. of one or more photoinitiators; and (d) 0-5% by wt. of additives.").).

Therefore, for the same reasons as apply and discussed with respect to claim 16, Section IX.D.6, Complainants have proven by a preponderance of evidence that each of the functional limitations in claim 30 is met by Respondent OFS' Accused Fibers when cured with the [ ] coating. (CX-0304C (OFS Resp. to RFA Nos. 166-275); CDX-0239C.). However, because Respondents have proven by clear and convincing evidence that this claim is invalid, the Accused OFS Fibers cannot, by operation of law, directly infringe the claim. *See, e.g., Commil*, 135 S. Ct. at 1929; *ePlus*, 790 F.3d at 1309.

Howver, Respondent MUV's [ ] coating does not infringe claim 30 because it is not a "primary coating," as that term has been construed in this Investigation.

E. Validity

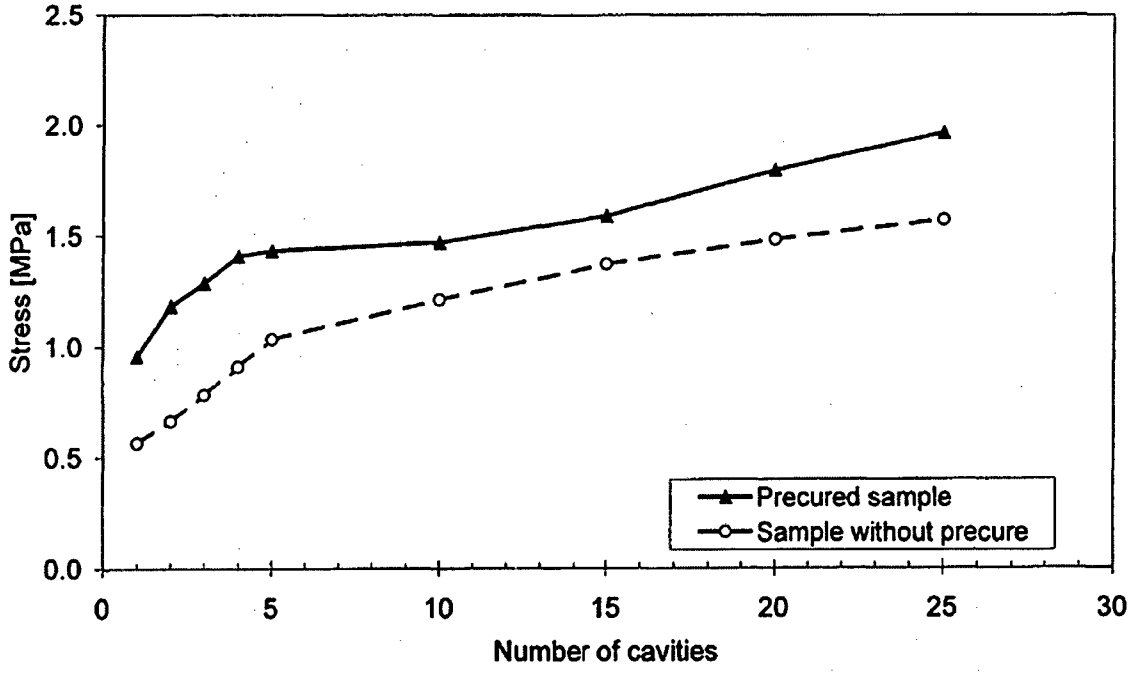
1. Claims 1-3, 9, 16-18, and 21 of the '659 Patent Are Invalid as Anticipated

Staff and Respondents asserted that claims 1-3, 9, 16-18 and 21 of the '659 patent are invalid as anticipated by [ ] ("99A"), a coating identified and discussed as "Comparative Experiment B and Example 1" in the '659 patent's specification. (SBr. at 74-76; RMBr. at 71; RX-0509C.0032 (DSM Resp. to RFA No. 22); JX-0004 at 25:52–26:6.). An anticipation defense under 35 U.S.C. § 102 requires a finding, based upon clear and convincing evidence, that each and every limitation is found either expressly or inherently in a single prior art reference. *See, e.g., Celeritas Techs. Inc. v. Rockwell Int'l Corp.*, 150 F.3d 1354, 1361 (Fed. Cir. 1998). Anticipation is a question of fact, including whether a limitation, or element, is inherent in the prior art. *In re Gleave*, 560 F.3d 1331, 1334-35 (Fed. Cir. 2009). As set forth below, claims 1-3, 9, 16-18 and 21 of the '659 patent are invalid as anticipated by 99A.

By way of background, the '659 patent's specification distinguishes between curing a

primary coating composition with or without a precure step, describing the former as means of boosting cavitation strength. For example, "resistance to cavitation [i.e., cavitation strength] can also be improved by a two-step curing process in which the coating is partly cured with a very low first dose (5-50 mJ/cm^2, hereinafter called pre-cure), and thereafter cured with a dose of at least about 50 mJ/cm^2." (JX-0004 ('659 patent) at 15:51-55.). Likewise, "FIG. 4 shows the number of cavitations at increasing stresses on a primary coating sample with pre-cure (0.96 J/cm^2+3 pre-cure flashes) and a sample without pre-cure (0.93 J/cm^2) (speed 20%/min)." (*Id.* at 3:42-46.).

Figure No. 12: Cavitation Strengths With and Without Precure



(JX-0004 at Fig. 4.).

With respect to invalidity, whether claims 1-3, 9, 16-18 and 21 of the '659 patent are anticipated by 99A is properly framed as a disagreement between the Parties over not whether 99A is on-sale prior art (the Parties agree that it is), but whether the asserted claims cover prior

art coatings (such as 99A) cured with a precure step. (*See* CBr. at 100 (citing Tr. (Paulus Steeman) at 188:19–190:8); RX-0509C.0035-36 (DSM Resp. to RFA No. 25)).).[59]

Specifically, the Parties disagreed over whether the claims were sufficiently broad to cover a coating composition subjected to precure treatment before a curing step (and its attendant enhancement of cavitation strength) or, conversely, were sufficiently narrow to exclude such a precure treated composition. (CBr. at 97-100; RMRBr. at 47-48; SBr. at 74-75.).

Resolution of this issue is critical because it determines whether 99A does or does not exhibit a cavitation strength required by the asserted claims. Relying on the opinions of Mr. Overton, Respondents contended that, when subjected to a precure step, 99A exhibited cavitation strength of [ ], well within the relevant claim limitations of "at least about 1.0 MPa" or "at least about 1.2 MPa." (CBr. at 97 (Mr. Overton relied on the precure value of cavitation strength for 951-092, Batch 99A which is [ ]).). Importantly, according to Complainants, when not subjected to a precure step, 99A exhibited a cavitation strength of only [ ], which is ***not*** "at least about 1.4 times said storage modulus" of [ ]. (CBr. at (citing Tr. (Sancaktar) at 1770:10-23; CDX-224C).). Conversely, [ ], the cavitation strength exhibited by 99A after a precure step, is clearly "at least about 1.4 times said storage modulus" of [ ]. In other words, if the asserted claims cover curing a coating composition with a precure step, Respondents' anticipation defense prevails.

While conceding that 99A is prior art, Complainants dismissed the cornerstone of

[59] When he testified during the evidentiary hearing on July 31, 2017, Dr. Paulus Steeman was a Corporate Science Fellow for Material Science for DSM, in the Netherlands. (Tr. (Steeman) at 186:12-15, 186:23-25.). At that time, Dr. Steeman had worked at DSM for 30 years and is a named inventor on the '659 patent. (JX-0003 at (75); *see also* Tr. (Steeman) at 188:1-4.). Complainants identified Dr. Steeman as a fact witness to provide testimony about matters related to the invention, validity, and domestic industry of the Cavitation patent. (CPSt. at 4.).

Respondents' anticipation defense, that is a broad interpretation of asserted claim scope, as "nonsensical" given Complainants' narrative of invention. In particular, Complainants depicted 99A as "a problematic batch of coating that DSM's customer [ ] identified" and "inventors solved the problem by developing a measuring system, modifying the materials, and developing new coating systems that would be resistant to [the problematic] cavitation." (CBr. at 100 (citing Tr. (Steeman) at 188:19–190:8); RX-0509C.0035-36 (DSM Resp. to RFA No. 25)).). In other words, according to Complainants, 99A was a problem, the '659 patent discloses the inventive solution, and, therefore, the asserted claims must cover the solution but not the problem. (*See id.*).

Complainants also explained that, within the '659 patent, the "definitive [specification] section on the measurement of cavitation strength" describes measuring cavitation strength in a coating that has not undergone a precure step. (*Id.* at 98.). With respect to the asserted claims, Complainants argued that the language "composition when cured" necessarily excludes compositions that have undergone a precure step. (*Id.*).

Yet, the "cavitation strength . . . at least about" claims at issue, that claims 1-3, 9, 16-18 and 21, simply lack that limitation. Moreover, importing it into the claims now, as Complainants' suggested, would exclude a disclosed embodiment of the invention from the specification, which is improper (*see* JX-0004 at 16:12-28 ("according to one embodiment, the present invention relates to a method for curing a primary coating composition, said method comprising the steps of . . . (ii) curing said composition with a first dose comprising at least one flash of UV-light of a total energy between about 5 and 50 mJ/cm^2").). *See Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276-77 (Fed. Cir. 2008) ("We normally do not interpret claim terms in a way that excludes embodiments disclosed in the specification"); *Verizon Servs. Corp. v. Vonage*

Holdings Corp., 503 F.3d 1295, 1305 (Fed. Cir. 2007) (rejecting proposed claim interpretation that would exclude disclosed examples in the specification).[60] Moreover, nothing in the *Markman* Order necessitates narrowing the claims pursuant to Complainants' request. (*See Markman* Order.). Complainants cannot rewrite their asserted claims now for the purpose of litigation expediency.

Complainants next challenged Staff's use of the inherency doctrine to account for the presence of the "cavitation strength . . . at least about" limitations in 99A, notwithstanding Corning's knowledge (or lack thereof) that it had purchased a product that, when cured with a precure step, would possess the claimed characteristics. (CBr. at 99-100; SBr. at 16, 75 (arguing that anticipation by inherent disclosure requires that the missing descriptive material is "necessarily present, not merely probably or possibly present, in the prior art." *Trintec Indus., Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 1295 (Fed. Cir. 2002); *see also In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349 (Fed. Cir. 2002) ("Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.")).). Instead of contending that 99A lacked "cavitation strength" as a physical property, Complainants made the curious argument, without legal citation, that 99A cannot inherently possess "cavitation strength" where that term is subject to at least two different interpretations: a cavitation strength measured with and without performance of a precure step. (*See id.*). Complainants' argument misses the mark.

As the'659 patent teaches, and the Parties' test results show, 99A is a chemical coating composition that inherently possesses the ability to manifest more than one cavitation strength,

[60] It would also obviate claim 7 from the '564, which shares the same specification as the '659 patent. (*See* JX-0006.). Claim 7 explicitly recites the use of a precure step. (*Id.*).

depending on the curing method used. *See In re Spada*, 911 F.2d 705, 709 (Fed. Cir. 1990) ("A chemical composition and its properties are inseparable."). In other words, 99A inherently possessed at least two cavitation strengths, only one of which clearly anticipates. As explained above, claims 1-3, 9, 16-18 and 21 of the '659 patent are broad enough to encompass that cavitation strength—the one derived from curing with a precure step.

Consequently, 99A anticipates claims 1-3, 9, 16-18 and 21 of the '659 patent. The salient evidence is internal documentation produced by Complainants, specifically the so-called [ ] and expert testimony regarding that documentation.[61] There is no dispute that 99A is prior art to the claims of the '659 patent because 99A was sold to [ ] more than one year before the priority date for the '659 patent. (RX-0509C.0035-36 (DSM Resp. to RFA No. 25).). There is also no dispute that 99A is a "coating composition" that, when cured on a fiber, becomes a "primary coating," as those terms are used in the claims at issue. (Tr. (Overton) at 1240:5-19; RDX-0004.61C; RX-0509C.0032 (DSM Resp. to RFA No. 22); RX-0094C.0009 [ ]; JX-0004 at 25:52–26:6.). There is also no dispute that, when cured using a precure step, 99A possessed properties that satisfy each of the limitations found in the above-mentioned claims. (RMBr. at App. A (citing, among other evidence, RX-0094C [ ]; Tr. (Overton) at 1241:13-22, 1244:10-1245:25; 1246:17-22, 1247:5-1248:25, 1835:16-1837:9; RX-0509C.0032 (DSM Resp. to RFA No. 31); SBr. at 74-76 (citing, among other evidence, RX-094C [ ]; JX-0004).).

Therefore, for the reasons stated above, claims 1-3, 9, 16-18, and 21 of the '659 patent

[61] The [ ], dated January 22, 2000, documents an effort by Complainants to investigate [

] (*See id.*).

are invalid as anticipated by prior art coating 99A.

2. Claims 1-3, 9, 16-18, and 21 of the '659 Patent Are Not Invalid as Derived from JSR Coatings [ ]

Staff and Respondents contended that claims 1-3, 9, 16-18, and 21 of the '659 patent are invalid under 35 U.S.C. § 102(f) because they are derived from existing coatings. (SBr. at 76-77; RMBr. at 71-73.). Staff and Respondents identified coatings [ ], that are manufactured by JSR[62] but not sold in the United States.

Staff and Respondents agreed that the inventors "knew of and were working with the JSR coatings around the time of the alleged invention." (SBr. at 76 (citing [ ] hereinafter referenced as RX-0094).). Indeed, it is undisputed that the alleged inventors used physical samples of [ ] to perform experiments. (RX-0094C.0009; Tr. (Overton) at 1239:12-21; Tr. (Steeman) at 202:18–203:9; JX-0006.0207; *see also* CX-0117C (Lab Notebook).). The inventors also disclosed [ ] formulation as "Comparative Experiment A" in the specification of the '659 patent, and represented R-1166 to the USPTO as "substantially similar to the compositions exemplified in WO 99/52958 and WO 99/08975," evincing familiarity with the R-1166's composition. (RX-1426C (Steeman Dep.) at 181:1-11, 182:1–184:6; JX-0004 at 25:41-50; CX-0117C (Lab Notebook); Tr. (Overton) at 1238:6-15; JX-0006.0207 ('564 patent file history).).

An invalidity defense based on derivation requires two elements: (1) prior conception and (2) communication to the patentee. *Gambro*, 110 F.3d at 1576 ("To show derivation, the party asserting invalidity must prove both prior conception of the invention by someone other than the

[62] Dr. Steeman, one of the inventors of the Cavitation Patent, testified that during the development process that resulted in the Cavitation Patent, DSM entered into a joint venture with a Japanese company, Japan Synthetic Rubber Company ("JSR"), to produce optical fiber coatings. (Tr. (Steeman) at 202:18-23.).

named inventors and communication of that conception to the patentee."). Additionally, "[t]he communication must be sufficient to enable one of ordinary skill in the art to make the patented invention." *Eaton Corp. v. Rockwell Intern. Corp.*, 323 F.3d 1332, 1344 (Fed. Cir. 2003); *Gambro*, 110 F.3d at 1578.

Whether derivation occurred seems like a "close case," as Staff contended, because the patent claims at issue read on coatings [ ] (SBr. at 76.). As set forth in Chart No. 9 below, which displays the results of test performed on the coatings, each has an "equilibrium modulus . . . of about 1.2 MPa or less," a "cavitation strength . . . of at least about 1.0 MPa [or 1.1 MPa]," "cavitation strength being at least about 1.4 [or 1.5] times said storage modulus at 23° C," and an "energy release rate G_o of at least about 20 J/m^2 as measured at a rate of about 1.10^{-5} s^{-1} or less." In light of the claim term "at least about," which has been construed to mean "approximately," the claims are satisfied not only by the "[p]rimary coating composition[s] when cured" using a precure step, but also when cured without a precure step. (*See* Order No. 17 at 40-44 (May 10, 2017).). As discussed, *supra*, in the context of anticipation, there is no reason to read these broad claims to exclude the former (precure step).

Chart No. 9: Test Results of [ ] Coatings

(SBr. at 76 (citing RX-0021C; RDX-0004C).).

However, the *sine qua non* of derivation is prior conception and attendant appreciation of the claimed subject matter by another.

The weight of the evidence does not support prior conception of the above-mentioned claims of the '659 patent by JSR. *See* 35 U.S.C. § 102(f) (a patent applicant is not entitled to a patent if "he did not himself invent the subject matter sought to be patented"). "Conception is the formation in the inventor's mind of a definite and permanent idea which constitutes the complete and operative invention as it is then to be applied in practice." *Hybritech Inc. v. Monoclonal Antibodies Inc.*, 802 F. 2d 1367, 1376 (Fed. Cir. 1986); *see also Langer v. Kaufman*, 465 F.2d 915, 918 (C.C.P.A. 1972) (new form of catalyst was not recognized when it was first produced; conception cannot be established *nunc pro tunc*).

While some of the chemical properties recited in the claims at issue appear in the prior art, the '659 patent also identifies "cavitation strength," as recited in the allegedly derived claims, as a defining feature of the invention, (JX-0004 at 1:30-32 ("a primary coating material having an *equilibrium modulus* of about 2 MPa or higher"); *id.* at 2:28-37 ("It is an object of the present invention to obtain an optical fiber coated with a primary and secondary coating, of which the primary coating has a sufficient high *cavitation strength* while having a low modulus. . . . It is another object of the invention to provide a method and an apparatus to measure the *cavitation strength*.").). There is no evidence that JSR knew, and certainly none that it had a definite and permanent idea, of "cavitation strength," as described and tested in accordance with the '659 patent's specification, when it manufactured the [

] coatings at issue. (*See* RMRBr. at 43 ("This information was also unavailable in the prior art because the cavitation strength test did not exist in the prior

art.").).

Thus, Respondents have failed to provide evidence, let alone clear and convincing evidence, that JSR conceived of the invention of the '659 patent. Moreover, it is axiomatic that Respondents have not proven, that JSR communicated something to the inventors of the '659 patent without evidence of it having a definite and permanent idea of that thing in the first place.

While Staff and Respondents argued that "cavitation strength" was an inherent property of the [ ] coatings,[63] they confused inherency for the purposes of anticipation with inherency for the purposes of derivation. (SBr. at 77; RMBr. at 72.).

As explained above in Section IX.E.1, the allegedly derived claims, claims 1-3, 9, 16-18, and 21 of the '659 patent, read on the [ ] coatings, and, if these coatings were prior art under 35 U.S.C. § 102(a) or (b), they would be anticipatory. *Abbott Labs. v. Baxter Pharm. Prods., Inc.*, 471 F.3d 1363, 1367 (Fed.Cir.2006) (""a reference may anticipate even when the relevant properties of the thing disclosed were not appreciated at the time.'").

However, in order to apply, derivation requires conception. Other than a general awareness in the industry of the problem posed by cavitations, the evidentiary record as it exists

[63] In violation of GR 7.2, Respondents raised this argument cursorily, in their respective Pre-Hearing Briefs, by citing applicable case law in the Legal Standards sections of the briefs and thereafter failing substantively to address inherency in sections of the briefs devoted to derivation contentions. (RMPBr. at 25, 71; ROPBr. at 8-9, 43.). Staff did not mention inherency *vis-à-vis* derivation in its Pre-Hearing Brief. Pursuant to Ground Rule 7.2, "[a]ny contentions not set forth in detail [in pre-hearing briefs] as required herein shall be deemed abandoned or withdrawn." Respondents failed to present the inherency argument with respect to their derivation contention "in detail" as required. Staff was silent on the issue until its Post-Hearing Brief. Both Staff and Respondents have waived their arguments under G.R. 7.2. However, because the argument could be important, and to forestall a valid appeal, this decision addresses the derivation-related inherency argument in the alternative.

is devoid of evidence that JSR conceived of the "cavitation strength" concept as a concrete property of coatings; as a "definite and permanent idea;" or that it had a test for operationalizing that idea (*see* JX-0004 at 1:46-48 ("such coatings tend to be very fragile and can result in the formation of defects in the coating during processing or use of the coated optical fiber")). *Griffin v. Bertina,* 285 F.3d 1029, 1034 (Fed. Cir. 2002) (in the interference context, referencing reduction to practice and drawing a distinction between "inherent properties" that "add nothing to the count beyond the other recited limitations and are not material to the patentability of the invention" and inherent properties that do); *Hitzeman v. Rutter*, 243 F.3d 1345, 1354-55 (Fed. Cir. 2001) ("On rare and special occasions, we have stated that commonplace properties of a claimed invention may be deemed "inherent" to the invention, and that specific conception of these properties is not required. . . . . 'Inherent' properties . . . are the rare exceptions to the rule that a party must show possession of 'every feature' recited in the count and that 'every limitation' of the count must have been known to the inventor at the time of the alleged conception. . . . To invoke the 'inherent conception' rule . . . the inventor needs to show that the allegedly inherent property adds nothing to the count beyond the other recited limitations, and is redundant to the count. . . . In the context of priority determinations, the allegedly inherent limitation cannot be material to the patentability of the invention.").

Given the centrality and materiality of the "cavitation strength" solution to the purportedly inventive concepts disclosed in the '659 patent, a finding that claims 1-3, 9, 16-18, and 21 of the '659 patent were derived by the inventors would be tantamount to establishing JSR's conception retroactively without any proof that it was entitled to such a correction or insertion.

3. Claims 1-3, 9, 12, 16-18, 21 and 30 of the '659 Patent Are Invalid for Lack of Written Description

The principle that "[t]he written requirement [that] prohibits a patentee from leaving the industry to complete an unfinished invention" applies to the '659 or Cavitation Patent. *Novozymes A/S v. DuPont Nutrition Biosciences APS*, 723 F.3d 1336, 1350 (Fed. Cir. 2013) (internal quotations and citations omitted). To satisfy the written description requirement, the patent specification must demonstrate that the inventors were in possession of the full scope of the invention that is claimed. *Ariad Pharms. v. Eli Lilly & Co.*, 598 F.3d 1336, 1355 (Fed. Cir. 2010) (en banc).

Respondents adduced clear and convincing evidence during the evidentiary hearing that claims 1-3, 9, 12, 16-18, 21 and 30 of the '659 patent are invalid for lack of a written description. As Respondents noted and Staff stated so succinctly and clearly, "they broadly claim primary coating compositions and primary coatings by a set of functional properties (i.e., reference to their cavitation strength, equilibrium modulus, and storage modulus (in ratio with the cavitation strength) without any clear correlation in the patent specification to the set of structures that are covered by these functionally described claims." (*See* SBr. at 79-80 (citing JX-0004; *AbbVie Deutschland GmbH & Co., KG v. Janssen Biotech, Inc.*, 759 F.3d 1285, 1301 (Fed. Cir.2014) ("Functionally defined genus claims can be inherently vulnerable to invalidity challenge for lack of written description support, especially in technology fields that are highly unpredictable, where it is difficult to establish a correlation between structure and function for the whole genus or to predict what would be covered by the functionally claimed genus."). "[W]hen a genus is claimed but the specification only describes a part of that genus that is insufficient to constitute a description of the genus." *AbbVie v. Janssen*, 759 F.3d at 1299; *see also Carnegie Mellon Univ.*,

541 F.3d at 1127 (noting the "unremarkable proposition that abroad claim is invalid when the entirety of the specification clearly indicates that the invention is of a much narrower scope.").[64] (*See also* SPBr. at 80; SBr. at 78; RMBr. at 64-65; RORBr. at 2; ROBr. at 28.).

As a starting point, claims 1-3 of the '659 patent describe ***primary coating compositions*** that are defined by their equilibrium modulus, storage modulus, and cavitation strength. (*See* JX-0004 at 27:25-30 (claim 1); JX-0004 at 27:32-34 (claim 2); JX-0004 at 27: 35-37 (claim 3); *see also* Section IX.B, for construed claim terms; *Markman* Order No. 17 at 44.).

Claim 9 describes ***primary coatings*** with the same properties as claims 1-3, but that are defined by a limitation for the strain energy release rate. (JX-0004 at 28:18-22.). Claim 12 describes ***primary coatings*** that are defined by reference to their equilibrium modulus and calculated volumetric thermal expansion coefficient (i.e. an equilibrium modulus of about 1.2 MPa or less and a calculated volumetric thermal expansion coefficient of 6.85×10^{-4} K^{-1} or less.).[65] (JX-0004 at 28:30-33.). The specification of the '659 patent essentially outlines coating properties without disclosing much else but as Staff described, "a very limited number of particular acrylate-based example formulations." (SBr. at 79 (citing *See* JX-0004 at 25:23–27:23).).

A first problem deals with the disclosure, or lack thereof, of a complete description that sets forth the claimed invention with all its limitations using "words, structures, figures, diagrams, and formulas." *Lockwood v. American Airlines, Inc.*, 107 F.3d, 1565, 1572 (Fed. Cir. 1997). The '659 patent does not comply with the *Ariad* requirement that a "patent specification

[64] Complainants, of course, dispute this. (CBr. at 112-14.).

[65] Claims 2, 3, and 9 are dependent claims.

must demonstrate that the inventors were in possession of the full scope of the invention that is claimed." *Ariad* at 598 F.3d 1355. While Complainants relied on the true proposition that chemical coatings were certainly well-known in the art at the time of the filing of the '659 patent, including "known or disclosed correlation between function and structure," Complainants' limited argument is that the '659 patent discloses the structure-function correlation because similar compositions of oligomer, reactive diluent, photoinitiator and additives, were well known. That argument does not address head-on certain problems with the '659 patent's written description. (*See* CBr. at 114 (citing *Streck, Inc. v. Res. & Diagnostic Sys., Inc.*, 665 F.3d 1269, 1285 (Fed. Cir. 2012) (including "known or disclosed correlation between function and structure"); *Enzo Biochem Inc. v. Gen Probe, Inc.*, 323 F.3d 956, 964 (Fed. Cir. 2002); Tr. (Bowman) at 1695:14–1696:7).).

For example, the primary testimony that Complainants relied upon to support their written description argument was that of Dr. Sancaktar's. (CBr. at 114.). Dr. Sancaktar's only specific testimony on written description of the '659 patent consisted of the following:

> I think the cavitation patent provides really extensive information. The sample and preferred parameters are provided. The patents do provide chemical compositions, as well as described in the earlier testimony by Dr. Bowman, and therefore, I believe that a person of ordinary skill would understand how to make and use the invention without undue experimentation.

(*See* Tr. (Sancaktar) at 1733:7-14.).

By contrast, Mr. Overton, Respondent OFS' expert explained[66] that the claim scope of

[66] The only testimony that Complainants offered on written description was Mr. Bowman's (after admittedly extensive testimony on specific discussion of the claims). (*See* CBr. at 114.). Mr. Bowman's testimony was: "Q: In view of everything we've discussed about the calculated volumetric thermal expansion coefficient, can you summarize what is your opinion as to written description relating to that claim element? A: There is adequate written description." (Tr. (Bowman) at 1695:14–1696:7; also directing the reader to section IV.E.3 of Complainants' Post-Hearing Brief which references

each claim is "very broad." (Tr. (Overton) at 1215:19.). When asked what the claim scope is, Mr. Overton testified: "I really don't know what it is, because, again, . . . there is nothing given about the scope of the composition, which I believe is what the patent is about. Just these performance criteria." (*Id.* at 1215:19-23.). When Mr. Overton was asked specifically if he could define the scope of the equilibrium modulus limitation, or the cavitation strength limitation, for each, he said that lower limits were available, but the upper bounds were unknown. (*Id.* at 1215:24–1216: 6.). When he was asked if the cavitation strength limitation or measurement was a "routine measurement in the industry," Mr. Overton categorically said "[n]o." (*Id.* at 1216:7-12.).

With respect to specific claim language, Mr. Overton was asked for his opinion of the scope of the calculated volumetric thermal expansion limitation of claim 12. (*Id.* at 1216:13-14.). He answered: "It has an upper bound, 6.85 x 10 to the minus 4 per Kelvin, but the lower bound is unknown." (*Id.* at 1216:15-16.).

Mr. Overton was asked if the calculated volumetric thermal expansion limitation was a "routine calculation in the industry and again he categorically answered "[n]o" both because he had never heard of it, and "I am not sure who in my industry has, and it's not intended to be used with cross-linked materials." (*Id.* at 1216:17-22.). With respect to claim 9, again Mr. Overton was asked for his opinion on the scope of the strain energy release rate G_o, he testified that "It has a lower limit of 20 joules per square meter, but the upper limit is -- upper bound is unknown." (*Id.* at 1216:23–2017:1.).[67] Generally, with respect to the scope of any primary

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Complainants' arguments with respect to the Cure Dose Patents.).

[67] At this point, there was an objection to Mr. Overton's testimony as beyond the scope of his early opinion. I resolved the objection but am reversing and allowing the testimony given the breadth of Mr.

coating composition limitations, Mr. Overton testified that "[i]t probably covers any primary coating made in the last 20 years, ever." (*Id.* at 1223:1-8.).

Staff's explanation, while consistent with the explanation that Mr. Overton provided, simply stated that "[c]laims 1-3 and 9 lack any meaningful material limitations whatsoever and are instead defined entirely by functional properties." (SBr. at 80.).

With respect to whether there is any clear correlation between structure and function in claims 16-18 and 21 of the '659 patent, as Staff also noted correctly, those claims only further add generic limitations to broad ranges of oligomer, reactive diluents, photoinitiator, and additive ingredients, much as in the Cure Dose Patents. (*See* SBr. at 80 (citing *generally* Tr. (Overton) at 1145:6–1146:24.). However, when Mr. Overton gave the testimony cited, he was talking about the '508 and '103 patents but later testified that the same problem existed in the specification of the '659 patent. This is illustrated to some extent in the language of claim 16 which describes the chemical compositions as follows:

> 16. Primary coating composition . . . wherein said primary coating composition comprises:
>
> (a) 20-98% by wt. of at least one oligomer having a molecular weight of about 1000 or higher;
> (b) 0-80% by wt. of one or more reactive diluents;
> (c) 0.1-20% by wt. of one or more photoinitiators; and
> (d) 0-5% by wt. of additives.

(JX-0004 at 27:44, 27:51-57.).

Claims 17-19 and 21, which depend from claim 16, have the same problem of specifying only broad ranges of generic chemical components without describing either the combinations of chemicals to use, or the exact amounts to achieve the structural results the patent allegedly

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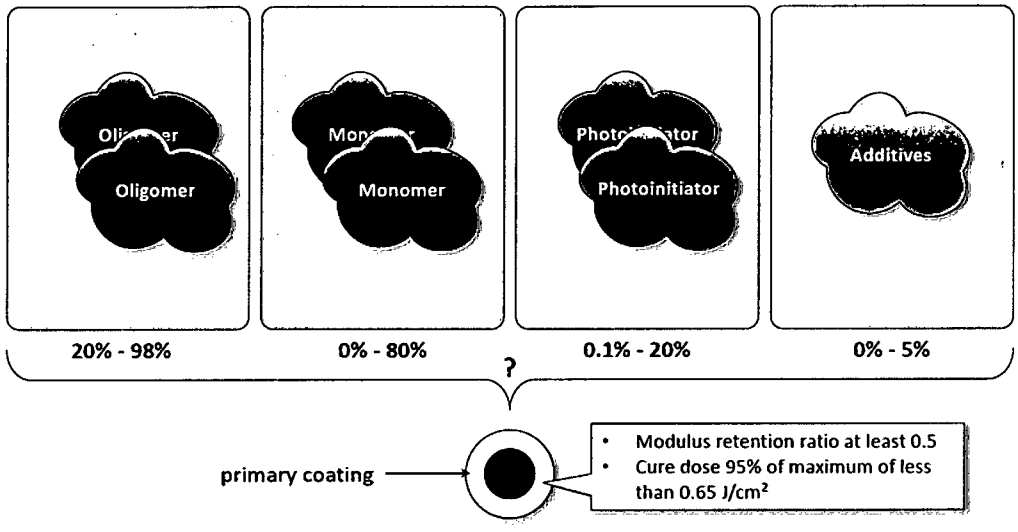
Overton's review of materials and the overall reliability and credibility of his testimony. (*See* Tr. (Overton) at 1217:3–1218:16.).

describes. (*See* SBr. at. 80; *see also* (Tr. (Overton) at 1828:11–1830:20; *compare* JX-0001 at 3:11–5:17 *with* JX-0004 at 11:7–13:29, 13:64–14:20.).

Mr. Overton's testimony appears to capture the problem of the written description of the '659 patent which fails to describe the invention or its structures, as follows:

> A: So as shown here, we have a huge breadth of allowable oligomer, and it can be one or more oligomers with almost any molecular weight. And zero to 80 percent reactive diluent is a huge range of a large family of chemicals. And .1 to 20 percent of one or more photoinitiators, which is not only is it a large range, but this is a cure speed patent that says we can produce a material that has only .1 percent by weight of a photoinitiator, and achieve high cure speed. With --
>
> Q: Does that make any sense to you?
>
> A: It does not make sense to me. I would dispute that that's possible today, not without using electron beam.
>
> Q: And how about the additives?
>
> A: It's open, wide open, 0 to 5 percent of just additives, which is practically not a descriptor, it could be anything.
>
> Q: So you've prepared a demonstrative to illustrate how broad this is; right? Could you explain RDX-4.28 to the Court?
>
> A: Well, it's -- it's just a picture image of a -- analogous to what we're talking about. So we have one or more oligomers, so that's -- and each of the oligomers could come from a huge -- a broad family of base chemicals. One or more monomer, 0 to 80 percent. One or more photoinitiator, .1 to 20 percent and then additives from a large range of possibilities, zero to 5 percent. When you compound all of these variables, it's a gigantic number. And we don't see any guidance as to how you move around in this universe away from the one or two single points that are given in examples and achieve anything.

Figure No. 13: Primary Coating Composition of the Claimed Invention



(Tr. (Overton) at 1145:12-1146:18; RDX-0004.28.)

> Q: So would you multiply each box in order to get the possible number of combinations?
>
> A: Well, yes, you could. It's millions or billions.
>
> Q: Millions or billions?
>
> A: Yes.

(Tr. (Overton) at 1146:19-24.).

Other than the outer boundaries for the mixtures of chemicals to use, there are, as Mr. Overton testified, an almost limitless number of possible coating compositions within the ranges that the claims specify.

Yet within the specification, there are only two (2) working examples (Tables 1 and 2) of claims 1-3, and 16-18. (*See* Tr. (Overton) at 1223:1–1224:21, 1828:11–1831:18.). Similarly, claims 12 and 30 of the '659 patent both require an equilibrium modulus of about 1.2 MPa or less and a calculated volumetric thermal expansion coefficient of 6.85 x 10^{-4} K^{-1} or less. (JX-0004 at 28:30-35; JX-0004 at 30:32-41.). In this case, there is no example in the patent

specification of a formulation that meets the claimed properties. (*See* Tr. (Steeman) at 228:3-22; Tr. (Bowman) at 1746:17–1747:3.). Also, at the evidentiary hearing, Complainants' expert, Dr. Bowman, testified:

> Q: If I give you a calculated volumetric thermal expansion coefficient, do you necessarily know what material it corresponds to?
>
> A: No. That mapping doesn't go that way, because you can have multiple materials that have the same coefficient of thermal expansion.

(*See* SBr. at 78 (citing Tr. (Bowman) at 551:20-25).).

Dr. Bowman pointed to Example 3 in the patent specification as the closest example to claims 12 and 30 of the '659 patent. (*Id.* (citing Tr. (Bowman) at 1747:2-3.). Example 3 in the patent specification discloses a primary coating composition that meets the calculated volumetric thermal expansion limitation, but does not meet the modulus limitation of claims 12 and 30 of the '659 patent. (JX-0004 at 26:23-37.).

As Staff so succinctly stated, "the evidence shows that the inventors have in essence drawn a box around the desirable combination of a coating with low modulus and high cavitation strength, while impermissibly leaving the confines of the invention and the full scope of composition that come within the claim scope to be discovered by others in the future." (SBr. at 80 (citing *generally* Tr. (Overton) at 1214:22–1216:12.).

In other words, Respondents have proven with clear and convincing evidence that the asserted claims of the '659 patent are invalid for lack of written description.

4. Claims 1-3, 9, 16-18, and 21 of the '659 Patent Are Invalid for Lack of Enablement

Staff and Respondents contended that the "cavitation strength" limitations in claims 1-3, 9, 12, 16-18, and 21 of the '659 patent, and the "calculated volumetric thermal expansion

coefficient" limitation in claims 12 and 30 of the '659 patent, are invalid due to lack of enablement. (SBr. at 81; RMBr. at 64-66.). "To be enabling, the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *ALZA*, 603 F.3d at 940 (internal citations and quotations omitted). For the reasons stated below, claims 1-3, 9, 12, 16-18, and 21 are invalid for lack of enablement, whereas claims 12 and 30 are not.

As an initial matter, to lay analytical groundwork, Respondents asserted that "the level of ordinary skill in the art was relatively low,"[68] "the quantity of experimentation needed to make or use the full scope of the claimed invention . . . is massive and . . . experiments required to determine whether a given formulation falls within the scope of the claims are not routine." (RMBr. at 65.). They further argued that "a person of ordinary skill in the art could not rely on the state of the prior art to fill in the gaps," and "there is insufficient guidance on how to modify existing coatings or develop new coatings to achieve the full scope of the asserted claims." (*Id.*). As discussed below, these assertions are far more persuasive for "cavitation strength" limitations than for the "calculated volumetric thermal expansion coefficient" limitation.

a) Lack of enablement of "cavitation strength" limitations

In post-hearing briefing, each party addressed enablement of the "cavitation strength" limitations. Respondents argued that "the development of coatings for optical fibers is an unpredictable art." (RMBr. at 61). Respondents also contended that "the scope of the asserted claims in the '659 patent encompasses a broad genus of widely variant species," "the

[68] "A person of ordinary skill in the art would have at least a B.S. in Chemistry, Chemical Engineering, Materials Science or a related field, approximately three to five years of postgraduate experience, including some experience in one or more of photopolymerization reactions, molecular synthesis, polymer characterization, polymer chemistry, and optical fibers." (*Markman* Order at 13.).

specification does not sufficiently describe a representative number of species for the broad and widely variant genus of primary coating compositions and primary coatings within the scope of the asserted claims," "or describe structural features common to members of the claimed genus or a reasonable structure-function correlation . . . to visualize or recognize the members of the genus." (*Id.* at 62-64).

While tacitly acknowledging that the claims at issue are broad, Complainants nevertheless asserted that the claims are enabled because key claim limitations are inherently in tension with one another. (CBr. at 109-10.). For example, "[o]ne cannot achieve a coating with infinite cavitation strength without sacrificing its equilibrium modulus." (*Id.* at 109.). Complainants also rely on the testimony of Dr. Bowman that "the 'nature of the invention or the characteristics of the components, they are well known' and the 'structure-property relationships are known' which would also apply to the '659 Patent since they involve similar compositions of oligomer, reactive diluent, photoinitiator and additives." (*Id.* at 110 (citing Tr. (Bowman) at 1695:14–1696:7).).

Based on the evidentiary record, and application of the *Wands* factors,[69] enablement is a close call for the "cavitation strength" claims, under the clear and convincing standard for invalidity. First, as discussed, *infra*, in the context of indefiniteness, the claims at issue are quite broad, as Complainants chose to disclose the inventive concept vaguely and yet, simultaneously,

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[69] The *Wands* factors are as follows:

> (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

In re Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).

claim the concept broadly via genus claims drawn to function (e.g., "a cavitation strength at which a tenth cavitation appears"). Simultaneously, Complainants chose not to disclose a precise chemical structure, thereby enhancing Complainants' enablement burden of teaching "one skilled in the art how to make or use the *full scope* of the claimed invention without undue experimentation." *See MagSil Corp. v. Hitachi Global Storage Tech., Inc.*, 687 F.3d 1377, 1380 (Fed. Cir. 2012) ("The open claim language chosen by the inventors does not grant them any forgiveness on the scope of required enablement.").

Second, while the '659 patent does provide some direction in terms of practicing the broadly claimed invention, including three working examples, someone with far more expertise than a person of ordinary skill in the art encountered marked difficulty trying to practice the purported invention. (Tr. (Overton) at 1091:23–1092:8, 1128:3–1133:9, 1165:15–1166:8; 1231:19-22.). Mr. Overton, Respondents' expert who testified extensively on the '659 patent and had 39 years of experience in the coated optical fiber industry, encountered several problems testing cavitation strength in particular, including breakage of the glass plates. (*Id.* at 1128:3-1133:9, 1165:15-1166:8; *see also* Tr. (Nairn) at 1055:13–1060:9.). As Mr. Overton testified, after 6 months of working, he had failed to replicate the cavitation strength test:

> Q: And how long did it take you to replicate the cavitation strength test?
>
> A: I had six months to build it and work with it, and I can't replicate them yet.
>
> Q: So in your opinion, why did it take so long?
>
> A: There's a lot of art involved in making the sample itself, and as I said before, where -- where it is now in my hands is still a measure of the sum of the flaws introduced in manufacturing the thin film between the two plates, plus parallelity errors. And then the coating has a contribution. But these three factors appear to be almost of equal influence, and I don't know how to unconfound them.

(Tr. (Overton) at 1231:19–1232:6.).

Third, the '659 patent discloses purportedly inventive concepts absent from the prior art, characterized by a definition of cavitation strength and a test for measuring it, again upping the ante for demonstrating enablement. (RMBr. at 65; CBr. at 101-03.).

Fourth, the evidentiary record demonstrates enough predictability in the art for a person of ordinary skill in the art to understand that fiber optic coatings with cavitation strength properties are made from oligomer, reactive diluent, photoinitiator and additives. (JX-0004 at 11:7-23.). Indeed, inventor Jan van Eekelen testified that Complainants "knew exactly where to go" in terms of pursuing coatings with the "in-conflict" properties claimed in the '659 patent. (Tr. (van Eekelen) at 135:12–136:2.). Yet, it is telling that Mr. van Eekelen also acknowledged that the development of coatings that satisfy the asserted claims took years and presented "quite some headache." (*Id.* at 154:24–155:8.).

Finally, enabling the full scope of the broadly-drawn asserted claims would likely entail undue experimentation by a person of ordinary skill in the art. It would require spending copious amount of time testing myriad species coatings (indeterminate in number), applying techniques absent from the prior art and demonstrably confounding to people with extensive industry experience, to determine whether a given formulation falls within the scope of the claims. (Tr. (Sancaktar) at 1776:15–1777:18 (stating that "it's not a short test" and that the "cavitation strength test needs to be performed").

On balance, there is clear and convincing evidence that only claims 1-3, 9, 16-18, and 21 of the '659 patent, those containing "cavitation strength" limitations, are invalid for lack of enablement. This conclusion is based on the breadth of the claims in combination with the lack of guidance disclosed, both in the '659 patent's specification and the prior art, as demonstrated by Complainants' difficulty in creating the purportedly inventive coatings, and the challenges

and undue experimentation that Mr. Overton faced attempting to practice the invention as described and claimed. Moreover, as Dr. Sancaktar's testimony suggests, it would require undue experimentation to make or use the full scope of the claimed invention, including the testing of myriad variant coatings to determine whether a given formulation falls within the scope of the genus-oriented asserted claims. (Tr. (Sancaktar) at 1776:15–1784:5.). This invalidity finding is a consequence of Complainants' decision to disclose vaguely and claim broadly.

b) Enablement of "volumetric thermal expansion coefficient" limitation

With respect to independent claims 12 and 30, which require "a calculated volumetric thermal expansion coefficient" but lack a "cavitation strength" limitation, clear and convincing evidence of lack of enablement is absent. Respondents argued that the "sophisticated" Synthia software package needed to calculate a "volumetric thermal expansion coefficient" "requires more than ordinary skill in the art to use" and that "none of the parties' respective experts even knew how to use the software." (RMRBr. at 41 (citing Tr. (Overton) at 1824:3-8, 1825:17-24; Tr. (Bowman) at 485:5-7).). Additionally, there is evidence that calculating each "volumetric thermal expansion coefficient" took a considerable amount of time. (Tr. (Bowman) at 1745:17–1746:7 (putting the initial determination of the calculated volumetric thermal expansion coefficient for a coating at "a few hours").).

However, Complainants proffered rebuttal evidence that Synthia software "reduced the burden on a person of ordinary skill in the art while designing a coating compared to conventional methods, by teaching such a person of ordinary skill to design coatings at the stroke of a computer key." (CBr. at 110-11 (citing Tr. (Bowman) at 1653:14–1654:11).). Although Complainants conceded the lack of working examples of "volumetric thermal expansion

coefficient" in the'659 patent, they nevertheless argued that "the '659 Patent teaches one of ordinary skill to use the Synthia software as a tool to screen coatings quickly for" that term.[70] (*Id.* at 111 (citing JX-0004 at 16:62-64, 20:1-15; Tr. (Bowman) at 1653:14–1654:11).). Finally, Complainants asserted that the "patent also teaches one of ordinary skill how to modify the volumetric thermal expansion coefficient." (*Id.*).

Application of the *Wands* factors in the context of "calculated volumetric thermal expansion coefficient" reveals the shortcomings of Respondents' lack of enablement defense with respect to claims 12 and 30 of the '659 patent. While these claims are broad, there is no evidence that "volumetric thermal expansion coefficient" is a new concept absent from the prior art. Although the evidence demonstrates that experts struggled to learn and properly use the Synthia software, and consequently arrived at different volumetric thermal expansion coefficient calculations, there is no evidence that the '659 patent specification failed to teach them how to practice claims 12 and 30 or that their struggles with the Synthia software amounted to months of undue experimentation. (Tr. (Overton) at 1824:3-8, 1825:17-24; Tr. (Bowman) at 485:5-7); *compare* CDX-0121C (Bowman) and CX-0576C (CTE calculations) *with* RDX-0006.7C (Overton) and RX-1401C (CTE calculations).). For the purposes of an enablement defense, expending elbow grease to learn disclosed prior art software is not undue experimentation.

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[70] "In the present invention, α_{23} is calculated by using the Synthia software of MSI as explained further below. . . . The thermal expansion coefficient α_{23} for several coating systems can be predicted on the basis of chemical structural information by using commercial software packages: the module Synthia of MSI (Molecular Simulations Inc, San Diego, Calif.) in combination with the Builder module of MSI. . . . The builder module is applied for the construction of the chemical monomer species that will serve as input for the Synthia module. This module Synthia is based on a methodology developed by J. Bicerano that is explained in detail in his monograph (J. Bicerano, Prediction of polymer properties, Marcel Dekker Inc., New York, 1993). This methodology makes use of compositional information, i.e. the chemical monomer structure, for the prediction of polymer properties. . . . among these properties the thermal expansion coefficient, of linear amorphous homopolymers and for linear alternating and random amorphous copolymers." (JX-0004 16:62-64, 17:66–18:20.).

Thus, claims 12 and 30 are not invalid for lack of enablement.

5. Claims 1-3, 9, 16-18, and 21 of the '659 Patent Are Invalid for Indefiniteness

Staff and Respondents contended that several claims of the '659 patent are invalid as indefinite. (SBr. at 82-84; RMBr. at 66-71; ROBr. at 45.). Staff focused on the "cavitation strength" limitation found in claims 1-3, 9, 16-18, and 21. (SBr. at 82-84.). Respondents echoed these arguments and asserted that two additional terms are indefinite: "equilibrium modulus," found in claims 1-3, 9, 12, 16-18, 21, and 30, and "calculated volumetric thermal expansion coefficient," found in claims 12 and 30. (RMBr. at 66-71; ROBr. at 45.). For the reasons set forth below, of the terms at issue, only "cavitation strength" is indefinite, rendering invalid claims 1-3, 9, 16-18, and 21 of the '659 patent.

A patent specification must "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as [the] invention." 35 U.S.C. § 112, ¶ 2. According to the Supreme Court, § 112, ¶ 2 requires "that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty. The definiteness requirement, so understood, mandates clarity, while recognizing that absolute precision is unattainable." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014) (citations omitted).

a) "equilibrium modulus" and "calculated volumetric thermal expansion coefficient"

According to Respondents, they have presented clear and convincing evidence that "equilibrium modulus" and "calculated volumetric thermal expansion coefficient" are indefinite claim terms. (RMBr. at 70-71; ROBr. at 45.). Respondents argued that these terms are subjective and unreliable insofar as there are multiple ways to arrive at calculations for them for

a particular coating. (*See id.*). Consequently, they contended, having tested the same coatings for "equilibrium modulus" and "calculated volumetric thermal expansion coefficient," the Parties' experts reported disparate test results. (*See* RMBr. at 70-71 ("the striking difference between those results and the equilibrium modulus results DSM provided to Dr. Bowman for the same product demonstrates how ***two slightly different procedures***, both of which are within the scope of the asserted claims, affect the equilibrium modulus . . . as demonstrated by the parties' respective experts, there are ***at least two different ways to calculate*** the volumetric thermal expansion coefficient using MSI's Synthia software that will typically yield a different result for a given primary coating composition") (emphases added).).

Yet, the evidentiary record does not contain clear and convincing evidence that the claim terms "equilibrium modulus" and "calculated volumetric thermal expansion coefficient" are indefinite. To the contrary, both terms are identified and illuminated with reasonable precision in the '659 patent's specification, as indicated by the illustrative excerpts below.

> The primary coating of the present invention has an equilibrium modulus of about 1.5 MPa or less. The equilibrium modulus according to the present invention is measured by DMTA in tension according to ASTM D5026-95a, wherein the modulus is determined as described in the experimental section.

(JX-0004 at 3:53-57).

> The volumetric thermal expansion coefficient α_{23} of a coating at 23° C. can be defined by the following formula (8):
>
> $$\alpha_{23} = 1/V(\delta V/\delta T) \qquad (8)$$
>
> wherein V represents the specific volume (m^3/kg) or the inverse of the density of the system, ($\delta V/\delta T$) represents the change in specific volume of the system as a function of the temperature and T = 23° C. In the present invention, α_{23} is calculated by using the Synthia software of MSI as explained further below.

(*Id.* at 16:54-64).

Notably, Staff did not identify these terms as indefinite. Moreover, Respondents' own descriptions of the indefiniteness, "two slightly different procedures" and "at least two different ways to calculate the volumetric thermal expansion coefficient using MSI's Synthia software," evinced confusion over not the meaning of a particular claim term or the type of test used to calculate the corresponding measurement, but certain intricacies of the test used to calculate the corresponding measurement. (*See* SBr. at 82-84; RMBr. at 70-71.)

There is evidence of "[s]ome modicum of uncertainty," pursuant to *Nautilus*, regarding "distance to the lamp in the curing process," and the disparate results of dueling experts, with respect to "equilibrium modulus" and "calculated volumetric thermal expansion coefficient." (CBr. at 108 (citing Tr. (Bowman) at 1696:20–1699:1); RX-1377.0009 (Overton Decl.); RDX-0004.23 (UV Curing Parameters); Tr. (Overton) at 1137:20–1138:12; CBr. at 103-04 (citing RX-1401C; CX-0102C).).[71] However, there is no evidence that the claims fail to inform those skilled in the art about the scope of the invention with reasonable certainty.

Indeed, the weight of the evidence supports the opposite view. For example, in measuring equilibrium modulus, "distance to the lamp in the curing process" is a relatively benign source of potential measurement error. (Tr. (Bowman) at 1696:20–1699:1.). In calculating the "volumetric thermal expansion coefficient," Respondents' expert, Mr. Overton, likely "incorrectly entered mole fractions, instead of mass fractions," causing the Parties' experts to calculate inconsistent values. (Tr. (Overton) at 1846:9-18, 1887:3–1895:23).

Additionally, in support of their indefiniteness assertions, Respondents cited cases that are apposite to the facts presented here, insofar as those cases presented extreme circumstances

[71] *See also* Section VIII.C.1, *supra*, where Respondents asserted similar arguments against the "cure dose" limitation claimed in the Cure Dose Patents, which this ID finds unpersuasive.

of patents devoid of guidance on particular claim terms, leading to genuine confusion among experts in those cases over the meanings of claim terms. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1341 (Fed. Cir. 2015) (indefiniteness found where "[t]here is no express definition of 'molecular weight' in the '808 patent specification."); *Dow Chemical Co. v. NOVA Chemicals Corp. et al.*, 803 F.3d 620, 630 (Fed. Cir. 2015) (method chosen by patent holder's expert to calculate the slope of strain hardening "was not even an established method but rather one developed for this particular case"). Indeed, as discussed below, these cases are much more applicable to the "cavitation strength" term.

b) "cavitation strength"

Staff argued, and Respondents concurred, that because of "the large amount of variability associated with the individual cavitation strength measurements and the inclusion of the terms 'at least about' in the claims in reference to the cavitation strength limitations, it is subjective and nearly impossible to determine whether or not claimed compositions with cavitation strength measurements that fall in the vicinity of the claim boundary do or do not come within the claim scope." (SBr. at 84.). Staff nevertheless recognized that the "cavitation strength test itself may have some value as a very coarse experimental technique for gauging the integrity or strength of various materials or for making relative comparisons when working with the same basic material." (*Id.* at 83.). Complainants, on the other hand, scrambled in whack-a-mole fashion to rebut the myriad grounds of Staff's and Respondents' "cavitation strength" indefinite arguments, including the following: (1) visibility [of cavitations] depends on the user; (2) the [cavitation strength] value is dependent on curing conditions; (3) [Complainants'] obtained variable results [in cavitation strength testing]; (4) the claims use the word "about"; and (5) there is allegedly close prior art." (RMRBr. at 73.).

In so doing, Complainants distanced themselves from indefiniteness decisions involving claims with relatively minor flaws that nevertheless "inform those skilled in the art about the scope of the invention with reasonable certainty," turning on notions such as "absolute precision is unattainable" and "relative terms and words of degree do not render patent claims invalid." *See Nautilus*, 134 S.Ct. at 2128-29 (whether the claim term "spaced relationship" in patent delineated the permissible spacing of electrodes with sufficient precision), *remanded to* 83 F.3d 1374, 1384 (Fed. Cir. 2015) (finding the claim term definite because "a skilled artisan would understand the inherent parameters of the invention as provided in the intrinsic evidence"); *One-E-Way, Inc. v. Int'l Trade Comm'n*, No. 2016-2015, slip op. at 8 (Fed. Cir. Jun. 12, 2017) (finding that term of degree "virtually" did not render claim limitation "virtually free from interference" indefinite, for patent directed to maintaining privacy for wireless headphone users).

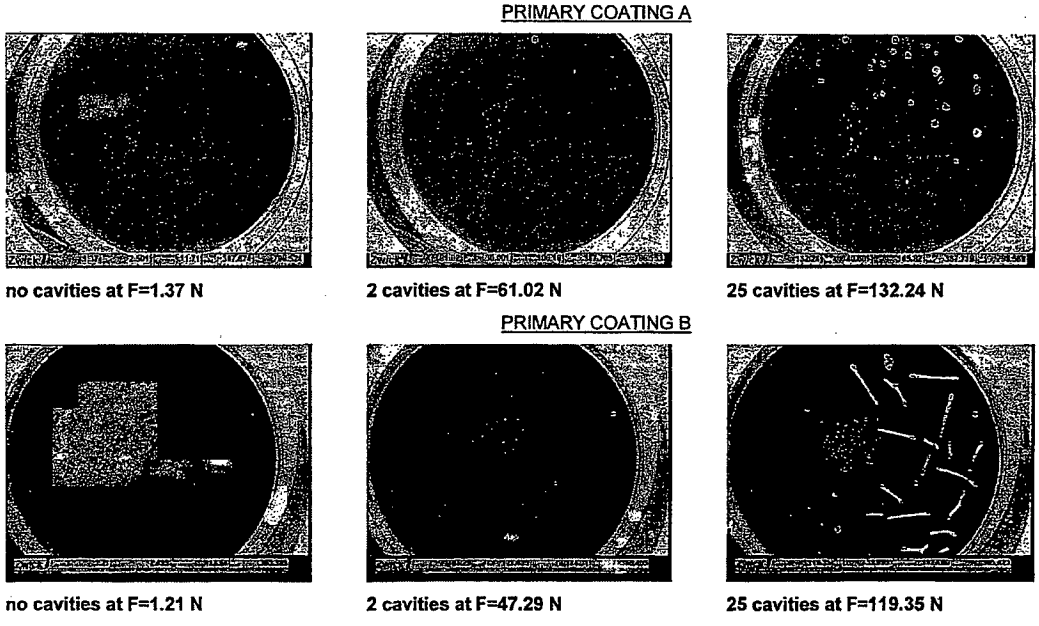
As the Parties recognized in the context of "cavitation strength," though obscured by a cacophony of competing testing regimes and corresponding results, and unwieldy variability in testing results, the critical issue is whether the patent claims at issue adequately place the public on notice regarding what is patent protected and what is not. (CBr. at 105-107; SBr. 82-84; RMBr. at 67-69.); *see also Halliburton Energy Services, Inc. v. M-I LLC*, 514 F.3d 1244, 1228 (Fed. Cir. 2008) ("[A] patent must be precise enough to afford clear notice of what is claimed, thereby 'appris[ing] the public of what is still open to them.'"). Appropriately, interpretation of claim language by a POSA plays a pivotal role. *See Nautilus*, 134 S.Ct. at 2128-30 ("[A] patent is invalid . . . if its claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty . . . [i]t cannot be sufficient that a court can ascribe some meaning to a patent's claims; the definiteness inquiry trains on the understanding of a skilled artisan at the time of the patent application, not that of a

court viewing matters *post hoc*.").

Yet, here, the hypothetical person of ordinary skill starts with few reference points because, although cavitations appear in the prior art, a definition for "cavitation strength," and a test for measuring it, do not. (RMBr. at 65; CBr. at 101-03.). Instead, these are the purportedly inventive features of the '659 patent. (JX-0004 at 2:65–3:24 ("A suitable definition of the phenomenon of cavitation strength according to the present invention is the stress at which the tenth cavitation becomes visible . . . . The present invention further provides an apparatus for measuring the cavitation strength of a coating and a method for measuring said cavitation strength of a coating for use as a primary coating on an optical glass fiber).).

It is evident that the Parties, and their respective experts, from a technical perspective, have struggled to reach consensus on the scope of "cavitation strength" and to measure that property with precision and consistency. Driving that confusion, the patent discloses that different coatings can manifest cavitations (or defects) in different ways.

Figure No. 14: Sample Primary Coatings with Cavities



(JX-0004 at Photograph 3 (showing coatings A and B manifesting differing cavitation patterns as applied force increases)).

Finally, the evidence reveals significant variability in cavitation strength results obtained by Respondents and attendant difficultly in distinguishing coatings based on those results. (RX-0179C; Tr. (John Nairn)[72] at 1065:3–1067:1, 1068:11-24, 1086:17–1088:10; Tr. (Overton) at 1130:20–1133:9, 1165:3-14, 1843:2-11; RDX-0004.19-21C ("[B]ecause of the high scatter, it is very difficult to distinguish in cavitation stress between the 10 coatings.").). Indeed, it is telling, and ultimately fatal to Complainants' indefiniteness rebuttal, that they, too, faced trouble, insofar as their own cavitation strength testing yielded variable results. (*See, e.g.,* CX-0409C [

]; CX-0434C [

]

Although Complainants argued that variability in cavitation strength results is resolved by performing multiple tests on a sample and computing an average cavitation strength, and that a person of ordinary skill in the art would know to do that, the '659 patent is silent on such averaging. (CBr. at 105.). Importantly, the patent is also silent on the number of test values to obtain before taking an average or how to handle outlier values. Indeed, relatively large variability in test results is anathema to the definiteness (precision) of claims that reference such results, particularly in light of prior art coatings with numerically close (and, yet, similarly variable) cavitation strength test readings. Making matters worse, the claims at issue recite cavitation strength values at least "about," a term previously found definite that, in this instance, nevertheless renders fatally imprecise claims even more imprecise. (*Markman* Order at 41-42

[72] When he testified during the evidentiary hearing on August 3, 3017, Dr. John A. Nairn was a Professor and held the Richardson Chair of Wood Science and Forest Products at Oregon State University. (RPSt. at Ex. 2; Tr. (Nairn) at 1046:19-20.). Respondents identified him as an expert witness to provide testimony about invalidity and testing of coatings. (RPSt. at 2.).

(construing "about" as "approximate").).

This appears to be a situation where, although Complainants may have possessed an inventive concept, characterized by a definition and test for cavitation strength, in spite of prior art, they chose to disclose that concept vaguely and yet, simultaneously, claim the concept broadly via claims drawn to amorphous function ("a cavitation strength at which a tenth cavitation appears"), not, for example, a precise chemical structure. (SBr. at 83.).[73]

Consequently, in light of the above analysis, there is clear and convincing evidence that a competitor exercising due diligence would have a difficult time determining whether its coatings infringe claims 1-3, 9, 16-18, and 21 of the '659 patent. Thus, these claims are invalid for indefiniteness.

X. DOMESTIC INDUSTRY REQUIREMENT: THE TECHNICAL PRONG

A. The Relevant Law of the Technical Prong of Domestic Industry Requirement

A complainant in a patent-based Section 337 investigation must demonstrate that it is practicing or exploiting the patents at issue. *See* 19 U.S.C. § 1337(a)(2) and (3); *Certain Microsphere Adhesives, Process for Making Same, and Prods. Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm'n Opinion at 8, Pub. No. 2949 (U.S.I.T.C., Jan. 16, 1996) ("*Microsphere Adhesives*"). The technical prong of the domestic industry requirement is satisfied when the complainant establishes that it is practicing or

[73] During the last day of the evidentiary hearing on August 15, 2017, Complainants tried to use Respondents' expert, Mr. Overton, to acknowledge that simply because he heard a "popping" sound on an unauthenticated video that purportedly showed cavitation strength testing, that he could know the cavitation strength when the 10th cavitation appeared because of the "pop," and therefore, the claim term at issue was not indefinite. (Tr. (Overton) at 1878-1884). Order No. 50 which issued on February 14, 2018 struck the video, exhibit CX-1475C, as unauthenticated and without a sponsoring witness pursuant to Ground Rule 8.6.9. (Order No. 50, Doc. ID No. 636511 (Feb. 14, 2018).). Complainants' argument was clever but absurd. Order No. 50 also struck Mr. Overton's testimony since he had no personal knowledge of the video, and there was no appropriate foundation or authentication of the video.

exploiting the patents at issue. *See id.*

The test for claim coverage for the purposes of the technical prong of the domestic industry requirement is the same as that for infringement. *Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109, 1990 WL 710463 (U.S.I.T.C., May 21, 1990), *aff'd*, Views of the Commission at 22 (October 31, 1990). "First, the claims of the patent are construed. Second, the complainant's article or process is examined to determine whether it falls within the scope of the claims." *Id.* The technical prong of the domestic industry can be satisfied either literally or under the doctrine of equivalents. *Certain Dynamic Sequential Gradient Devices and Component Parts Thereof*, Inv. No. 337-TA-335, Initial Determination at 44, Pub. No. 2575 (U.S.I.T.C., Nov. 1992). "In order to satisfy the technical prong of the domestic industry requirement, it is sufficient to show that the domestic industry practices any claim of that patent, not necessarily an asserted claim of that patent." *Certain Ammonium Octamolybdate Isomers*, Inv. No. 337-TA-477, Comm'n Opinion at 55 (U.S.I.T.C., Jan. 5, 2004) ("*Certain Isomers*").

B. Complainants Have Satisfied the Technical Prong of the Domestic Industry Requirement For the Cure Dose Patents

Complainants asserted that their DP-1017/[ ] coating practices claims 20-22 of the '508 patent and claims 1, 2, 4-10, and 13-15 of the '103 patent. (*See, e.g.*, CBr. at 14.). Complainants have also asserted that the DP-1017/[ ] and DP-1032 coatings ("DI Cure Dose Coatings") practice claims 20-22 of the '508 patent and claims 1-10 and 13-15 of the '103 patent. (*Id.*). Complainants presented evidence, which is summarized in Chart No. 10 below, that the DI Cure Dose Coatings have the following characteristics, and practice the claims identified above.

Chart No. 10: Summary of Measurements of DI Cure Dose Coatings

'508 Patent	**DP-1017/[ ]** (CBr. at Ex. A)	**DP-1032** (CBr. at Ex. B)
Claims Practiced	20-22	20-22
In-situ modulus (after cure) < 0.6 MPa (Claim 20) < 0.56 MPa (Claim 22)	Approximately [ ]	Approximately [ ]
Cure Dose < 0.65 J/cm^2	[ ]	[ ]
Modulus retention ratio (after cure) > 0.6 (Claim 20) > 0.5 (Claim 22)	[ ]	[ ]

'103 Patent	**DP-1017/[ ]** (CBr. at Ex. C)	**DP-1032** (CBr. at Ex. D)
Claims Practiced	1, 2, 4-10, and 13-15	1-10 and 13-15
In-situ modulus (after cure) < 0.6 MPa	Approximately [ ]	Approximately [ ]
Cure Dose < 0.65 J/cm^2	[ ]	[ ]
Modulus retention ratio (after cure) > 0.6	[ ]	[ ]
20-98 wt. % relative to the total weight of the composition of a radiation curable urethane **(meth)acrylate oligomer**	[ ]	[ ]

'103 Patent	DP-1017/[ ] (CBr. at Ex. C)	DP-1032 (CBr. at Ex. D)
having polyether polyol backbone		
0-80 wt. % relative to the total weight of the composition of one or more **reactive diluents**	[ ]	[ ]
0.1-20 wt. % relative to the total weight of the composition of one or more **photoinitiators**	[ ]	[ ]
0-5 wt. % relative to the total weight of the composition of **additives**	[ ]	[ ]

As Complainants and Staff pointed out, Respondents did not meaningfully challenge that the technical prong of domestic industry is satisfied by the DI Cure Dose Coatings.[74] (*See* CRBr. at 17; SBr. at 44.). Thus, Respondents have waived any argument regarding the technical prong of DI under Ground Rule 10.1.

For the reasons discussed below, Complainants have met their burden and proven by a preponderance of evidence that the DI Cure Dose Coatings practice claims 20-22 of the '508 patent and claims 1-10 and 13-15 of the '103 patent. Because claims 20 and 22 of the '508 patent have been found to be invalid (*see* Section VIII.G.3, *infra*), Complainants have satisfied the technical prong of the domestic industry requirement based on claim 21 of the '508 patent

[74] For example, for the '103 patent's technical domestic industry, Respondent MUV's Post-Hearing Brief points to Section VI.D of Respondent OFS' Post-Hearing Brief. (RMBr. at 17.). Section VI.D of Respondent OFS' Post-Hearing Brief points back to Sections VI.B.1 and 2 of Respondent MUV's Post-Hearing Brief (ROBr. at 42), which present Respondents' ***non-infringement*** arguments.

and claims 1-10 and 13-15 of the '103 patent. *See, e.g.*, *Certain Ground Fault Circuit Interrupters and Prods. Containing Same*, Inv. No. 337-TA-739 ("*Ground Fault Circuit Interrupters*"), Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citing *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000) ("To prevail [on the test for satisfying the technical prong], the patentee must establish by a preponderance of the evidence that the domestic product practices one or more ***valid*** claims of the patent, either literally or under the doctrine of equivalents.") (emphasis added).

1. Complainants' DP-1017/[ ] and DP-1032 Coatings ("DI Cure Dose Coatings") Each Practice Claims 20-22 of the '508 Patent

a) Claims 20 and 22 of the '508 Patent

Complainants presented evidence that the DP-1017/[ ] coating is an inner primary coating composition that has an in-situ modulus of approximately [ ], which is less than 0.60 MPa (claim 20) and 0.56 MPa (claim 22), a "cure dose" of [ ], which is less than 0.65 J/cm^2, and a modulus retention modulus of approximately [ ] (claims 20 and 22), which is at least 0.6 (claim 20) and 0.5 (claim 22). (*See* CX-0480; CX-0382C; CX-0383C; CX-0451C; CX-0452C; CX-0453C; CX-0032C; CX-0463C; CX-0464C; CX-0437C; CX-0465C; CX-0466C; CX-456C; CX-0457C–0461C; Tr. (Bowman) at 480:7-13, 444:1-7, 447:23–448:5, 453:19-23.).

Complainants also submitted evidence that the DP-1032 coating is an inner primary coating composition having an in-situ modulus of [ ], which is less than 0.60 MPa (claim 20) and 0.56 MPa (claim 22), a "cure dose" of [ ], which is less than 0.65 J/cm^2 (claims 20 and 22), and a modulus retention ratio of [ ], which is at least 0.6 (claim 20) and 0.5 (claim 22). (*See* CX-0481; CX-0454C; CX-0455C; CX-0033C; CX-0467C; CX-0468C; CX-

0034C; CX-0469C; CX-0470C; CX-0456C; CX-0462C; Tr. (Bowman) at 480:7-13, 444:8-13, 448:6-12, 453:14-18.).

Moreover, for the reasons discussed in Section VIII.C, it is a finding of this decision that Complainants' test procedures were performed in accordance with the instructions disclosed in the Cure Dose Patents and yielded reliable results.

Complainants have proven by a preponderance of evidence that the DI Cure Dose Coatings meet these limitations and practice claims 20 and 22 of the '508 patent. However, because Respondents have proven by clear and convincing evidence that these claims are invalid, Complainants cannot rely on them to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

b) Claim 21 of the '508 Patent

The evidence adduced in this Investigation demonstrates that the DP-1017/[ ] comprises radiation-curable oligomer having a backbone derived from [

] (*See* CX-0428C; CX-0499C; CX-0429C; Tr. (Bowman) at 480:14-22, 465:16-22.). The evidences also establishes that the DP-1032 coating comprises radiation-curable oligomer having a backbone derived from [

] (*See* CX-0428C; CX-0499; CX-0498; Tr. (Bowman) at 480:7-13, 465:23–466:2.).

Complainants have proven by a preponderance of evidence that the DI Cure Dose Coatings meet the additional claims limitations and practice claims 21 of the '508 patent.

2. Complainants' DP-1017/[ ] and DP-1032 Coatings Each Practice Claims 1-2, 4-10, 13-15 of the '103 Patent; Complainants' DP-1032 Coating Practices Claims 1-10 and 13-15 of the '103 Patent

a) Claim 1 of the '103 Patent

The evidence establishes that the DP-1017/[ ] and DP-1032 coatings are both inner primary coating compositions that have an in-situ modulus of approximately [ ], a "cure dose" of approximately [ ], respectively, and a modulus retention ratio after aging of at least [ ]. (*See* CX-0032C-0034C; CX-0437C; CX-0451C-0453C; CX-0456C-0461C; CX-0463C; CX-0468C; CX-0465C-0466C; CX-0470C; Tr. (Bowman) at 441:11-25, 461:25–462:11, 442:1–448:12, 452:10–453:7, 453:14-23.).

For the reasons discussed in Section VIII.C, Complainants' test procedures were performed in accordance with the instructions disclosed in the Cure Dose Patents and yielded reliable results.

Additionally, Complainants submitted evidence confirming that the DP-1017/[ ] and DP-1032 coating formulations are composed of approximately [ ] by weight, respectively, of radiation-curable urethane acrylate oligomers having a polyether polyol backbone; both include reactive acrylate diluents; both include approximately [ ] by weight, respectively, of the photoinitiator [ ]; and both include roughly [ ] by weight of additives. (*See* CX-0428C; CX-0429C; CX-0499; *see also* Tr. (Bowman) 458:8-23, 459:18:–460:8, 460:21–461:6, 461:16-24.).

Complainants have proven by a preponderance of evidence that the DI Cure Dose Coatings meet the claim limitations and practice claim 1 of the '103 patent.

b) Claims 2 and 3 of the '103 Patent

Complainants alleged that the DP-1017/[ ] coating practices claim 2, and that the DP-

1032 coating practices claims 2 and 3. (CBr. at 14.). The evidence adduced in this Investigation demonstrates that the DP-1017/[ ] coating includes a urethane acrylate oligomer with a number average molecular weight of approximately [ ], which falls within the range of 1,200 g/mol to 20,000 g/mol recited in claim 2. (*See* CX-0444C; Tr. (Bowman) at 463:1-9.). The evidence also establishes that the DP-1032 coating includes a urethane acrylate oligomer with a number average molecular weight of approximately [ ], which falls into the range recited in claim 2 and the range of 2,200 g/mol to 10,000 g/mol recited in claim 3. (*See* CX-0483C; Tr. (Bowman) at 463:10-15.).

Complainants have proven by a preponderance of evidence that the DP-1017/[ ] coating practices claim 2 of the '103 patent, and that the DP-1032 coating practices claims 2 and 3 of the '103 patent.

c) Claims 4 and 5 of the '103 Patent

The evidence reflects that the number average molecular weight for the polyether polyol used in DP-1017/[ ] is about [ ], and the number average molecular weight of the polyether polyol used in DP-1032 is roughly about [ ]. (*See* CX-0428C (noting [ ]); CX-0430C; CX-0498C; Tr. (Bowman) at 464:12-25.).

Complainants have proven by a preponderance of evidence that the DI Cure Dose Coatings meet the additional claim limitations and practice claims 4 and 5 of the '103 patent.

d) Claim 6 of the '103 Patent

The evidence adduced in this Investigation demonstrates that the polyether polyol in the DP-1017/[ ] and DP-1032 coatings is a polypropylene glycol. (*See* CX-0428C; Tr. (Bowman) at 465:16–466:2.).

Complainants have proven by a preponderance of evidence that the DI Cure Dose Coatings meet the additional claim limitation and practice claim 6 of the '103 patent.

e) Claims 7 and 8 of the '103 Patent

The evidence demonstrates that the DP-1017/[ ] coating includes [ ] as reactive diluents. (*See* CX-0428C; Tr. (Bowman) at 467:8-14.). Dr. Bowman confirmed that [ ] (*See* Tr. (Bowman) at 468:2-16.). These reactive diluents both include aromatic rings. (*Id.*).

Additionally, Complainants submitted evidence that the DP-1032 coating includes as reactive diluents [ ] (*See* CX-0428C.). Dr. Bowman confirmed that [ ] both include aromatic rings. (*See* Tr. (Bowman) at 467:8-20, 468:2-22.).

Complainants have proven by a preponderance of evidence that the DI Cure Dose Coatings meet the additional claim limitations and practice claims 7 and 8 of the '103 patent.

f) Claim 9 of the '103 Patent

The evidence adduced in this Investigation demonstrates that the DP-1017/[ ] and DP-1032 coatings both include the photoinitiator [ ] which includes a phosphorus atom. (*See* CX-0428C; Tr. (Bowman) at 469:7-17.).

Complainants have proven by a preponderance of evidence that the DI Cure Dose Coatings meet the additional claim limitation and practice claim 9 of the '103 patent.

g) Claim 10 of the '103 Patent

The evidence demonstrates that the DP-1017/[ ] and DP-1032 coatings both include [ ], which is a silane coupling agent. (*See* CX-0428C; Tr. (Bowman) at 470:2-13.).

Complainants have proven by a preponderance of evidence that the DI Cure Dose Coatings meet the additional claim limitation and practice claim 10 of the '103 patent.

h) Claims 13-15 of the '103 Patent

The evidence adduced in this Investigation shows that the DP-1017/[ ] and DP-1032 products both have an in-situ modulus of approximately [ ], which is substantially less than the values of 0.56, 0.54, and 0.52, which are recited in claims 13-15, respectively.

Complainants have proven by a preponderance of evidence that the DI Cure Dose Coatings meet the additional claim limitations and practice claims 13-15 of the '103 patent.

C. While the DI Cavitation Coatings Practice Certain Claims of the Cavitation Patent Thereby Meeting the Technical Prong of the Domestic Industry Requirement, Because the Asserted Claims Are Invalid, the DI Coatings Cannot Be Used to Satisfy the Technical Prong

Complainants asserted that they presented evidence that domestic industry products DP-1017, DP-1021, DP-1032, DP-1014XS, and DCP-0041 ("DI Cavitation Coatings") practice the '659 patent. Complainants proffered that their evidence, summarized in Chart No. 11 below, proves that: (i) DP-1017 and DP-1021 satisfy all elements of claims 1-5, 9, 13, and 16-22 of the '659 patent and therefore practice those claims; (ii) DP-1032 satisfies all elements of claims 1-5, 9, 12, 16-21 and 30 of the '659 patent and therefore practices those claims; (iii) DP-1014XS

satisfies all limitations of claims 1-5, 9, 12, 16-21 and 30 of the '659 patent and therefore practices those claims; and (iv) DCP-0041 satisfies all limitations of claims 1-5, 9, 12-13, 16-22 of the '659 patent and therefore practices those claims.

However, since the Cavitation Patent has been found to be invalid, the findings and analysis of this Section with respect to whether the Complainants practice the technical prong of the domestic industry requirment is offered in the alternative, if the Commission does not uphold the findings of invalidity of the Cavitation Patent.

Chart No. 11: Summary of Measurements of DI Cavitation Coatings

	DCP-0041 (CBr. at Ex. I)	**DP-1014XS (CBr. at Ex. J)**	**DP-1017/[ ] (CBr. at Ex. K)**	**DP-1032 (CBr. at Ex. L)**
Claims Practiced	Claims 1-5, 9, 12-13, and 16-22	Claims 1-5, 9, 12, 16-21, 30	Claims 1-5, 9, 13, 16-22	Claims 1-5, 9, 12, 16-21 and 30
Cav. strength > 1.0 MPa to infringe	[ ]	[ ]	[ ]	[ ]
Eq. Mod. <1.2 MPa to infringe	[ ]	[ ]	[ ]	[ ]
Storage mod. @ 23°C	[ ]	[ ]	[ ]	[ ]
$\sigma^{10}_{cav} / E'_{23}$ > 1.4 to infringe	[ ]	[ ]	[ ]	[ ]
Strain energy release rate G_0 > 20 J/m^2 to infringe	[ ]	[ ]	[ ]	[ ]
Calc. vol. ther. exp. coeff. < 6.85 x 10^{-4} K^{-1} to infringe	[ ]	[ ]	[ ]	[ ]

(CBr. at 92 (based on testing values found in Exs. I-L).).

As Complainants and Staff argued, Respondents did not meaningfully challenge that the technical prong of domestic industry is satisfied by the DI Cavitation Coatings, leaving Complainants to rest on their proof. (*See* CRBr. at 67-68; SBr. at 44.).

For example, in its Pre- and Post-Hearing Briefs, Respondent MUV merely incorporated by reference sections of Respondent OFS' corresponding briefs without adding to any of the arguments.[75] (RMPBr. at 66; RMBr. at 44.). Thus, Respondents have waived any argument regarding the technical prong of DI under Ground Rule 10.1.

Staff argued that Complainants could not establish technical domestic industry with respect to asserted claims 9, 12-13, 21-22, and 30 drawn to "primary coatings," because the domestic industry products are "primary coating compositions," not "primary coatings." (SBr. at 70-71.).

For the reasons discussed below, Complainants have met their burden and proven by a preponderance of evidence that the DI Cavitation Coatings practice claims 1-5, 9, 12, 16-21, and 30 of the '659 patent. However, because all of these claims have been found to be invalid (*see* Section IX.E, *infra*), the technical prong of the domestic industry requirement for the '659 patent is largely moot. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012); *Bayer*, 212 F.3d at 1247.

1. Complainants' DP-1017/[ ], DP-1032, DP-1014XS and DCP-0041 Coatings Each Practice Claims 1-5 and 16-20 of the '659 Patent

a) Claim 1 of the '659 Patent

As shown in Chart No. 11 above, all of the limitations of claim 1 are met by Complainants' DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings. For each

[75] The pertinent sections in Respondents OFS' Pre- and Post-Hearing Briefs rehash challenges to Complainants' testing regimen, focusing on the measurements of properties such as cavitation strength, not on whether such properties, as specified in the domestic industry claims, are present in Complainants' domestic industry products. Complainants' testing regimen has been found to be valid and reliable and generally consistent with the teachings of the '659 patent, while Respondents' testing regimen has, in-part, diverged from the teachings of the '659 patent and thereby yielded questionable results. (*See* Sections VIII.C, IX.C.).

coating, the equilibrium modulus is less than the required "1.2 MPa or less," the cavitation strength exceeds the required of "at least about 1.0 MPa," and the cavitation strength is "at least about 1.4 times said storage modulus." (CX-0428C; CX-0434C-0436C; CX-0489C).

Therefore, a preponderance of evidence supports a finding that DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 each practice claim 1 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

b) Claim 2 of the '659 Patent

Claim 2 depends from claim 1 and additionally requires that "the cavitation strength σ^{10}_{cav} is atleast about 1.5 times the storage modulus at 23°C." (JX-0004 at 27:32-34.). As shown in the chart above, the cavitation strength for each of the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings satisfies this claim limitation. (CX-0428C; CX-0434C-0436C; CX-0489C.).

A preponderance of the evidence supports a finding that DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 each practice claim 2 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

c) Claim 3 of the '659 Patent

Claim 3 depends from claim 1 and further requires that "the cavitation strength σ^{10}_{cav} is at

least about 1.1 MPa." (JX-0004 at 27:35-37.). As shown in the chart above, the cavitation strength for each of the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings satisfies this claim limitation. (CX-0428C; CX-0434C; CX-0435; CX-0436C; CX-0489C.).

The preponderance of evidence supports a finding that DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 each practice claim 3 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

d) Claim 4 of the '659 Patent

Claim 4 depends from claim 1 and further requires "at least one cross-linking component introducing bimodal distribution into the composition." (JX-0004 at 27:38-42.). The evidence shows that each of the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings satisfies this claim limitation. (CX-0428C.).

A preponderance of evidence supports a finding that the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings practice claim 4 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

e) Claim 5 of the '659 Patent

Claim 5 depends from claim 4 and further requires that "said cross-linking component is an alkoxylated diol diacrylate." (JX-0004 at 27:42-44.). The evidence supports a finding that

each of the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings satisfies this claim limitation. (CX-0428C.).

A preponderance of evidence supports a finding that the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings practice claim 5 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

f) Claim 16 of the '659 Patent

As set forth above in the analysis for claim 1, the evidence shows that all of the functional limitations of claim 16 are met by DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041. (JX-0004 at 28:44-50.). The undisputed evidence also shows that each of these coatings satisfies the structural limitations of claim 16, including at least one acrylate oligomer, reactive diluent, photoinitiator, and additive within the percentages required by the claims. (CX-428C; JX-0004 at 28:52-56.).

A preponderance of evidence supports a finding that the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings practice claim 16 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

g) Claim 17 of the '659 Patent

Claim 17 depends from claim 16 and further requires that "the cavitation strength σ^{10}_{cav} is

at least about 1.5 times the storage modulus at 23°C." (JX-0004 at 28:58-60.). The analysis for this claim limitation is the same as for claim 2.

A preponderance of evidence supports a finding that the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings also practice claim 17 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

h) Claim 18 of the '659 Patent

Claim 18 depends from claim 16 and further requires that "the cavitation strength σ^{10}_{cav} is at least about 1.1 MPa." (JX-0004 at 28:61-63.). The analysis for this limitation is the same as for claim 3.

A preponderance of evidence supports a finding that DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings also practice claim 18 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

i) Claim 19 of the '659 Patent

Claim 19 depends from claim 16 and further requires "the composition comprises at least one cross-linking component introducing bimodal distribution into the composition." (JX-0004 at 28:64-67.). The analysis for this claim limitation is the same as for claim 4.

A preponderance of evidence supports a finding that the DP-1017/[ ], DP-1032, DP-

1014XS, and DCP-0041 coatings also practice claim 19 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

j) Claim 20 of the '659 Patent

Claim 20 depends from claim 16 and further requires that "said cross-linking component is an alkoxylated diol diacrylate." (JX-0004 at 29:1-3.). The analysis for this claim limitation is the same as for claim 5.

A preponderance of evidence supports a finding that the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 coatings also practice claim 20 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

k) Complainants' DP-1032 and DP-1014XS Coatings Each Practice Claims 9, 12 and 21 of the '659 Patent

i. Claim 9 of the '659 Patent

Claim 9 depends from claim 1 and further requires that said "coating has a strain energy release rate G_o of at least about 20 J/m^2 as measured at a rate of about 1.10^{-5} s^{-1} or less." (JX-0004 at 28:18-22.). The evidence shows that, when cured, each of the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 products produces a coating with "a strain energy release rate G_o of at least about 20 J/m^2 as measured at a rate of about 1.10^{-5} s^{-1} or less." (CX-0491C; Tr.

(Sarmah) at 285:13–286:18.).

This is a coating claim. Complainants have established that they, or others through licensing, practice the claim by curing some, but not all, of the above coating compositions on optical fibers. Specifically, DP-1032 is applied to fiber by [ ], a fiber company based in [ ]. (Tr. (Overton) at 1848:2-21; Tr. (Sancaktar) at 1758:20-24; Tr. (Crowell) at 94:25–95:24, 97:11-22.). Coating DP-1014XS is applied by [ ]. (Tr. (Overton) at 1848:2-21; Tr. (Sancaktar) at 1758:20-24.).

A preponderance of evidence supports a finding that third-parties, using DP-1032 and DP-1014XS coatings, practice claim 9 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

ii. Claim 12 of the '659 Patent

As shown in the table above, all of the limitations of claim 12 are met by Complainants' DP-1032 and DP-1014XS coatings. For each coating, the equilibrium modulus is less than the claim requirement of "1.2 MPa or less" and the calculated volumetric thermal expansion coefficient α_{23} is less than the claim requirement of "6.85×10^{-4} K^{-1} or less." (CX-0102C; CX-0577C: CX-0578C; Tr. (Bowman) at 486:19–487:15; JX-0004 at 28:30-33.). This is a coating claim, and, as stated above with respect to claim 9, Complainants have established that they or others via license practice the claim by curing only DP-1032 and DP-1014XS coatings on optical fibers.

Accordingly, a preponderance of evidence supports a finding that the DP-1032 and DP-1014XS coatings practice claim 12 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

iii. Claim 21 of the '659 Patent

Claim 21, also a coating claim, depends from claim 16 and further requires that said "coating has a strain energy release rate G_0 of at least about 20 J/m^2 as measured at a rate of about 1.10^{-5} s^{-1} or less." (JX-0004 at 29:4-7.). The analysis for this dependent claim limitation is the same as for claim 9.

A preponderance of evidence support a finding that only the DP-1032 and DP-1014XS coatings practice claim 21 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

l) Complainants' DCP-0041 and DP-1017/[ ] Coatings Do Not Practice Claims 13 and 22 of the '659 Patent

Claims 13 and 22 depend from claims 1 and 16, repectively, and additionally require coatings with an "equilibrium modulus is about 0.9 MPa or less" (JX-0004 at 28:32-34, 29:8-9.). As explained in analyses for claims 1 and 16, and as set forth in the chart above, the undisputed evidence shows that, when cured, each of the DP-1017/[ ] and DCP-0041 coatings produces a coating exhibiting an equilibrium modulus that "is about 0.9 MPa or less." (CX-0491C; Tr.

(Sarmah) at 285:13-286:18.). However, these are coating claims. Complainants have not established that they, or others who hold licenses, practice the claim by curing coating compositions on optical fibers.

Complainants have not met their burden and proven by a preponderance of evidence that the DP-1017/[ ] and DCP-0041 coatings practice claims 13 and 22 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted); *Bayer*, 212 F.3d at 1247.

m) Complainants' DP-1014XS and DP-1032 Coatings Each Practice Claim 30 of the '659 Patent

Claim 30 possesses the structural limitations of claim 16 and the functional limitations of Claim 12. (JX-0004 at 28:44-50.). As stated above in analyses of those claims, Sections X.C.1.(a)(vi) and X.C.1(b)(ii), a preponderance of evidence reflects that all of the stated claim limitations are met by DP-1032 and DP-1014XS. Additionally, becasuse these are coating claims, and, as stated above with respect to claim 9, Complainants have established that they, or others through licensing, practice the claims by curing the DP-1032 and DP-1014XS coatings on optical fiber.

Accordingly, Complaiants have proven by a preponderance of evidence that the DP-1032 and DP-1014XS coatings practice claim 30 of the '659 patent. However, because Respondents have proven by clear and convincing evidence that this claim is invalid, Complainants cannot rely on it to satisfy the technical prong of the DI requirement. *See, e.g.*, *Ground Fault Circuit Interrupters*, Comm'n Opinion, 2012 WL 2394435, at *46 (June 8, 2012) (citation omitted);

Bayer, 212 F.3d at 1247.

XI. ECONOMIC PRONG OF THE DOMESTIC INDUSTRY REQUIREMENT

1. Complainants Have Satisfied The Economic Prong of the Domestic Industry Requirement[76]

The Commission may only find a violation of Section 337 "if an industry in the United States relating to the articles protected by the patent . . . exists or is in the process of being established." 19 U.S.C. § 1337(a)(2). Typically, a complainant must show that a domestic industry existed at the time a complaint was filed. *See Motiva LLC v. Int'l Trade Comm'n*, 716 F.3d 596, 601 n.6 (Fed. Cir. 2013).

Section 337(a)(3) sets forth the following economic criteria for determining the existence of a domestic industry in such investigations that a complainant must satisfy:

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[76] Respondent MUV adopted Respondent OFS' arguments that Complainants' contentions and data do not meet the Economic Prong of the Domestic Industry Requirement. (*See* RMBr. at 73-74.). Respondents' arguments are essentially seven (7): (i) that Complainants have not sufficiently segregated its domestic units in Elgin Illinois, from some of units that are part of Royal D.S.M., and DSM Desotech B.V. and DSM Desotech SC Lt.; (ii) that Mr. Schoettelkotte overestimated the investments in the Functional Materials Unit because he included investments by Complainants' Japanese partner, JFC; (iii) that Complainants' assets have a depreciated value of zero (0) because they are so old; and (iv) the order of magnitude of the investments upon which Complainants rely is "not that large." (*See* RBr. at 45-48 (citations omitted).). Ultimately, Respondents took the depreciated value of Complainants' Elgin assets for the Cure Dose Patents, calculated they are less than 5% of the [ ] in cost of goods sold for the DSM Fiber Optic Materials Business, and the holding of *Lelo* that an investment percentage of less than 4% of the cost of goods sold is "not significant." (RBr. at 48 (citing *Lelo*, 786 F.3d at 882, 885; Tr. (Riley) 1448:2–1449:5; RDX-0015.14C).). Many of these arguments are flawed, as explained in this Section. To those arguments, Respondents added that Complainants' investments in the United States are diminishing, even though that is a makeweight argument since the investment at the time of the complaint is the standard. *See, e.g. Certain Television Sets, Television Receivers, Television Tuners & Components Thereof*, Inv. No. 337-TA-910, Comm'n Opinion at 37 (Oct. 30, 2015). Moreover, Respondents ignored the more [ ] that Complainants invested in a pilot plant replacement in addition to other new equipment when it calculated Complainants' investments in plant and equipment. (*See* CRBr. at 81 (citing ROBr. at 47-48).). Finally, Respondents claimed that Complainants had no benchmark or analysis for the Cavitation Patent DI products. While the latter is not true given the method by which Complainants traced investments to projects encompassed by the Cavitation Patent, Sections XI.B(1)-(3), *infra*, if the Commission upholds the finding that the asserted claims of the Cavitation Patent are invalid for lack of written description and enablement, how Complainants calculated or allocated their costs to the Cavitation Patent would be irrelevant.

> (3) For purposes of paragraph (2), and industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark, mask work, or design concerned –
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> > (A) significant investment in plant and equipment;
> > (B) significant employment of labor, or capital; or
> > (C) substantial investment in its exploitation, including engineering, research and development, or licensing.

Given that these criteria are listed in the disjunctive, satisfaction of any one of them will be sufficient to meet the economic prong of the domestic industry requirement. *Certain Integrated Circuits, Chipsets and Prods. Containing Same,* Inv. No. 337-TA-428, Order No. 10, Initial Determination (unreviewed) (May 4, 2000) ("*Certain Integrated Circuits*"). However, under Section 337(a)(3) a complainant must substantiate the nature and the significance of its activities with respect to the articles protected by the patent at issue. *Certain Printing and Imaging Devices and Components Thereof,* Inv. No. 337-TA-690, Comm'n Opinion at 30 (Feb. 17, 2011). In explaining this, the Commission has also interpreted sections 337(a)(3)(A) and (B) to concern investments in plant and equipment and labor and capital "with respect to the products presented by the patent." *Certain Ground Faults Interrupters and Prods. Containing Same,* Inv. No. 337-TA-739, 2012 WL 2394435 at *50, Comm'n Opinion at 78 (June 8, 2012) (quoting U.S.C. §§ 1337(a)(3)(7)). It is not sufficient for the "substantial investment" under paragraph (C) to merely relate to articles protected by the asserted patents. Rather, "the complainant must establish that there is a nexus between the claimed investment and asserted patent regardless of whether the domestic-industry showing is based on licensing, engineering, research and development." *Certain Integrated Circuit Chips & Prods. Containing*, Inv. No. 337-TA-845, Final Initial Determination, 2013 WL 3463385 at *14 (June 7, 2013) ("*Certain Integrated Circuit Chips*").

In other words, the domestic industry requirement consists of both an economic prong (concerning "the activities of or investment in a domestic industry") and a technical prong ("whether complainant (or its licensees) practices its own patents."). *Certain Elec. Devices, Including Wireless Commc'n Devices, Portable Music & Data Processing Devices, & Tablet Computers*, Inv. No. 337-TA-794, Order No. 88, 2012 WL 2484219, at *3 (June 6, 2012).

There is no mathematical threshold test or a "rigid formula" for determining whether a domestic industry exists. *Certain Male Prophylactic Devices, Inc.* Inv. No. 337-TA-292, Comm'n Opinion at 39, USITC Pub. 2390 (June 1991). However, to determine whether investments are "significant" or "substantial," the actual amounts of a complainant's investments or a quantitative analysis must be performed. *Lelo Inc. v. Int'l Trade Comm'n*, 786 F.3d 879, 883-84 (Fed. Cir. 2015) ("*Lelo*"). Even after *Lelo*, which requires some quantification of a complainant's investments, there is still no bright line as to a threshold amount that might satisfy an economic industry requirement. It is the complainant's burden to show by a preponderance of evidence that each prong of the domestic industry requirement is satisfied. *Certain Prods. Containing Interactive Program Guide and Parental Control Tech.*, Inv. No. 337-TA-845, Final Initial Determination, 2013 WL 3463385 at*14 (June 7, 2013.). Moreover, the Commission makes its determination by "an examination of the facts in each investigation, the article of commerce, and the realities of the marketplace." *Certain Male Prophylactic Devices*, Inv. No. 337-TA-546, Comm'n Opinion at 39, USITC Pub. 4005 (May 2008) (quoting *Certain Double Sided-Floppy Disk Drives and Components Thereof*, Inv. No. 337-TA-215, Comm'n Opinion at 17, USITC Pub. 1859 (May 1986).).

B. Complainants Have Satisfied the Economic Prong of the Domestic Industry Requirement Under Section 337(a)(A), (B), and (C)

Complainants have proven that they have satisfied the economic prong of the domestic industry requirement under all three prongs of Section 337(a)(3)(A), (B), and (C) by having made significant investments in plant and equipment (subsection A), in employment of labor and capital (subsection B) and in exploitation of the patents through research and development ("R&D") and engineering (subsection C). (*Accord* SBr. at 85; CBr. at 116; *contra* ROBr. at 45, 47-49.).

Complainants conduct virtually all of their R&D for their DI coatings and related products (inks and matrix materials) at their global headquarters in Elgin, Illinois ("Elgin facility"). Complainants' Functional Materials ("DSM FM") business unit that markets, sells and supports Complainants' domestic industry coatings also is located in the Elgin facility. (Tr. (Crowell) at 68:9-11.). Desotech, Inc., the U.S.-based entity that is part of DSM FM is also located in the Elgin facility.[77] The DSM FM business unit includes: (1) the FOM (fiber optic materials) business, which includes the DI Coatings; and (2) the SOMOS® business. (*See* Tr. (Crowell) at 67:17–68:8.). The FOM unit is part of D.S.M. N.V., a Dutch multinational company active in the fields of health, nutrition and materials. (*See* Tr. (Crowell) at 68:3-8.). Complainants maintain a customer support staff as well as a full-time technical staff who provide R&D and technical support for their fiber optic business and the domestic industry products that practice the '103, '508 and '659[78] patents. (*See* CX-0018C; CX-0084C; CX-1451C; CX-1454C;

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[77] Complainant DSM FM includes the U.S. entity and Complainant DSM Desotech, Inc., DSM Desotech B.V. (Netherlands), and DSM Desotech SC Ltd. (China). (CBr. at 117 n.17 (citing RX-0520C).).

[78] Since the '659 patent is found to be invalid in Section IX.E, any attribution of investments to any of the categories of investment for domestic industry would be moot. However, if the decision of this ID with

RX-0520; Dep. Tr. (Crowell) at 81:20–82:1, 120:16-22; Dep. Tr. (Schoettelkotte) at 782:16–783:16).

Complainants' domestic industry products include both the primary and secondary coatings that are discussed elsewhere in this decision.

The primary coatings include Complainants' coatings identified by codes DP-1014XS, DCP-0041, DP-1017, DP-1021 and DP-1032. (CBr. at 115-16; *see also* App. C.). The secondary coatings that Complainants develop and market that are designed to work with these primary coatings (including 3471-2-136, DS-2024–DS-2035) are usually purchased together by Complainants' customers. (*See* CBr. at 116 (citing Tr. (Crowell) at 83:7-15, 120:23–121:1).).

According to Complainants' expert, Mr. Schoettelkotte, who used a sales-based allocation method to calculate domestic sales as a percentage of global sales global sales, products in the FOM business comprise approximately [ ] of the total global sales of the DSM FM business. (*See* Tr. (Schoettelkotte) at 772:9-23; CDX-0405C.). According to Complainants, their domestic coatings from 2014 through 2016 comprised some [ ] of Complainants' FOM business based on global sales revenue and [ ] of the DFM business unit's global sales. (*See* CX-1452C (DSM Functional Materials Global Sales All Sales); CX-0503C (SAP Data Output showing Sales); CDX-0407C; Tr. (Schoettelkotte) at 774:5-20.).

A sales-based allocation methodology that calculates domestic sales as a percentage of global sales, which Complainants' expert, Mr. Schoettelkotte, used, is acceptable to the Commission. *See, e.g., Certain Marine Sonar Imaging Devices, Including Downscan and Sidescan Devices* ("*Marine Sonar Imaging Devices*"), Inv. No. 337-TA-921, Comm'n Opinion at

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respect to the '659 patent is not affirmed, then the analysis here provides a basis for showing Complainants' investments in the '659 patent.

61-62 (Jan. 7, 2016); *Certain Elec. Devices, Including Wireless Commc'n Devices, Portable Music and Data Processing Devices, and Tablet Computs.*, Inv. No. 337-TA-794, Order No. 88 at 5 (June 6, 2012). According to Mr. Schoettelkotte, Complainants look to sales when accounting for assets such as equipment in the ordinary course of their business. (*See* Tr. (Schoettelkotte) at 771:24–772:8; *see also* Tr. (Crowell) at 81:5-19.).

1. Complainants Have Made Significant Investment in Plant and Equipment Under § 337 (a)(3)(A)

Complainants' Elgin facility occupies approximately [ ] square feet which is used for DSM's FM business and both FOM and SOMOS. (*See* Tr. (Schoettelkotte) at 770:13–771:1.). The Elgin facility includes laboratory space, much of which according to Complainants, is for work related to the FOM business, and more specifically, to work related to the research, development, and business development of curable compositions for optical fibers, including primary coatings, secondary coatings, matrix materials, and/or inks. (*See* Tr. (Crowell) at 70:18–74:4.). Complainants supplied a floor plan layout of the Elgin facility. (*See* CX-1205C; *see also* Tr. (Crowell) at 70:18-24.). Complainants described the Elgin facility's laboratory spaces as used for a variety of technical activities. (*See* Tr. (Crowell) at 70:25–73:23.). products and An Applications Lab is used for curing experiments. (CBr. at 117 (citing Tr. (Crowell) at 71:18–72:1).). The West Applications Lab has a draw tower simulator and ribbon line so that Complainants can replicate portions of their customers' operations to allow them to develop new products and to trouble-shoot existing products. (*See* Tr. (Crowell) at 72:2-16.). The Pilot Lab has a small-scale reactor to formulate new coatings for development and testing. (*Id.* at 73:5-9.).

According to Complainants, the East Lab occupies approximately [ ] square feet; the West Lab is approximately [ ] square feet; the Ink Lab is approximately [ ] square feet;

the TH Lab is approximately [ ] square feet; the Pilot Lab is approximately [ ] square feet; the Applications Lab is approximately [ ] square feet; the West Applications Lab is approximately [ ] square feet; and the North Applications Lab is approximately [ ] square feet. (CBr. at 119 (citing CX-1205C; Tr. (Crowell) at 73:24–74:4).). Together, the laboratory space occupies approximately [ ] square feet, that is used either exclusively used for FOM (West Applications Lab, Ink Lab, and Applications Lab/North Applications Lab, totaling approximately [ ] square feet), or is shared with SOMOS (West Lab, East Lab, TH Lab, and Pilot Lab, totaling approximately [ ] square feet), with the majority of the shared lab space used by FOM. (CBr. at 119 (citing CX-1205C; Tr. (Crowell) at 70:25–71:5; 72:23–73:4).). In addition, Complainants noted that there are laboratory offices, which add an additional approximately [ ] square feet. (CBr. at 119 (citing CX-1205C).). In total, laboratory and laboratory office space is approximately [ ] square feet. (*Id.*).

The Elgin facility also holds an array of technical equipment that constitute significant assets. (CBr. at 119 (citing Tr. (Crowell) at 74:17–75:6; Tr. (Schoettelkotte) at 777:9–778:4).). According to Complainants' witnesses, a substantial portion of the facility assets can be allocated to the FOM business, and specifically to the DI Coatings. The equipment that is used for R&D activities related to the FOM business include a draw tower simulator (shown below), a replacement pilot reactor, and a Cool UV lamp system. (CBr. at 119 (citing Tr. (Crowell) at 75:7-17, 76:6–77:17; Tr. (Sarmah) at 288:12–292:15).).

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(CBr. at 120 (citing CX-1012C, Ex. 54 to the Compl.).).

According to Complainants, the draw tower, shown above in Figure No. 15, uses a metal wire to simulate the glass of optical fiber. It allows Complainants to experiment with various coatings, perform testing, and develop next generation coating products. (Tr. (Crowell) at 75:7-17.). As shown in CX-0016C, the draw tower simulator had an acquisition cost of [ ] along with a power supply unit, which cost [ ] (*See* CBr. at 121 (citing CX-0016C.0005; CDX-0411C).). Complainants also invested [ ] in a Cool UV lamp system that allows them to work with customers in developing new coatings and improving existing coatings for use in LED UV curing, which Complainants described as a more efficient means of curing. (*See id.* (citing Tr. (Crowell) at 76:10–77:2; CDX-0411C; CX-0016C.0009).).

In 2015, Complainants replaced a pilot reactor to make development coatings in the Elgin

facility, at a cost of [ ]. (*Id.* (citing CX-0016C.0009; Tr. (Crowell) at 77:3-17; CDX-0411C).). Other equipment used exclusively for the FOM business includes: an optical time domain reflector (EnvirOTDR [ ] and OTDR [ ]); inking/matrix machines (Upgrade OFC-21 Ribbon Line to Allow Splitting) [ ] and Optical Fiber Ribbon [ ]); an NIR [ ]; a Fusion Unit Upgrade, [ ], and a Fusion UV Curing System [ ]. (CBr. at 121 (citing CX-0016C; CDX-411C; Tr. (Schoettelkotte) at 777:9778:4).).

According to Complainants, much of the other equipment listed in CX-0016C is used by FOM and SOMOS, except for certain SOMOS-specific equipment. (CBr. at 121.). Other than the SOMOS-specific equipment, the remaining shared equipment has been allocated between FOM and SOMOS based on a sales-based allocation method. (*Id.* (citing Tr. (Schoettelkotte) at 778:5–779:4).). For the equipment and other assets that Complainants reported they acquired for the Elgin facility and are shared between the FOM and SOMOS units, approximately [ ] can be allocated to the FOM unit. (*Id.* (citing CDX-0412C; CDX-0413C).). Including the [ ] in acquisitions of equipment and other assets within the Elgin facility used exclusively by Complainants' FOM unit, [ ] in equipment and other asset acquisitions can be allocated to Complainants' FOM unit. (*Id.* (citing Tr. (Schoettelkotte) at 781:4–782:8; CDX-0413C).). According to Complainants' allocation based on global sales for just the DI Coatings, some [ ] in equipment and other asset purchases can be allocated to the DI Coatings. (*Id.*).

Respondents argued that Complainants have not established that their facilities and equipment are used specifically and only for domestic industry products. (*See* ROBr. at 44-45.). However, there is no Commission requirement that an entire physical facility and every piece of

equipment must be purchased and used only for use with the domestic industry products. As the Commission has noted, that the complainant's investment in other chips in addition to the domestic industry products at issue did "not diminish that [complainant's] investment is also with respect to the domestic industry articles." *Certain Integrated Circuit Chips and Products Containing the Same*, Inv. No. 337-TA-859, Comm'n Opinion at 48 (Aug. 11, 2014); *see also Marine Sonar Imaging Devices*, *Marine Sonar Imaging Devices,* Inv. No. 337-TA-921, Comm'n Opinion at 60 n. 31 (Jan. 7, 2016) (ID overturned because the analysis required the complainant to show that its domestic investment related only to the patented product).

The Elgin facility has an assessed value of nearly [ ] and an assessed tax value of nearly [ ]. (*See* CX-0920C-0922C.). Approximately [ ] square feet of laboratory and laboratory office space at the Elgin facility is either dedicated to Complainants' FOM business or shared between FOM and SOMOS (some [ ] of square feet of laboratory space is allocated to the FOM business and almost [ ] square feet is shared space). (*See* CX-0015C; CX-1205C; CX-1444C.).

Using a sales-based allocation, Mr. Schoettelkotte specifically allocated [ ] square feet of the laboratory and laboratory office space at the Elgin facility to Complainants' FOM unit. (*See* CBr. at 120; CDX-0406C.). By applying the same sales-based ratio for domestic products, Mr. Schoettelkotte allocated approximately [ ] square feet of laboratory and laboratory office space to the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 products that practice the '659 patent. He allocated nearly [ ] square feet dedicated to the DP-1017/[ ] and DP-1032 products that practice the '508 and '103 patents. (*See* CX-0406C-0407C; CX-0503C; CX-1452C-1453C.). As Staff noted, while not perfect, the allocation "appears to be reasonable." (SBr. at 86.).

With respect to investments in equipment and other facility assets, the Elgin facility houses a sizeable amount of technical research and development equipment. (*See* CX-0016C.). Among other items, this equipment includes a draw tower simulator that was acquired for [ ] and is used exclusively by the FOM business. (CBr. at 120-21.).

Again, using a sales-based allocation, Mr. Schoettelkotte allocated [ ] in equipment and other asset purchases to the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 domestic industry products. (CBr. at 120-121.). In other words, Mr. Schoettelkotte has allocated approximately [ ] in equipment and other asset purchases to the DP-1017/[ ] and DP-1032 products that practice the '508 and '103 patents. (*See* CX-0016C; CX-1445C; CX-1453C.). These are "substantial" amounts and quantitatively significant in an absolute sense. *See Lelo*, 786 F.3d at 883, 884.

In addition, the square footage at the Elgin facility that Mr. Schoettelkotte allocated to the '659 patent and the Cure Dose Patents is also quantitatively significant. *Id.* As Staff noted appropriately, the approximately [ ] square feet that can be allocated to the Cure Dose Patents may not appear especially large in comparison to the overall square footage of the Elgin facility, it is quantitatively significant that the DP-1017/[ ] and DP-1032 products, from 2014 to 2016, comprised [ ] of the total sales of Complainants' fiber optics business. The other [ ] of the sales of Complainants' fiber optics business is not limited to other primary coating formulations. (SBr. at 88.). Included in the [ ] of sales is Complainants' associated secondary coatings, inks, and matrix materials that may be used in conjunction with the patented primary coating products. Therefore, it is likely that substantial portions of shared laboratory and laboratory office space at the Elgin facility may be used for the DI products even if not broken out separately. As Complainants' supporting figures also suggest, the [ ] allocation to

the Cure Dose products, DP-1017/[ ] and DP-1032, may be understated because that figure does not take into account that sales of DP-1032 grew substantially in 2016. (SBr. at 88-89 (citing CX-1453C).). Sales of DP-1032 grew from [

] (*See* CDX-0409C.).

Respondent OFS' expert, Michele Riley, criticized Mr. Schoettelkotte's use of the full purchase price of assets at the Elgin facility and not the depreciated value since, as Respondent noted, the Elgin facility was purchased between 1990 and 1998 and the equipment was purchased "years ago." (ROBr. at 47 (citing Tr. (Riley) at 1452:7-25, 1467:15–1468:21; Tr. (Schoettelkotte) at 907:7-22); *see also* Tr. (Crowell) at 69:2; Tr. (Schoettelkotte) at 907:10-20; CDX-0411C.). Respondent OFS also noted that Complainants did not discount the use of the plant for that period. (ROBr. at 47 (citing Tr. (Schoettelkotte) at 837:5-12).). Respondent OFS observed that approximately [ ] of the equipment at the Elgin facility is now so old that it has been depreciated to zero, and Complainants received federal tax benefits as a result. (*Id.* at 47 (citing Tr. (Riley) at 1446:23–1447:15; Tr. (Crowell) at 110:5-15; CX-0016).). Respondent OFS contended that if depreciation were used, the allocated [ ] in plant and equipment would be reduced to a mere [ ] (*Id.* (citing Tr. (Riley) at 1447:16–1448:1).). Finally, Respondents argued that depreciated value, an accounting concept for profit calculations, should be used.

However, contrary to Respondents' argument, the Commission has rejected outright the use of depreciated values in a domestic industry analysis. *See,* e.g. *Electronic Devices*, Inv. No. 337-TA-724, I.D. Granting Summary Determination of Economic Prong of Domestic Industry, Order No. 29 at 10 (March 11, 2011). As Complainants argued, Section 337 requires an analysis of the amounts invested in a domestic industry, not a valuation based on tax accounting. (CBr. at

123 (citing 19 U.S.C. §1337).).

To conclude, Mr. Schoettelkotte's allocations for Complainants' investments in equipment and other facility assets are qualitatively and quantitatively significant investments in the products that practice the Asserted Patents. That many of Complainants' investment expenditures are "past" expenditures is irrelevant so long as investments pertain to the complainant's industry with respect to the articles protected by the asserted IP rights and the complainant is continuing to make qualifying investments at the time the complaint is filed. *Certain Television Sets, Television Receivers, Television Tuners, and Components Thereof*, Inv. No. 337-TA-910, Comm'n Opinion at 36 (Oct. 30, 2015); *see also Certain Electronic Digital Media Devices and Components Thereof*, Inv. No. 337-TA-796, Comm'n Opinion at 99-102 (Sept. 6, 2013) (domestic industry exists where complainant had substantial past investments in engineering and R&D related to discontinued protected articles but continued to exploit the patent through continuing development of existing products at the time of the complaint); *Certain Electronic Devices, Including Mobile Phones, Portable Music Players, and Computs.*, Inv. No. 88, 337-TA-701, Order No. 58 at 16-17 (Nov. 18, 2010) (domestic industry satisfied based on past substantial investments in R&D for protected articles and undisputed facts activities with respect to protected articles including development, warranty repairs, sales, and/or maintenance of inventories in the United States at the time the complaint was filed).

The Elgin facility has continuing research and development work, applications development, and physical analytical chemistry related to fiber optic coatings, including improving the domestic industry coatings. (*See* RX-1421 (Dep. Tr. (Crowell)) at 118-20, 131-32, 163-65.). According to Complainants' unrebutted evidence, the Elgin facility and the described equipment enables their development work to continue an ongoing basis. (*See* Tr.

(Crowell) at 93:23–95:24.).

For example, a draw tower simulator is used by the applications development group to test formulation changes and how they would perform for customers. (*See* RX-1421 (Dep. Tr. (Crowell)) at 118:11-22.). According to Complainants' unrebutted evidence, the draw tower simulator in the Elgin facility is being used "constantly," including for improvements to the DI Coatings because Complainants are working on [

] (*See* RX-1421 (Dep. Tr. (Crowell)) at 165:6-13; Tr. (Crowell) at 95:15-24.). In other words, Complainants have ongoing investments in the patents at issue and are not merely using old equipment without purpose. They have made significantly quantitative investments in their equipment and plant before the filing of their Complaint. (*See* Tr. (Schoettelkotte) at 908:16-20.).

2. Complainants Have Made Significant Investments in Employment of Labor or Capital Under Section 337 (a)(3)(B)

Complainants have made significant investments in labor or capital relating to the products that practice the '508, '103, and '659 patents (to the extent they are valid). Complainants' admitted evidence reflects that they have approximately [ ] full-time employees working at the Elgin facility who at least partially support their FOM business. Of those [ ] employees, [ ] work exclusively for FOM. (*See* CX-0018C; CX-1451C.). The combined salary and benefits for the [ ] FOM employees between 2014-2016 was [ ]. (*See id.*; CDX-0420C.). During the same two-year time frame, the combined salary and benefits for the [ ] Elgin employees who work on both FOM and SOMOS products was approximately [ ]. (*Id.*).

Mr. Schoettelkotte used the same sales-based allocation method and percentages for

Complainants' employment investment as for their investments in plant and equipment. Then, Mr. Schoettelkotte allocated [ ] in employee salary and benefits to the DP-1017/[ ], DP-1032, DP-1014XS, and DCP-0041 products that practice the '659 patent. (*See* CDX-0421C.). Mr. Schoettelkotte also allocated [ ] to Complainants' domestic products, DP-1017/[ ] and DP-1032, that is, products that practice the'508 and'103 patents. (*Id*; *see also* CBr. at 127.). These investments in labor are both qualitatively and quantitatively significant under *Lelo*, *supra*.

According to Complainants' evidence, the referenced employees in the Elgin facility are engaged in work related to improved fiber optic coatings, to develop the next generation of products. (CBr. at 127.). Complainants also described this work as "technical support for the commercialization of the DI products, debugging operational efficiencies during fiber production, improving performance of existing products, development of coatings to use LED curing, reducing costs of raw materials like helium while improving microbending performance, and development of new generations of products." (*Id.* at 130 (citing Tr. (Schoettelkotte) at 788:10–790:3; CDX-0419C).).

In addition to records kept on employee allocation by business or operational unit, Complainants also have kept records on a project basis related to their coatings, which includes R&D and the costs of bringing those products to market. (*See id.*). To that end, Complainants use "cost centers" to track various "activities" that include research and development for "nonexclusive coatings," application development, and physical analytical chemistry.

For example, according to Complainants, the cost center A50420 in the Elgin facility, "Non-Exclusive Coatings," relates to research and development work involving Complainants' coatings for optical fiber, including the DI Coatings, such as engineering tasks and

troubleshooting issues with coatings for customers. (*Id.* at 131 (citing Tr. (Schoettelkotte) at 795:5–796:8).). Within this cost center, Complainants incur expenses related to salaries and benefits, equipment and supplies, and other miscellaneous services and items. (*Id.* (citing CX-0021C (DSM Cost Centers DSM-ITC00399097 (2012-2014)); CX-0937C (Spending Report DSM-ITC00439434 (2015)); CX-0938C (Spending Report DSM-ITC00439435 (2016)); CDX-0424C).). According to admitted evidence, from 2012 through 2016 Complainants' investments that support Complainants' research and development of coatings within their FOM business totaled [ ]. (*Id.*).

As another example, a cost center A50220, "FOM Application Development," includes the development of Complainants' primary coating products using the draw tower. (*Id.* (citing RX-1421 (Crowell Dep. Tr.) at 118).). According to their evidence, Complainants invested [ ] from 2012 through 2016 in the FOM Application Development cost center, including for expenses such as salaries and benefits, equipment and supplies, and other miscellaneous services and items. (*Id.* (citing Tr. (Schoettelkotte) at 796:14-24; CDX-0425C; CX-0021C (DSM Cost Centers DSM-ITC00399097 (2012-2014)); CX-0937C (Spending Report DSM-ITC); CX-0937C (Spending Report DSM-ITC00439434 (2015)); CX-0938C (Spending Report DSM-ITC00439435 (2016)).).

Complainants' A50410 cost center, "Physical Analytical Chemistry," applies to Complainants' FM unit (including both FOM and SOMOS) but also relates directly to Complainants' primary coating products. (*See* CBr. at 132 (citing RX-1421 (Crowell Dep. Tr.) at 119-20).). This cost center is "part of the R&D department that investigates experimenting with different formulations to test the effect on materials [and] to explore as fundamental research for design changes with materials . . . . It is understanding the rheology, the physical,

mechanical behaviors of materials in the design of formulations . . . . It helps [DSM] determine processes specifications, the tolerances for [DSM's] materials, whether or not they'll function in the materials." (*Id.* (quoting RX-1421 (Crowell Dep. Tr.) at 119-20).). From 2012 through 2016, according to Complainants, their investments in this cost center totaled [ ] in support of the Functional Materials business unit. (*Id.* (citing Tr. (Schoettelkotte) at 796:25–797:18; CDX-0426C; CX-0021C (DSM Cost Centers DSM-ITC00399097 (2012-2014)); CX-0937C (Spending Report DSMITC00439434 (2015)); CX-0938C (Spending Report DSM-ITC00439435 (2016))).).

As Complainants explained, because the investment in the referenced cost centers is not product-specific, Mr. Schoettelkotte made allocations to the DI Coatings using the same sales-based allocation method described above to provide a conservative estimate of value.

Based on allocations of costs, in the period 2012-2016, Complainants incurred [ ] in costs related to the coatings research cost center and [ ] in application development, both of which Mr. Schoettelkotte allocated to the FOM business. The Physical Analytical Chemistry cost center relates to the overall Functional Materials business unit (including FOM and SOMOS), and again, was allocated using the [ ] of global sales methodology, with [ ] from the Physical Analytical Chemistry cost center thus allocated to the FOM business. (*See* CBr. at 133 (citing Tr. (Schoettelkotte) at 796:25–797:18; CDX-0426C).). Thus, according to Mr. Schoettelkotte, Complainants' total expenditure in ongoing research and development related to the FOM business was [ ] from 2012 through 2016. (*See* Tr. (Schoettelkotte) at 797:19–798:19; CDX-0427C).). Mr. Schoettelkotte made an additional sales-based allocation of Complainants' research and development to the DI Coatings in the amount of [ ] to the '659 patent ([ ] if only claim 30), and

[ ] that Mr. Schoettelkotte allocated to the Cure Dose Patents. (*Id.*).

Finally, over and above their dollar investments in labor, as part of their cost calculations, Complainants kept track of hours their employees worked on certain projects. From 2013 through 2015, Complainants invested approximately [ ] employee full-time hours in their domestic coatings. (*See* CX-0024C; CX-0501C; CDX-0418C.). Complainants also estimated that approximately [ ] employee hours were spent on research, development, and commercialization efforts for the DP-1017/[ ] products. (*See* CBr. at 126; CDX-0417C.). Therefore, Complainants have expended approximately [ ] employee hours on the development of the products that practice the Cure Dose Patents.

Whether calculated as dollar investments or converted to employee hours, Complainants have a significant investment in labor and capital under Section 337(a)(3)(B).

3. Complainants Have Made Significant Investments in Research and Development Under Section 337 (a)(3)(C)

Complainants' expenditures in plant, equipment, and labor noted above can also be treated as investments in R&D under Section 337 (a)(3)(C). *See, Certain Optoelectronic Devices for Fiber Optic Communications, Components Thereof, and Prods. Containing the Same*, Inv. No.337-TA-860, Comm'n Opinion at 15 (May 9, 2014). Complainants have established that their ongoing work in their Elgin facility includes improvements to the DI products, work to improve the features of the patents at issue (including cavitation issues and cure speed) as well as work to improve efficiencies for the DI Coatings and the subsequent products that build on those coatings. This work and the investments that support it, establishes a nexus between the investments and the Asserted Patents. (*See* Tr. (Schoettelkotte) at 799:19–800:9; *see also* Tr. (Sarmah) at 288:12–292:15.).

Although Complainants' validly patented inventions are only components of their total commercial products, there is a clear nexus between Complainants' plant, equipment, and capital expenditures identified above that have been allocated specifically to the DP-1017/[ ] and DP-1032 primary coating products and the exploitation of the Cure Dose Patents. Some [ ] is allocated to the DP-1017/[ ] and DP-1032 products that practice the '508 and '103 patents. Moreover, with some [ ] invested in equipment and assets, and [ ] in labor and capital, and [ ] in research and development costs that were specifically allocated to the DP-1017/[ ] and DP-1032 products, Complainants have satisfied Section 337(a)(3)(C) of the economic domestic industry prong.

XII. RECOMMENDATION ON REMEDY AND BOND

A. Relevant Law

Pursuant to Commission Rule 210.42, an ALJ must issue a recommended determination on: (i) an appropriate remedy if the Commission finds a violation of Section 337, and (ii) an amount, if any, of the bond to be posted. 19 C.F.R. § 210.42(a)(1)(ii). When a Section 337 violation has been found, as here, "the Commission has the authority to enter an exclusion order, a cease and desist order, or both." *Certain Flash Memory Circuits and Prods. Containing the Same*, Inv. No. 337-TA-382, Comm'n Opinion on the Issues Under Review and on Remedy, the Public Interest and Bonding, at 26 (June 9, 1997). There is a mandate in 337(d), which provides: "if the Commission determines, as a result of an investigation under this section, that there is a violation of this section, it shall direct that the articles concerned, imported by any person violating the provision of this section, be excluded from entry to the United States." 19 U.S.C. § 1337(d).

In this case, Complainants have requested that in the event of a finding of violation of

Section 337, that the Commission issue a limited exclusion order ("LEO") and a cease and desist ("C&D") order directed to both Respondents. (CBr.at 150.). Complainants have argued that a bond in an amount of 50% of the entered value of the products is appropriate. (*Id.*).

Staff recommended that a LEO with a certification provision issue against Respondent, OFS, and that a C&D order issue against both Respondents in the event of the finding of a violation of Section 337. However, Staff argued that any remedial orders involving Respondent OFS should be delayed for three (3) to four (4) months to reflect Public Interest considerations. (SBr. at 96; SRBr. at 46.). Staff also argued for a 40% bond of entered valued against Respondent MUV's coating products. (*Id.*).

Respondents largely agreed with Staff's position, but suggested that if a LEO enters, it should be delayed for six (6) to nine (9) months rather than 4 months; that no C&D order is warranted; and that a bond of 40% of the entered value be entered value be required of Respondent MUV for its infringing coating products rather than a 50% bond. (ROBr. at 60-61; RMBr. at 75-76; RORBr. at 8-9.).[79]

B. A LEO with a Certification Provision Would Be Warranted Against Respondent OFS if the Commission Does Not Affirm This Decision's Finding that Respondent OFS' Accused Optical Fiber Does Not Infringe the Cure Dose or Cavitation Patents

Although this decision finds that Respondent OFS has not violated Section 337, if the Commission determines otherwise, then the recommendation of this decision is that a LEO with a certification provision would be appropriate. A LEO with a certification provision should apply to Respondent MUV's infringing coatings.

[79] Respondent MUV has adopted Respondent OFS' arguments and positions on Remedy and Bond without varying or adding to any of Respondent OFS' positions. (*See* RMBr. at 74-75.).

For the reasons explained in Section XIII below on the Public Interest, in the alternative, if a LEO were to be imposed against Respondent OFS, a LEO should be delayed for four (4) months to ensure there is no market supply disruption in optical fiber cable. Given the inevitable appeals of this decision, the Commission might request updated information on the state of market supply or shortages in the fiber coatings and optical fiber markets in the U.S. and abroad as part of its review.

Respondents' and Staff's argument for a LEO tailored only to those products that are found to infringe the Asserted Patents is compelling. (ROBr. at 59-60 citing (*In the Matter of Certain Personal Data and Mobile Comm'ns Devices & Related Software*, Inv. No. 337-TA-710, Initial Determination, 2011 ITC LEXIS 1668 at *296 (Jul. 15, 2011). Both Respondents and Staff agreed that a LEO should include a certification provision because of the difficulty U.S. Customs and Border Protection ("CBP") would have in inspecting coated optical fibers and products to determine whether they fall within the scope of a limited exclusion order. (ROBr. at 59-60; Tr. (Oliviero) at 1417:4-21.).

Moreover, as Respondents noted, a certification provision would permit Respondent OFS to certify that it is familiar with the terms of LEO, that it has made appropriate inquiry, and to stated that, to the best of its knowledge and belief, the products being imported are not excluded from entry under the order. (ROBr. at 60 (citing *In the Matter of Certain Semiconductor Chips with Minimized Chip Package Size and Prods. Containing Same*, Inv. No. 337-TA-605, Comm'n Opinion, 2009 ITC LEXIS 841 at *104-05 (June 3, 2009); *see also* SBr. at 96; SRBr. at 46).). As with Staff, Respondents agreed that there should be delay in implementing a LEO. (SBr. at 96; SRBr. at 46).).

However, unlike Staff, Respondents seek a six (6) to nine (9) month delay in

implementation of remedial orders. (RORBr. at 9.). The delay is being sought because of a world-wide shortage in coated optical fiber cable.

If the Market Outlook Report identified in Section XIII below is accurate (and it may not be by the summer of 2018), it may be that optical fiber (and glass preform) shortages will end in 2018. Moreover from the August 2017 hearing testimony, it is apparently that Respondent OFS has been attempting to qualify other non-infringing coatings for at least a year and a half.

Therefore, this decision agrees with Staff's position that a shorter delay period in implementing remedial orders would be warranted while the Commission seeks updated information on coatings and optical fiber market supplies from the Parties. There may be incentives for Complainants and Respondents to obtain the most accurate information available with respect to market supply.

Complainants argued that they should receive samples for testing of any of Respondents' products that would be subject to a LEO with a certification provision. (CBr. at 87.). Complainants criticized Respondents' testing procedures throughout this Investigation, some of which was justified. Moreover, Complainants argued that because they do not know which coatings Respondents may try to import in the future, a certification provision that would permit only unilateral testing by Respondents without Complainants being allowed to validate the testing could lead to additional litigation. (CRBr. at 87-88.). Complainants have not suggested how this would be accomplished or cite to any Commission precedent that would allow for Complainants' validation of Respondents' certifications. Staff did not address this point.

Given the potential penalties that Respondents could incur for falsely certifying their products for entry into the U.S., the threat of additional sanctions should satisfy here. Permitting Complainants to "validate" Respondents' samples could be unwieldy and unnecessarily time-

consuming. Nonetheless, when this decision is appealed, Complainants might be asked to submit additional information with respect to their product testing validation proposal. At this point, Complainants proposal is unsubstantiated and at best is an inchoate suggestion.

C. A Four Month Delay in Issuance of a Cease and Desist Order May Be Warranted if the Commission Determines On Review that Respondent OFS Violated Section 337

A cease and desist order is typically imposed when "commercially significant inventories of infringing products are present in the United States." *Certain Baseband Processor Chip and Chipsets, Transmitter and Receiver Chips, Power Control Chips, and Prods. Containing Same, Including Cellular Telephone Handsets*, Inv. No. 337-TA-543, Comm'n Opinion at 134-35 (June 19, 2007) (internal quotation omitted). However, the presence of a U.S. inventory is not a statutory requirement. *See Certain Digital Models, Digital Data, and Treatment Plans for Use in Making Incremental Dental Positioning Adjustment Appliances, the Appliances Made Therefrom, and Methods of Making the Same*, Inv. 337-TA-833, Comm'n Opinion at 147 (Apr. 10, 2014).

Complainants and Staff contended, and this decision agrees, that Respondent OFS maintains commercially significant inventory in the United States. (CBr. at 137-38; SBr. at 96.). Respondent OFS argument on its own behalf and on behalf of Respondent MUV that [

] (ROBr. at 62.).

According to Dr. Andrew Oliviero, OFS' Director of Product Line Management, [

] (Tr. (Dr. Oliviero) at 1399:9–1400:3.). Dr. Oliviero confirmed his deposition testimony that [

] (*See* CX-1426 (Dep. Tr. (Oliviero)) at 33.). While Dr. Oliviero tried to suggest during his evidentiary hearing testimony that [

] that testimony fails to consider the dollar value of Respondent OFS' inventory at any given time as last known. (Tr. (Oliviero) at 1400:13–1401:1.).

According to the testimony of Dr. W. Todd Schoettelkotte,[80] Complainants' expert, Respondent OFS' inventory control spreadsheets reflect that [

] (*See* CX-220C.). [

] (Tr. (Schoettelkotte) at 822:9-18). Those [

] (*Id.* at 822:14-18; *see also* CX-0266C; CDX-0430C.). During the same period, [

] (Tr. (Schoettelkotte) at 822:19-24; *see also* RX-2239C; RX-2240C; CDX-431C; RX-2240.). Mr. Schoettelkotte noted that [

[80] When he testified during the Hearing on August 2, 2017 as Complainants' expert on domestic industry, remedy and bond, Mr. William Todd Schoettelkotte was President and Managing Director of Intellectual Property and Financial Consulting ("IPFC"). (Tr. (W.Todd Schoettelkotte) 760:19–761:1.). Mr. Schoettelkotte described himself as having expertise in intellectual property valuation and damages assessments. (*Id.* at 761:1-10.). According to Mr. Schoettelkotte, he holds degrees in management and accounting and is a Certified Valuation Analyst. (*Id.* at 761:21-25; *id.* at 762:3-12; *see also* CX-1442.).

] (Tr. (Schoettelkotte) at 824:14-21 (citing RX-2240C-2).). Mr. Schoettelkotte noted that the inventory figures for the [ ] remained [ ] (*Id.* at 824:19-21). Ultimately, Mr. Schoettelkotte concluded that the inventory that Respondent OFS holds at any given time is [ ] (*Id.* at 824:25–825:3.).[81] It may be the [ ] However, that does not mean a LEO with a certification provision should not apply.

Mr. Schoettelkotte also evaluated Respondent MUV's inventory for its commercial significance. The amount of inventory that Respondent MUV held in its North Carolina facility most recently was evaluated as [

] *(Id.)*.

This decision, with Staff, does [

]

D. A 40% Bond During the Presidential Review Period Is Warranted Against Respondent MUV

In the event a violation of Section 337 is found, importation of the infringing articles is permitted under bond in an amount determined by the Commission to be sufficient to protect the Complainant from any injury during the Presidential Review Period. *See* 19 U.S.C. § 1337(j)(3).

[81] Respondent OFS tried to suggest that Mr. Schoettelkotte testified during the hearing that [ ] Mr. Schottelkotte's testimony was the opposite. (*See* ROFSBr. at 61.).

The Commission typically sets the bond based on the differential in the sales price between the domestic industry product and the accused product, or on a reasonable royalty rate. *See, e.g., Certain Microsphere Adhesives, Processes for Making Same, and Prods. Containing Same, Including Self-Stick Repositionable Notes,* Inv. No. 337-TA-366, Comm'n Opinion at 24 (Jan. 1996) (setting bond based on price differentials); *Certain Plastic Encapsulated Integrated Circuits*, Inv. No. 337-TA-315, Comm'n Opinion at 45 (Nov. 1992) (setting the bond based on a reasonable royalty). Complainant bears the burden of establishing the need for a bond. *Certain Rubber Antidegradants, Components Thereof, and Prods. Containing Same*, Inv. No. 337-TA-533, Comm'n Opinion at 39-40 (July 21, 2006); *see also Certain Laser Imageable Printing Plates*, Inv. No. 337-TA-636, Comm'n Opinion at 9 (Nov. 30, 2009).

Complainants have not requested an entry of a bond against Respondent OFS' fiber products. (CBr. at 141.). There is no basis for doing so. Since Complainants do not manufacture optical fiber, and does not compete in the market for finished coated optical fiber market, it has no basis upon which to compare its products for purpose of a bond against Respondent OFS' optical fiber.

However, Complainants have requested that a 50% bond enter against Respondent MUV's infringing coating products during the Presidential Review Period. According to persuasive evidence that Complainants submitted, it appears undisputed that [

] (*See* Tr. (Schoettelkotte) at 828:25–829:8). Respondent MUV presented no testimony during the hearing with respect to its own price differential calculations. Moreover, Respondent MUV's expert on Complainant's domestic industry products, Michele Riley, did not opine on an appropriate level of bond. (*See* Tr. (Michele Riley) at 1437:20–

1450:7.).[82]

Respondent MUV suggested in its Pre-Hearing Brief that a bond of 40% of entered value should apply without providing a rationale. (RMPBr. at 74.). Staff's position is that a 40% bond of entered value based on the price differential in *2016* should enter but only for the UV curable coatings for optical fibers. (*See* SBr. at 97-98; SPBr. at 96-97.). However, Complainants argued that a 50% bond is warranted.

Complainants argued that the unrebutted evidence establishes that the weighted average selling prices of the DI coating products for the years 2014-2016 is as follows:

Chart No. 12: Prices of Complainants' Coatings: 2014-2016

(*See* CBr. at 139 (citing Tr. (Schoettelkotte) at 825:11-21; CX-1455C (DSM DI Coatings); CX-0503C (DSM SAP data); CDX-0432C).).

Complainants noted that they supplied Prysmian with coatings, including domestic industry coatings, at prices according to 2014 and 2016 supply agreements that are consistent with the prices above. (CBr. at 139-40 (citing Tr. (Schoettelkotte) at 825:22–827:2; CX-0407C

[82] When she testified during the evidentiary hearing on August 4, 2017, Michele Riley was a Managing Director of Stout Risius Ross a financial and economic consulting firm. (Tr. (Michele Riley) at 1474:7-9.). She is a Certified Public Examiner and a Certified Fraud Investigator who holds a B.A. in physics and an MBA with a finance concentration. (*Id.* at 1432:11-18.). Ms. Riley testified specifically that she was "asked to respond to Mr. Schoettelkotte's determinations whether a domestic industry exists for the products at issue, and my presentation today is going to focus on the cure dose patents. (*Id.* at 1432:1-5, 1437:22-25.). Complainants offered a muted "clarification" as did Staff, to Ms. Riley being qualified as an expert on DI products, when her area is finance. (*See id.* at 1436:17–1437:10.). She did not offer opinion on the Cavitation Patent. (*Id.* at 1451:11-15.). Moreover, she provided no calculations of her own.

(Prysmian Supply Agreement at 761); CX-0408C (First Amendment to Prysmian Agreement) at 788; CDX-0433C).).

Complainants noted that the price per kilogram for which Respondent MUV sold the accused coatings in the U.S. averaged [ ] (CBr. at 140 (citing Tr. (Schoettelkotte) at 827:3-12; CX-1456C (MUV Sales); CX-266 (MUV Sales raw data); CDX-0434C).). Complainants noted that [ ] The [ ] between Respondents MUV and OFS [ ] (CBr. at 140; *see* CX-0266C (MUV Invoices).). Complainants contended that for the relevant period in 2018 when a bond might be in place during the Presidential Review Period, Respondents OFS and MUV are [ ] (CBr. at 141 (citing Tr. (Schoettelkotte) at 827:13–828:11; CX-0272C [ ]; CX-0266C).).

Complainants noted that by comparing the average selling price data, the [ ] becomes clearer:

[

]

(CBr. at 140 (citing Tr. (Schoettelkotte) at 828:12-24).).

Complainants argued that a bond of no less than 50% is warranted to protect it during the

60-day Presidential Review Period.

While some of Complainants' argument is speculative, much of the analysis with respect to [ ] is sound and unrebutted. Because Complainants based the argument for a 50% bond of entered value on [

] this decision recommends a bond of 40% of entered value is supported by Complainants' ***actual*** data, *supra*. Staff agreed. (SBr. at 97-98.). When this decision is reviewed, the Commission might request updated pricing information on Respondent MUV's infringing coatings and adjust a bond value accordingly.

XIII. PUBLIC INTEREST

A. The Commission Directed that Evidence Be Taken on Public Interest Considerations

In the NOI, the Commission directed that the ALJ "take evidence or other information and hear arguments from the parties and other interested persons with respect to the Public Interest in this investigation, as appropriate, and provide the Commission with findings of fact and a recommended determination on this issue[.]" 81 Fed. Reg. 76963 (Nov. 4, 2016).

Section 337 mandates consideration of the effect of exclusion orders or similar remedies on: (1) public health and welfare; (2) competitive conditions in the U.S. economy; (3) U.S. production of articles that are like or directly competitive with the articles subject to the investigation; and (4) U.S. consumers. 19 U.S.C. § 1337(d)(l). This is often referred to as the "public interest" analysis. *See, e.g.*, Commission Rule § 210.50(a)(2), (4).

In general, relief under Section 337 should be denied only when the adverse effect on the public interest outweighs the interest in protecting the patent holder. *Certain Battery-Powered*

Ride-On Toy Vehicles, Inv. No. 337-TA-314, Comm'n Opinion, 0091 WL 11732578 at *8-9 (Apr. 1991). It is the Respondents' burden to show that remedial relief should be precluded based on the public interest factors. *Certain Light-Emitting Diodes and Products Containing Same*, Inv. No. 337-TA-512, Comm'n Opinion at 10 (Apr. 14, 2008)). While such instances are reputedly rare (and no party cited to such a case), in this instance the Public Interest at least for a circumscribed period, outweighs the rights of the patent holder.

While findings have been made that Respondent OFS does not infringe the Asserted Patents because they are invalid, and therefore has not violated Section 337, the Commission requires that each major area of law, including the Public Interest, be addressed. The Recommendation in this instance with respect to Respondent OFS is an alternative recommendation. If the Commission does not uphold the findings that the Asserted Patents are invalid, then the recommendation made here would apply.

While Complainants disputed that Respondents have provided sufficient evidence of actual harm to the Public Interest under any of the Public Interest considerations, a different conclusion has been reached in this decision. (*See generally* CBr. at 141-50; *contra* SBr. at 93.). For reasons discussed in Section XIII below, the weight of the evidence supports a finding that Public Interest considerations warrant a delay in the entry of remedial orders against Respondent OFS for four (4) months if the Commission does not uphold the findings that Respondent OFS has not violated Section 337 of the Tariff Act.

This suggested delay in remedial orders would give Respondent OFS and its customers time to [

] (*See* Section XIII, *infra.*). A delay in the entry of a Cease and Desist Order ("C & D") against Respondent MUV is neither recommended nor warranted.

B. Because the Demand for Fiber Optic Coated Cable Is High, Public Health and Welfare Considerations Suggest that the Supply of Optical Coated Fiber Cable Should Not Be Constrained

There is a high demand for coated optical fiber in multiple markets in the United States (U.S.), particularly as the country adds to its broadband capacity. (CX-1177 (Verizon Press Release); Tr. (Crowell) at 101:24–102:8; Tr. (Murray) at 1035:20-25.). While Complainants stated categorically, without any of its own evidentiary support, that excluding Respondents' UV curable coatings (MUV) and optical fiber (OFS) from importation will "not implicate any public health, safety or welfare concerns," that is not quite accurate. (CBr. at 143.).

As Respondent OFS noted, the Commission has recognized the public's interest in access to broadband data networks. (*See* ROBr. at 63 (quoting *In the Matter of Certain Baseband Processor Chips*, Inv. No. 337-TA-543, Comm'n Opinion, 2007 ITC LEXIS 621 at *237-241 (June 19, 2007).). "These technologies are important in their own right, but they also have significant effects on other economic activity in the United States." (*Id.* at 239.). The Commission also found that "unless wireless carriers were able to achieve returns on their investments in wireless infrastructure, incentives for these companies to construct the next generation of wireless technologies would diminish." (*Id.*). It is reasonable to infer that if access to broadband is in the public interest, so too is the availability of the optical cable and the coatings that cover that optical cable that is instrumental to the broadband industry (and to other industries.).

While Complainants criticized Respondent OFS' presentation of Public Interest considerations as based only upon broad generalities, there are certain metrics about Respondent OFS' own supply and manufacturing capacity and knowledge of its competitors clear.

Respondent OFS performs approximately [ ] of its optical fiber manufacturing in the

U.S. (Tr. (Murray) at 1041:5-7.). Respondent OFS currently supplies approximately [ ] of the U.S. market for optical fiber. (Tr. (Oliviero) at 1403:21-25; Tr. (Schoettelkotte) 851:22–852:3.). That translates to some [ ], or approximately [ ] of optical fiber per year. (Tr. (Oliviero) at 1403:21–1404:1-10.).[83] Respondent OFS supplies cables for trans-oceanic data transfer of telephone calls, supports multiple U.S. media and retail companies (including [ ]), and U.S. telecommunications companies [ ]. (*Id.* at 1429:17–1430:3.). The only other major manufacturers of optical fiber in the U.S., are Respondent OFS' competitors, Corning Cable Systems ("Corning") and Prysmian Cable ("Prysmian").[84] (*Id.* at 1404:19-20; *see also* Tr. (Crowell) at 102:9-12.).

According to Dr. Oliviero, 2/3 of the demand for fiber optic cable in the U.S. is used for fiber in homes and businesses, while the remaining 2/3 is used for mobile broadband or mobile telephony. (*Id.* at 1405:7-10.). While according to Mr. Crowell, the U.S. consumes only 15% of the world-wide market of optical cable, as Dr. Oliviero described, much of the growth demand in the U.S. is coming both from homes and businesses as they seek to convert from copper to fiber optic cable. In mobile markets, plans are underway to move from 4th generation (or 4G) LTE wireless to fifth generation (5G) LTE, which has speeds of 10%-100% greater than 4G LTE. (*Id.* at 16-19.). According to Dr. Oliviero, 5G LTE will require "two to three times more optical fiber than is presently used today." (Tr. (Oliviero) at 1407:15-17.).

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[83] The primary coating that Respondent OFS purchases from Respondent MUV and uses on many of its manufactured fiber optic cable is [ ]. (*See, e.g.* generally Tr. (Oliviero) at 1414:1–1417:25.).

[84] Dr. Oliviero also mentioned Sumitomo Corporation, a Japanese conglomerate. (Tr. (Oliviero) at 1404:19-20.).

Complainants argued that since the coatings and fiber of the Accused Products are not sold to consumers, there would be no direct impact on, or nexus to public health, *per* se, if remedial remedies were to apply to coatings or optical fiber. However, Complainants' argument is too narrow and literal without considering the broader health- related market *sector* that could be affected by an optical fiber shortage. (CBr. at 143.).

Among other markets that Dr. Oliviero described as using and having a great demand for optical fiber are the health care and education markets, both of which require fiber optic-related cloud computing, which relies upon optical fiber for rapid communication. The health care sector uses cloud computing for patient records storage, while schools use cloud computing for classroom virtual learning. (Tr. (Oliviero) at 1406:7–1407:1.). Similarly, Dr. Oliviero noted that other markets such as the financial industry and the defense industry rely heavily upon the use of coated glass optical fiber for rapid data transmission (e.g., stock trading) while defense industry has a variety of security-related needs for optical fiber. (*Id.* at 1407:6-7.). There was no rebuttal to any of this testimony despite its somewhat general description.

The only documentary evidence presented by any party on the scope or nature of supply, manufacturing capacity, and demand in the world-wide fiber optical cable market is contained in "Telecom Cables Market Outlook," dated February 2017, published by an independent third-party consultant. (*See* ROBr. at 64 (citing RX-2965).).[85] According to an "Executive Summary"

[85] Complainants repeatedly criticized the evidence that Respondents offered on the Public Interest as consisting of "broad generalities" or as "vague assertions" or as "generalized testimony by self-interested witnesses, without "documentary support of harm to OFS." (CBr. at 141-43.). That criticism was only partially accurate. Complainants did note, accurately, that the only documentation that Respondents provided to support its arguments with respect to worldwide optical fiber cable demand, and world shortages of optical cable from 2015-2017 that was expected to abate sometime in 2018, was RX-2965, "Telecom Cables Market Outlook," dated February 2017 ("Market Outlook Report") and produced by an independent organization called CRU International. However, the Market Outlook Report provides a

in that document, an optical fiber shortage began in China and 2016 and "spread to other countries as the year progressed, causing long delivery times and high prices by year-end." (RX-2965.0009.). A "Key theme," of that same report states:

> World optical fiber and cable markets are experiencing a disruption, a worldwide shortage. This shortage has resulted from a mismatch in the demand trend and the rate at which new capacity has been added. This situation will be reversed over the next two years, as demand growth decelerates and capacity expansion "catches up" with the market.

(RX-2965.0010.).

The quoted market information, above, is consistent with Mr. Murray's and Mr. Crowell's observations of the market: "[T]he market for optical fiber and cable right now is in a very tight, constrained position." (Tr. (Murray) at 1035:20-21; *see also* Tr. (Crowell) at 99:24–100:1-2 [

]86 While, according to Mr. Crowell, there are other major suppliers of optical cable in addition to Respondent OFS that includes Corning, Sumitomo (Japan), Prysmian, as well as companies in China whom Mr. Crowell did not name, there is still not enough capacity to deal with world demand. (Tr. (Crowell) at 101:25–103:15.).[87]

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great deal of market information about cable production in different regions of the world from 2015 through early 2017. Clearly, market projections are speculative. However, to the extent that the Market Outlook Report is consistent with testimony, *supra,* that optical fiber and coating products are not growing as rapidly as market demand requirements, and that supply would be short through sometime in 2018, it was an acceptable source of data.

[86] [

] (*See* Tr. (Oliviero) at 1416:17–1417:2.). According to Dr. Oliviero, [

]

(*Id.* at 1416:17-23.).

[87] Dr. Oliviero also testified that he did not believe that China, the largest producer with 50% of the world's production capacity, could fill its own demand for optical fiber let alone for the shortfall in the United States. (Tr. (Oliviero) at 1412:13-25.). Without providing specifics, Dr. Oliviero also testified

Because of the [

] (Tr. (Crowell) at 98:12-19; RX1421C (Dep. Tr. (Crowell)) at 183:15–184:6; CX-0384C; Tr. (Murray) at 1042:22–1043:5; Tr. (Oliviero) at 1402:23–1403:15, 1407:24-25; Tr. (Konstadinidis) at 1329:5-10.). Respondent OFS' testimony was unrebutted that [

] (Tr. (Konstadinidis) at 1329:11-18, 1327:10–1329:4.). The process of [

] (*Id.* at 1329:2-14.).

It is the shorter period with which this decision is concerned because [

] (*See* Tr. (Murray) at 1043:23-25.). According to Mr. Crowell, if a product is being modified, the qualification process takes between 6-18 months, or longer, depending upon the sophistication of the customer and the customer's requirements. (Tr. (Crowell) at 98:12-19).). Dr. Oliviero suggested [

] (Tr. (Oliviero) at 1402:23–1403:4.).

The process of qualifying an optical fiber coating involves both a manufacturer and its customers. A new coating must be created, or if one has already been developed, Respondent

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that China does not provide many of the type of coated optical fiber that is used in the U.S.

OFS tests to ensure the coating meets performance and quality standards, including [ ] conditions in addition to international and national standards. (Tr. (Konstadinidis) at 1327:10–1328:19.). Then, it might take one of [ ] to modify a coating or test it for use on their products in order to conform to a particular product need or requirement. (Tr. (Oliviero) at 1403:6-11.). When the two (2) phases of the qualifying process are considered together, the [ ]

Complainants argued that Respondent OFS' qualification process of other coatings was well under way by the start of evidentiary hearing because [ ] (CBr. at 148 (citing CX-0227C.0007 [ ] Complainants also argued that Respondent OFS [ ] (*See* CBr. at 148-49 (citing CX-0230C; CX-0230C.0005; Tr. (Oliviero) at 1426:11–1427:11; CX-0186C (March 2017 "New Next Generation Coating Plan")).). One of the coating suppliers that Complainants said Respondent OFS was dealing with included [ ] (*Id.* at 145.).

Moreover, Complainants argued that by the time the Commission issues its Opinion and

the Presidential Review Period commences, the world-wide shortage in fiber optic cable should have abated. (*Id.* at 149.). Accordingly, Complainants asserted that Respondent OFS should not be rewarded by delayed remedial orders because it continued to use Respondent MUV's infringing coating(s) knowing that that they were infringing Complainants' patents. (*Id.*).

Respondent OFS' rejoinder to Complainants' point that Respondent OFS was working with [

]

(ROBr. at 60-61 (citing (Tr. (Konstadinidis) at 1337:19–1340:3).).

It may be that Complainants are correct that the worldwide shortages in fiber optic cable and coatings may abate. However, there is no such evidence at this point.

In this case, Staff's and Respondent OFS' positions consider the likelihood that there may be some disruption in production if Respondent OFS' [ ] market share were to be abruptly removed from the supply chain even if there is no certainty about the size of such a disruption or how long such a disruption might last. (*See* SBr. at 94; ROBr. at 65.). Given the uncertainties, it would be prudent to mitigate the risks of a possible disruption in the market and to Respondent OFS' customers even if market predictions, discussed in Section XIII, are wrong. If Respondent OFS' optical fiber were removed from the U.S. market without other companies having ramped up simultaneously to replace Respondent OFS' production capacity, there would be a market problem that, at least now, is foreseeable. (SBr. at 94.).

While Staff supports a delay of four (4) months in imposition of remedial orders on only the optical fiber that uses infringing MUV coatings and not on the infringing coatings, as the time comes closer to a Presidential Review Period, the Commission could solicit evidence on the state of the fiber optic market to determine if shortages that have existed have ended, or whether

they have continued.

C. Competitive Conditions in U.S. Economy Warrant a Delay in Imposition of Remedial Orders Against Respondent OFS

As noted in Section XIII.B above, there is a limited number of fiber manufactures, including Corning and Prysmian, who are already operating at what Dr. Oliviero described as an "oversold" capacity. (Tr. (Oliviero) at 1407:21–1409:9.). While Corning announced in a press release that it had a $1 million agreement with Verizon to add another 20 million kilometers of fiber per year, that additional capacity belongs to Verizon. (*Id.* at 1407:24–1408:4.). While theoretically Chinese or other foreign countries might be able to replace some of Respondent OFS' market (there is no testimonial metric on this), Dr. Oliviero noted that an added constraint on using foreign-made optical fiber is the "Buy America Act. "[88] That statute requires the use of American-made optical fiber, or optical fiber product that would qualify under a "Buy America" clause through a free trade agreement. (*Id.* at 1408:12–1409:23.). Dr. Oliviero estimated that a "minimum of 50% of the material and processing that occurs in making optical fiber cable would have to occur in the U.S. or from eligible countries." (*Id.* at 1409:19-23.).

While Complainants contended that as the world's leading developer of coatings, it could replace Respondent MUV's [ ] U.S. market share of coatings, and supply coatings to Respondent OFS, it offered no testimony on how it would go about absorbing Respondent MUV's market share or how long that might take. (CBr. at 144-45.). No party considered the monopolistic effect if Complainants were to have supply control over most of the U.S. market.

While Complainants also suggested that other foreign companies such as PhiChem

[88] The Buy America Act, 41 U.S.C. §§ 8301–8305, was passed by Congress in 1933 and signed by President Hoover on his last full day in office (March 3, 1933).

(China) or Sumitomo (Japan) and Fujikura (Japan) might be available to supply along with Complainants to supply coatings,[89] Complainants acknowledged that PhiChem does not currently supply coatings for optical fiber in the U.S. (CBr. at 144 (citing CX-1435 (Dep. Tr. (Zhu)) at 15; CX-1420 (Dep. Tr. (Yanping (Grace) Cao) at 21-22).). Moreover, Complainants offered no rebuttal information on how long it might take PhiChem, Sumitomo and Fujikura to move into or to expand their presence in the U.S. market. (*See id.* at 144-45.). Similarly, Complainants did not mention the "Buy America" constraint that might eliminate or reduce *any* foreign company's (such as PhiChem, Sumitomo, or Fujikura) ability to provide coatings for at least a certain segment of the replacement coatings and optical fiber markets. (*See id.* at 144.).

Complainants also did not mention which world-wide companies might have the capacity to step in to manufacture ***fiber optic cable*** during the months that Respondent OFS might be subject to remedial orders. Respondents did not provide detailed information on that point either. That is a large gap in analysis given the known existence of the world-wide shortage in optical fiber that includes shortages in China and Japan. (*See* Tr. (Oliviero) at 1411:24–1412:25.).

One of Complainants' arguments with respect to optical fiber manufacturing capacity is that the optical fiber market is a "very active one," and that the limiting factor for supply is in the glass "preform," not draw tower capacity. (CBr. at 147 (citing RX-2965.0046).). However, that focus is not supported by the weight of the testimony. While Complainants criticized the Market Outlook Report, Complainants also relied in-part on that report for its own statement that "[b]y

[89] Complainants mentioned Corning as a competitor that might provide coatings, Complainants never mentioned, let alone rebutted, Dr. Oliviero's testimony that Corning is "oversold" and its supply is already taken by contract. (*See* CBr. at 144-45.).

2018, the supply of preform, and thus fiber, is expected to catch up, and perhaps even exceed supply." (*Id.* at 147 (citing Tr. (Schoettelkotte) at 905:6–906:3).).

Finally, if Respondent OFS were subject to an immediate imposition of remedial orders, according to Dr. Oliviero jobs could be lost. (Tr. (Oliviero) at 1415:1-8.).). Moreover, Dr. Oliviero was uncertain whether some of Respondent OFS' competitors would wish to undertake the capital outlays required for what could be a temporary expansion of capacity that might not be sustained if demand levels off or drops. (*Id.* at 1415:24–1417:2.).

D. There Are No Other American Companies that Can Supply the Same Products, or Products that Would Be Considered To Be "Like" Products

Section XIII.C above describes in as concrete terms as possible, given the evidence, of the U.S. market that exists in the manufacture/product of coatings for optical cable, and of optical fiber. While Complainants said they can supply fiber-optic coatings, thereby replacing Respondent MUV's share of the optical fiber coatings market, Complainants have not indicated which companies might be positioned to supply Respondent OFS' [ ] market share of optical fiber cable. (CBr. at 144-45.). There is no good evidence that leads persuasively to a conclusion about this factor or consequential problems. Similarly, there was no evidence presented on any possible substitute product for optical fiber.

E. Potential Negative Effects on U.S. Consumers Weigh in Favor of Delaying Implementation of Remedial Orders Against Respondent OFS

As described in Sections XIII.B-D above, any disruptions in Respondent OFS' business operations could affect Respondent OFS' customers and could also affect U.S. consumers' access to broadband services and high-bandwidth information technologies. (*See* Tr. (Oliverio) at 1404:22–1407:8.). While there is no definitive evidence that categorically reflects a certain market disruption if Respondent OFS' products were to be removed from the U.S. market, there

is sufficient uncertainty about the potential for a problem given what is known. That is, there has been a growing market demand for fiber optic cable and coatings with a more than two (2)-year shortage of optical fiber to meet the growth in demand. A delay of certain remedial orders would be prudent. Again, the length of time that such a delay might last could be tailored by submissions of updated market reports to the Commission.

However, this alternative recommendation would apply only if the Commission does not uphold the finding that Respondent OFS has not violated Section 337.

XIV. WAIVER OR WITHDRAWAL OF RESPONDENTS' DEFENSES

Respondent MUV did not raise in its Pre-Hearing Brief or offer any evidence during the evidentiary hearing to support its Third (no import violation), Fourth (no unfair act), Seventh (unenforceability based on equitable doctrines), Ninth (lack of standing), and Tenth (failure to state a claim) Affirmative Defenses. (*See* Resp. MUV Am. Resp. at 20-24.).

Respondent OFS did not raise in its Hearing Brief or offer any evidence during the evidentiary hearing to support its Fourth (no importation) and Fifth (no jurisdiction to issue remedy) Affirmative Defenses. (*See* OFS Am. Resp. at 25-26.). Finally, Respondent MUV argued in its Pre-Hearing Brief that [ ]. (*See* RMPBr. at 71-72.). That belated argument was not raised as an Affirmative Defense in Respondent MUV's Response to the Complaint. Respondent MUV's license argument was waived because it was not pled. *Certain Ink Application Devices and Components Thereof and Methods of Using the Same*, Inv. No. 337-TA-832, Order No. 27, 2013 WL 1278080, *1 (Mar. 26, 1913).[90]

Consequently, it is a finding of this decision that these Affirmative Defenses have been

[90] Respondent raised this issue of license (and argued it incorrectly as an implied license) in a motion for summary determination, which was denied. (Order No. 31 (Jul. 25, 2017).).

withdrawn, waived and/or abandoned consistent with Ground Rules 7.2 and 10.1. *Kinik Co. v. Int'l Trade Comm'n*, 362 F.3d 1359, 1367 (Fed. Cir. 2004).

XV. CONCLUSIONS OF FACT OR LAW: THIS INITIAL DETERMINATION FINDS A SECTION 337 VIOLATION BASED UPON INFRINGEMENT OF U.S. PATENT NOS. 6,961,508 AND 7,171,103

1. The Commission has subject matter, personal, and *in rem* jurisdiction in this Investigation.

2. Accused MUV Coatings and Accused OFS Fibers have been imported into the United States.

3. Complainants have proven by a preponderance of evidence that the Accused MUV Coatings infringe asserted claim 21 of U.S. Patent No. 6,961,508.

4. Complainants have proven by a preponderance of evidence that the Accused MUV Coatings infringe asserted claims 1-10 and 13-15 of U.S. Patent No. 7,171,103.

5. Complainants have not proven by a preponderance of evidence that the Accused MUV Coatings infringe claims 1-3, 9, 12, 16-18, 21, and 30 of U.S. Patent No. 7,706,659.

6. Complainants have not proven by a preponderance of evidence that the Accused OFS Fibers infringe any of the asserted claims of U.S. Patent Nos. 6,961,508; 7,171,103; or 7,706,659.

7. Respondents have proven by clear and convincing evidence that asserted claims 1-8, 11-15, 18-20, and 22 of U.S. Patent No. 6,961,508 are invalid.

8. Respondents have proven by clear and convincing evidence that all of the asserted claims, claims 1-3, 9, 12, 16-18, 21, and 30 of U.S. Patent No. 7,706,659 are invalid.

9. Respondents have not proven by clear and convincing evidence that asserted claim 21 of U.S. Patent No. 6,961,508; and asserted claims 1-10 and 13-15 of U.S. Patent No. 7,171,103 are invalid.

10. Complainants have proven that they satisfy the technical prong of the domestic industry requirement for U.S. Patent Nos. 6,961,508 and 7,171,103.

11. Complainants have not proven that they satisfy the technical prong of the domestic industry requirement for U.S. Patent No. 7,706,659.

12. Complainants have proven that they satisfy the economic prong of the domestic

industry requirement.

13. Complainants have proven that Respondent MUV has violated Section 337 of the Tariff Act of 1930, as amended.

The lack of discussion of any matter raised by the Parties, or any portion of the record, does not indicate that it has not been considered. Rather, any such matter(s) or portion(s) of the record has/have been determined to be irrelevant, immaterial or meritless. Arguments made on briefs, which were otherwise unsupported by record evidence or legal precedent, have been accorded no weight.

XVI. CONCLUSION AND ORDER

Based upon the foregoing, it is my Initial Determination on Violation of Section 337 that Respondent MUV has violated Section 337 of the Tariff Act of 1930, as amended, by importing into the United States, selling for importation, or selling within the United States after importation of certain UV curable coatings for optical fibers, by reason of infringement of claim 21 of United States Patent No. 6,961,508.

I have found that Respondent MUV has violated Section 337 of the Tariff Act of 1930, as amended, by importing into the United States, selling for importation, or selling within the United States after importation of certain UV curable coatings for optical fibers, by reason of infringement of claims 1-10, and 13-15 of United States Patent No. 7,171,103.

I have found that Respondent MUV has not violated Section 337 of the Tariff Act of 1930, as amended, by importing into the United States, selling for importation, or selling within the United States after importation of certain UV curable coatings for optical fibers, by reason of infringement of claim 20 and 22 of United States Patent No. 6,961,508; or claims 1-3, 9, 12, 16-18, 21, and 30 of United States Patent No. 7,706,659.

I have found that Respondent OFS has not violated Section 337 of the Tariff Act of 1930, as amended, by importing into the United States, selling for importation, or selling within the United States after importation of certain coated optical fibers, by reason of infringement of claims 1-8, 11-15, and 18-22 of United States Patent No. 6,961,508.

I have found that Respondent OFS has not violated Section 337 of the Tariff Act of 1930, as amended, by importing into the United States, selling for importation, or selling within the United States after importation of certain coated optical fibers, by reason of infringement of claims 1-10 and 13-15 of United States Patent No. 7,171,103.

I have found that Respondent OFS has not violated Section 337 of the Tariff Act of 1930, as amended, by importing into the United States, selling for importation, or selling within the United States after importation of certain coated optical fibers, by reason of infringement of claims claims 1-3, 9, 12, 16-18, 21, and 30 of United States Patent No. 7,706,659.

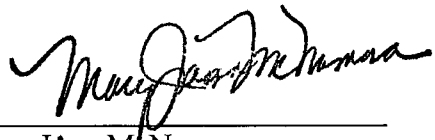
This Initial Determination on Violation of Section 337 of the Tariff Act of 1930 is certified to the Commission. All orders and documents, filed with the Secretary, including the exhibit lists enumerating the exhibits received into evidence in this Investigation, that are part of the record, as defined in 19 C.F.R. § 210.38(a), are not certified, since they are already in the Commission's possession in accordance with Commission Rules. *See* 19 C.F.R. § 210.38(a). In accordance with 19 C.F.R. § 210.39(c), all material found to be confidential under 19 C.F.R. § 210.5 is to be given *in camera* treatment.

After the Parties have provided proposed redactions of confidential business information ("CBI") that have been evaluated and accepted, the Secretary shall serve a public version of this ID upon all parties of record. The Secretary shall serve a confidential version upon counsel who are signatories to the Protective Order (Order No. 1) issued in this Investigation.

Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission unless a party files a petition for review pursuant to 19 C.F.R. § 210.43(a) or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the Initial Determination or certain issues therein.

Within fourteen (14) days of the date of this document, the party shall submit to the Office of Administrative Law Judges a joint statement regarding whether or not they seek to have any portion of this document deleted from the public version. The Parties' submission shall be made by hard copy and must include a copy of this ID with red brackets indicating any portion asserted to contain CBI to be deleted from the public version. The Parties' submission shall also include an index identifying the pages of this document where proposed redactions are located. The Parties' submission concerning the public version of this document need not be filed with the Commission Secretary.

SO ORDERED.



MaryJoan McNamara
Administrative Law Judge

APPENDIX A

Respondent MUV's Accused Fiber Optic Coatings
[ ]

APPENDIX B

Respondent OFS' Accused Coated Optical Fibers	
Coated Optical Fibers ("Accused OFS Fibers")	AllWave, AllWave+, AllWave LL, AllWave One, AllWave Flex, AllWave Flex+, AllWave Flex 190/200, AllWave Flex+ 190/200, AllWave Flex Max, EZ-Bend, Generic G.652D, Generic G.657 A1 and A2, Generic OM1, Generic OM2, GigaGuide 62.5, GigaGuide 62.5 XL, GigaGuide 50, GigaGuide 50 XL, LaserWave 300, LaserWave 550, LaserWave G+, TeraWave SLA+, TeraWave, TeraWave SCUBA, TeraWave ULA, TeraWave ULL, TrueWave Reach, TrueWave RS, TrueWave SRS, TrueWave XL, AllWave® FLEX Max Bend-Optimized Single-Mode Fiber, AllWave® Zero Water Peak (ZWP) Single-Mode Optical Fiber, AllWave® FLEX Zero Water Peak (ZWP) Single-Mode Fiber, AllWave® FLEX+ Zero Water Peak (ZWP) Single-Mode Fiber, AllWave® FLEX Zero Water Peak (ZWP) 200 Micron Bend-Optimized Single-Mode Fiber, AllWave® FLEX+ Zero Water Peak (ZWP) 200 Micron Bend-Optimized Single Mode Fiber, AllWave® Zero Water Peak (ZWP) Low Loss Fiber, TeraWave SLA+ Ocean Fiber, TeraWave ULA Ocean Fiber, TrueWave XL Ocean Fiber, AllWave® FLEX Zero Water Peak (ZWP) Single-Mode Ocean Fiber, TrueWave® High Dispersion (HD) Ocean Fiber, TrueWave® LA Low Water Peak (LWP) Fiber, TrueWave® RS Low Water Peak (LWP) Fiber, TrueWave® REACH Low Water Peak Fiber, TrueWave® Submarine Reduced Slope (SRS) Ocean Fiber, AllWave® One Zero Water Peak (ZWP) Single-Mode Optical Fiber, AllWave®+ Zero Water Peak (ZWP) Single-Mode Optical Fiber, TeraWave Fiber, LaserWave® FLEX 300/550 (OM3/OM4) Fiber, LaserWave® FLEX G+ Bend-Optimized Fiber, 62.5 Micrometer (um) Laser Optimized Multimode Optical Fiber, 500 um Coated Graded Index Multimode Fiber 50/125, 500 um Coated Graded Index Multimode Fiber 62.5/125, LaserWave® FLEX WideBand Fiber. (CX-0192 (OFS Website Printout of Single-Mode Products); CX-0193 (OFS Website Printout of Multi-Mode Products).).
Single-Mode Coated Optical Fibers ("Accused OFS Single-Mode Fibers")	AllWave® FLEX Max Bend-Optimized Single-Mode Fiber, AllWave® Zero Water Peak (ZWP) Single-Mode Optical Fiber, AllWave® Zero Water Peak (ZWP) Low Loss Fiber, AllWave® One Zero Water Peak (ZWP) Single-Mode Optical Fiber, AllWave®+ Zero Water Peak (ZWP) Single-Mode Optical Fiber, TeraWave SLA+ Ocean Fiber, TeraWave ULA Ocean Fiber, TeraWave Fiber, TeraWave ULL Fiber, TrueWave® LA Low Water Peak (LWP) Fiber, TrueWave® RS Low Water Peak (LWP) Fiber, TrueWave® REACH Low Water Peak Fiber, TrueWave® REACH Low Water Peak Fiber, AllWave® FLEX Max Bend-Optimized Single-Mode Fiber, AllWave® FLEX Zero Water Peak (ZWP) Single-Mode Fiber, AllWave® FLEX+ Zero Water Peak (ZWP)

	Single-Mode Fiber, AllWave® FLEX Zero Water Peak (ZWP) 200 Micron Bend-Optimized Single-Mode Fiber, AllWave® FLEX+ Zero Water Peak (ZWP) 200 Micron Bend-Optimized Single Mode Fiber, AllWave® One Zero Water Peak (ZWP) Single-Mode Optical Fiber, AllWave®+ Zero Water Peak (ZWP) Single-Mode Optical Fiber. (CX-0192 (OFS Website Printout of Single-Mode Products).).

APPENDIX C

Complainants' DI Fiber Optic Coatings
DP-1017/[ ] Coating
DP-1032 Coating
DP-0041 Coating
DP-1014XS Coating

APPENDIX D

Prior Art Fiber Optic Coatings
[ ]

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME **Inv. No. 337-TA-1031**

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served by hand upon the Commission Investigative Attorney, Claire K. Comfort, Esq., and the following parties as indicated, on **March 15, 2018**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants DSM Desotech, Inc. and DSM IP Assets B.V.:

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☒ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____

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UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME**	**Inv. No. 337-TA-1031**

CORRECTED ORDER NO. 32:[1]

INITIAL DETERMINATION GRANTING RESPONDENT MUV's MOTION FOR SUMMARY DETERMINATION THAT COATINGS [ ] AND [ ] DO NOT INFRINGE U.S. PATENT NO. 7,067,564 [MOTION DOCKET NO. 1031-027]

(July 7, 2017)

I. INTRODUCTION

On May 22, 2017, pursuant to Commission Rule 210.18 and Ground Rule 2, Respondent Momentive UV Coatings (Shanghai) Co., Ltd. ("MUV"), filed a motion for summary determination ("Motion") that MUV's accused coatings [ ] and [ ] do not infringe the asserted claims 2-4, 9, 11, 12 and 15 of U.S. Patent No. 7,067,564 ("the '564 patent") because they do not contain at least "two oligomers" as required by that patent. (Motion Docket No. 031-027; Mot. at 1; Memorandum ("Mem.") at 1-2; Statement of Undisputed Material Facts ("SUMF").).[2] On June 1, 2017, Complainants DSM Desotech, Inc. and DSM IP

[1] The caption of Order no. 32, as originally filed (Doc. ID No. 616164), inadvertently included the phrase "because of indefiniteness," which has been deleted from Corrected Order No. 32.

[2] MUV certified pursuant to Ground Rule 2.2 that it consulted with Complainants DSM Desotech, Inc. and DSM IP Assets B.V. (collectively, "DSM"); Respondent OFS Fitel, LLC ("OFS"); and Commission Investigative Staff ("Staff") at least two (2) business days before it filed its Motion in an effort to resolve

Assets B.V. (collectively, "DSM") filed their opposition ("Opposition") to MUV's Motion. (Doc. ID No. 613328; Opp'n at 1.). Commission Investigative Staff ("Staff") filed a response in support of the Motion ("Staff Response") on June 5, 2017. (Doc. ID No. 613438; Staff Resp. at 1.). Respondent OFS Fitel, LLC ("OFS") did not file papers.

II. LEGAL STANDARDS

A. Summary Determination

Summary determination under Commission Rule 210.18 is analogous to summary judgement under Federal Rule of Civil Procedure 56, and may be granted only where the evidence shows "that there is no genuine issue as to any material fact and that the moving party is entitled to summary determination as a matter of law." *See* 19 C.F.R. § 210.18(b). The party moving for summary determination bears the initial burden of establishing that there is an absence of a genuine issue of material fact and that it is entitled to judgment as a matter of law. *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986). Even if the moving party meets this burden, summary determination must be denied where the non-moving party "set[s] forth specific facts showing that there is a genuine issue for trial." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 256 (1986) ("*Anderson*"). Courts must examine all the evidence in the light most favorable to the non-moving party. *Id.* at 255. All "justifiable inferences" are to be drawn in the non-moving party's favor. *Id.*

B. Infringement

Infringement must be proven by a preponderance of the evidence. *See, e.g., Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1310 (Fed. Cir. 2005).

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disputes reflected in its Motion. (Mot. at 2.). MUV reported that DSM said it would oppose the Motion, OFS did not oppose the Motion, and Staff said it would reserve its position until it had an opportunity to review the Motion and supporting papers. (*Id.*).

Determining patent infringement is a two-step process. First, the claims must be construed. Second, the construed claims are compared to the accused product. *See, e.g.*, *Tessera, Inc. v. Int'l Trade Comm'n*, 646 F.3d 1357, 1364 (Fed. Cir. 2011); *Adv. Cardiovascular Sys. v. SciMed Life Sys., Inc.*, 261 F.3d 1329, 1336 (Fed. Cir. 2001). Literal infringement under 35 U.S.C. § 271(a) exists only when each and every element of the claim reads on the accused product. *See, e.g.*, *Abraxis Bioscience, Inc. v. Mayne Pharma (USA) Corp.*, 467 F.3d 1370, 1378 (Fed. Cir. 2006); *Allen Eng'g Corp. v. Bartell Indus.*, 299 F.3d 1336, 1345 (Fed. Cir. 2002); *Amgen, Inc. v. Hoffman-La Roche Ltd.*, 580 F.3d 1340, 1374 (Fed. Cir. 2009).

III. ISSUE AND SELECTED SUMMARY ARGUMENTS

MUV argues that because each asserted claim of U.S. Patent No. 7,067,564 ("the '564 patent") requires "two oligomers," accused coatings [ ] and [ ] cannot literally infringe the '564 patent [ ] (Mot. at 1.). Staff agrees. (Staff Resp. at 2 (citing (Mot. at Exs. G, H)).).

The *Markman* Order, Order No. 17, construed the term "oligomer" (both singular and plural) to mean "molecules composed of repeating structural units, wherein the molecules must include acrylate or methacrylate." (Order No. 17 at 23-24; 35-36 (May 10, 2017).). However, MUV notes that the definition of "oligomers" provided in the *Markman* Order does not resolve the meaning of "at least two oligomers." (Mem. at 5-6.). MUV asserts that Respondents and Staff proposed as part of their *Markman* supplemental briefing that "two oligomers" means "at least two oligomers with **different** repeating structures, which was not addressed in the *Markman* Order. (*Id.* at 5 (emphasis in original).). MUV notes that the chemical compositions of the accused products are not in dispute: merely the meaning of the term "at least two oligomers." (*Id.*).

Moreover, MUV explains that [

]

MUV explains that [

] However,

MUV notes that prior to this Investigation, [

[3] Figure 2, depicted below as Staff's depiction of the GPC plot, is the same as MUV's depiction in its Memorandum at 9.

] So, MUV agrees that while the [

] the claim element requiring "at least one oligomer having a number average molecular weight of about 1000 or higher," because [

] MUV also notes that "none of DSM's experts provided any opinions that [ ] contain 'at least two oligomers' under the construction of the phrase proposed by Staff and MUV." (*Id.* at 11.).[4]

Staff notes that the [

] Staff also notes that based on evidence, the differences [

] Staff notes that [

] Staff provided the [

] as follows:

[4] That may be true, but DSM says its experts did apply the plain and ordinary meaning of "two oligomers." (Opp'n at 5.). Nonetheless, the patent specification dictates meaning; not the experts. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). It appears that DSM's experts may have strayed from the context of the patent specification.

]

Given the information DSM has provided, Staff agrees with MUV that the [

]

Staff also agrees with MUV that it is undisputed that asserted claims 2-4, 9, 11, 12 and 15 of the '564 patent all require a composition that includes: "at least ***two oligomers*** at least one of said oligomers having an average molecular weight that is at least twice the average molecular weight of another of said at least two oligomers, at least one oligomer having a number average molecular weight of about 1000 or higher." (*Id.* at 3 (emphasis in original) (citations omitted).)

Staff notes, and it appears to be unrebutted as a genuine dispute, that during prosecution of the '564 patent, the patent examiner "repeatedly rejected" DSM's application claims based on a prior art reference, U.S. Patent No. 6, 215,934, to Alosio et.al. ("Alosio"). (*Id.* (citing Complaint, App. E-Certified File History USP 7,067,564 ("Patent Prosecution File History"),

Office Actions of Aug. 11, 2003, March 8, 2004, Oct. 25, 2004, and May 9, 2005); *see also* Mem. at 14-20.). After the disallowance of the claims by the patent examiner, DSM finally amended the application regarding claim 2 to incorporate the "two oligomer" subject matter of dependent claim 26, as well as a new application claim 33 (which issued as claim 15 of the '564 patent) with the same "at least two oligomer" limitation. (*Id.* at 4 (citing '564 Patent Prosecution File History, Amendment and Response, Aug. 9, 2005).). As a result of DSM's amendments, the patent examiner allowed the "two oligomer" patent claims. (*Id.* (citing Notice of Allowance, Nov. 22, 2005 (other citations omitted).). Staff contends that DSM is relying "entirely" on the [

] As Staff interprets the referenced [

] but there is no support in the '564 patent specification [

] Alternatively, as MUV expresses the issue: the claim language implies that the difference between two oligomers contained in the '564 patent at 14:5-11 means "more than just the variation in chain length and associated molecular weight of the oligomer molecules." (Mem. at 16; *see generally id.* at 14-20.).

MUV also notes that DSM made representations to the European Patent Office that the '564 patent discloses compositions "contain[ing] only one oligomer" and that "[t]he commercial coating used for example 1 does not contain at least two oligomers with a different molecular weight." (Mem. at 22-23 (citing RXM-0004 at 7:4-9; 8:24-25; SUMF at ¶ 32).).

MUV and Staff agree that the patent specification suggests that if one of the chemicals, that is an oligomer with a defined identity and repeating unit structure, were to be selected from the list DSM submitted that is reproduced as Ex. 1 to MUV's Motion, that would be one

oligomer; and if two of the listed oligomers (that is two (2) chemicals) were to be selected, that would be two oligomers. (*See* Mem. at 17 (citing Staff's Suppl. *Markman* Br. at 6-7, Doc. ID No. 609331 (April 21, 2017)); *see also id.* at 5-8, 9 n.5.).

Staff argued in its Supplemental *Markman* Brief that she did not think there was one definition of "two oligomers" that would resolve the parties' dispute. (*See* Staff Suppl. *Markman* Br. at 9 n.5.). However, Staff also noted in her Supplemental *Markman* Brief that given the history of the '564 patent, (which she describes again in the her Staff Response), that DSM should not be allowed to "read out the two oligomer limitations in claims 2 and 15" of the '564 patent and have those claims cover compositions that, like Alosio, use only one oligomer in combination with reactive monomer diluents. (*Id.* at 9.). Accordingly, the Staff submits that the "at least two oligomers" limitation in claims 2 and 15 of the '564 patent requires "at least two oligomers with different repeating unit structure." (*Id.*). Staff makes the same argument here.

DSM's position is that claim construction is complete, and therefore, the Investigation is at the second stage of claim construction, that is whether the '564 patent's properly construed claims read on [ ] and [ ] which are issues of fact. (Opp'n at 2.). DSM also takes the position that the *Markman* Order deliberately did not construe the term "at least two oligomers." (*Id.* at 6.). DSM contends that while Respondents' expert, Mr. Overton, never applied the court's construction in his infringement opinions, DSM's experts Dr. Bowman and Dr. Sancaktar did, and that creates a dispute. (*Id.* at 5.).

However, DSM appears to equate the definition that MUV originally proposed for "at least two oligomers" to include "of a certain type" to be the same as "different repeating unit structure" and because the *Markman* Order rejected the former, it necessarily rejected the latter. (*Id.* at 7 (citations omitted).). DSM would give the term "at least two oligomers" its plain and

ordinary meaning that does not need more. (*Id.* at 6.). However, other than noting that ultimate conclusions conflict, DSM appears not to address the problem that if its chemical composition in [ ] and [ ] does not contain "at least two oligomers" it (they) does not read on the asserted claims of the '564 patent.

IV. ANALYSIS AND ORDER

DSM contends that summary determination is not possible because there are material disputes of fact with respect to the meaning of the claim term "two oligomers" since that term was not construed during the *Markman* proceedings, even after supplemental briefing was allowed. (Mot. at 1; Mem. at 5-6.). All parties acknowledge that the term "oligomers" in the singular or plural was construed in the *Markman* Order as "molecules composed of repeating structural units, wherein the molecules must include acrylate or methacrylate." (Order No. 17, Appx. A at 23-24, 35-36 (May 10, 2017.).

While it is true that MUV's proposed construction of the term "two oligomers of a certain type" as a modifying phrase to "molecules" was rejected as part of the *Markman* Order, it was rejected because that phrase is extraneous to the specification language, does not describe what "of a certain type" means, and is vague. (Opp'n at 7; *see also* Order No. 17, Appx. A at 25.). That complete explanation may not have been provided in the *Markman* Order, but it is evident that none of the claim language of the '564 patent, which the parties have quoted at length throughout their summary determination briefs, includes the phrase "of a certain type." It is impossible to know how to construe "of a certain type."

Construing the term "at least two oligomers" now as MUV's Motion requests, does not implicate new claim construction that contravenes the *Markman* Order, even though DSM makes a legitimate point. (Opp'n at 7.). However, contrary to DSM's argument, there is nothing

inconsistent in reading the term "two oligomers" in the context of the asserted claims 2-4, 9, 11, 12, and 15 of the '564 patent to require a composition that includes "at least ***two oligomers*** at least one of said oligomers having an average molecular weight that is at least twice the average molecular weight of another of said at least two oligomers, at least one oligomer having a number average molecular weight of about 1000 or higher." (*See* MUV's SUMF at ¶¶ 2, 5 (emphasis added) (citing Complaint, Ex. 3 ('564 patent) at 12:1-10); *see id.* at 14:5-11.). *See also Phillips*, 415 F.3d at 1312-13. Accordingly, the term "at least two oligomers" as construed now means "more than one" and that there must be "different repeating unit structures." (*See e.g.* Mot., Ex. L (WO 99/08975) at 11:6-29; SUMF at ¶ 8; *see also* Mot., Ex. K (WO 98/19189) at 9-20; SUMF at ¶ 11.).

An issue also addressed in MUV's Motion is whether the chemical coatings [ ] and [ ] contain the formulation of a least two oligomers with the different molecular weights described in the specification, and not the meaning *per se* of just the term "two oligomers" by itself.[5] (*See* e.g. SUMF at ¶¶ 27-32, 38-39, 51-53; Mot., Ex. I (Bowman Dep.) at 332:15–333:16.).

As should be evident, if the failure to resolve a claim term that would resolve the dispute occurred (as apparently occurred here), then it is the Court's "duty to resolve it." *02 Micro Int'l Ltd. v. Beyond Innovation Tech Co.,* 521 F.3d 1351, 1362 (Fed. Cir. 2008). It would be a waste

[5] The word "two" or the phrase "at least two," does not need construction, let alone by experts. It has a plain meaning that any person understands, including a person of skill in the art. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). It means more than one. In this instance, the Court disagrees with DSM's argument (although DSM makes a good point) that this is only a matter of repeat "claim construction" at the wrong stage of the proceeding. (*See* Mot. at 1, 6; Opp'n at 6, 9, 11-12, 15-16.). The chemical structure of the composition of the coatings is at issue and apparently could have been resolved earlier during the *Markman* proceedings. Claim construction is a matter of law, supported by underlying facts. (*See* Mem. at 14 n.5 (citing *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831 (2015)).).

of resources and trial time not to construe a term that very likely should have been construed during *Markman* proceedings.

If as Staff, MUV and DSM *all* seem to agree, DSM's own coating specifications "consistently identifies oligomers with more than one repeating unit structure," [

] then there cannot be any genuine disputed facts here; merely extrinsic expert arguments that do not all reflect the intrinsic evidence in the patent specification or patent history. Therefore, the construed claim term, above, should resolve the first dispute. The chemical composition is what it is regardless of how the experts may try to fit it into a definition that may not be applicable in the context of the plain specification language of the '564 patent. (*See* Staff Resp. at 6.).

Therefore, even viewing the facts in a light most favorable to DSM, the matter of infringement of the asserted claims of the '564 patent is ripe for summary determination. *Anderson*, 477 U.S. at 255. (*See also* Mem. at 13 (citing *Athletic Alternatives, Inc. v. Prince Mfg., Inc.*, 73 F.3d 1573, 1578 (Fed. Cir. 1996); *U.S. v. Esnault-Pelterie*, 303 U.S. 26, 30 (1938) ("We are not unmindful of the rule that where, with all the evidence before the court, it appears that no substantial dispute of fact is presented, and that the case may be determined by a mere comparison of structures and extrinsic evidence is not needed for purposes of explanation, or evaluation of prior art, or to resolve questions of the application of descriptions to subject-matter, the questions of invention and infringement may be determined as questions of law.").

Staff notes that DSM and its experts [

] (Staff Resp. at 7; *see also* Mem. at 24-25).

They are trying to make such an argument even though it is [

] The term "two oligomers" cannot be divorced from the patent specification or from the structure of the chemical composition. *See* Aventis *Pharms. Inc. v. Amino Chems. Ltd.*, 715 F.3d 1363, 1375 (Fed. Cir. 2013); *see also Phillips*, 415 F.3d at 1312-13.

The *Tessera* holding requires that the construed claim must be compared against each claim of the patent specification. *Tessera,* 646 F.3d at 1364. Regardless of any other arguments, the chemical composition of [ ] and [ ] cannot literally infringe claims 2-4, 9, 11, 12 and 15 of the '564 patent because they do not contain at least "two oligomers" as required by that patent. "If any claim limitation is absent from the accused device, there is no literal infringement as a matter of law." *Amgen,* 580 F.3d at 1374.

It is equally telling that DSM argued to the European Patent Office that the same chemical formulation DSM now says contains two oligomers was reported or argued as having only one. (Mem. at 22-23 (citing RXM-0004 at 7:4-9, 8:24-25; SUMF at ¶ 32) (other citations omitted).). Accordingly, DSM is precluded under the doctrine of patent prosecution history estoppel from claiming that claims 2-4, 9, 11, 12 and 15 of the '564 patent are infringed by equivalents since DSM is attempting to make a different argument now. *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 741 (2002).

For the reasons explained above, there are no genuine material facts in dispute. Given the construction of "two oligomers" and the analysis provided, and considering all supporting documents and materials the parties provided in a light most favorable to DSM, MUV's Motion that accused coatings [ ] and [ ] do not infringe the asserted claims 2-4, 9, 11,

12 and 15 of U.S. Patent No. 7,067,564, that is Motion Docket No. 031-027, is *granted.*

Within seven (7) days of the date of this document, each party shall submit to the Office of the Administrative Law Judges a statement as to whether or not it seeks to have any portion of this document deleted from the public version. The parties' submissions must be made by hard copy by the aforementioned date. Any party that does not respond will be considered to have waived its rights to redact information.

Any party seeking to have any portion of this document deleted from the public version thereof must submit to this office a copy of this document with red brackets clearly indicating any portion asserted to contain confidential business information by the aforementioned date.

The parties' submission concerning the public version of this document need not be filed with the Commission Secretary.

SO ORDERED.

MaryJoan McNamara
Administrative Law Judge

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME

Inv. No. 337-TA-1031

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served by hand upon the Commission Investigative Attorney, Claire K. Comfort, Esq., and the following parties as indicated, on **November 16, 2017**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME	Inv. No. 337-TA-1031

COMMISSION OPINION

On July 7, 2017, the presiding Administrative Law Judge ("ALJ") in the above-identified investigation issued Corrected Order No. 32, an initial determination ("ID") granting Respondent Momentive UV Coatings (Shanghai) Co., Ltd.'s ("MUV") motion for summary determination that MUV's accused coatings [ ] and [ ] do not infringe the asserted claims of U.S. Patent No. 7,067,564. The ID finds "no genuine material facts in dispute" with respect to the infringement issue. *See* ID at 12-13. Instead, the dispute between the parties centers on the claim construction of the term "*at least two oligomers*," which the ID resolves in favor of MUV. *See id.* For the reasons set forth below, the Commission has determined to review the ID, and on review, to affirm the ID's ultimate conclusions on claim construction and non-infringement but to provide its own analysis and set aside the ID's analysis.

I. BACKGROUND

A. Procedural Background

By publication in the Federal Register on December 5, 2016, the Commission instituted Investigation No. 337-TA-1031, based on a complaint filed by Complainants DSM Desotech, Inc. of Elgin, Illinois and DSM IP Assets B.V. of Herleen, Netherlands (collectively, "DSM" or "Complainants"). *See* 81 *Fed. Reg.* 87588-9 (Dec. 5, 2016). The Complaint alleges violations

of section 337 based upon the importation into the United States, the sale for importation, and the sale within the United States after importation of certain UV curable coatings for optical fibers, coated optical fibers, and products containing same by reason of infringement of claims 1-8, 10-15, and 18-22 of U.S. Patent No. 6,961,508 ("the '508 patent"),[1] claims 1-10 and 13-15 of U.S. Patent No. 7,171,103, claims 2-4, 9, 11, 12, and 15 of U.S. Patent No. 7,067,564 ("the '564 patent"),[2] and claims 1-3, 9, 12, 16-18, 21, and 30 of U.S. Patent No. 7,706,659. *See id.* The notice of investigation identifies two respondents: Momentive UV Coatings (Shanghai) Co., Ltd. of Shanghai, China ("MUV") and OFS Fitel, LLC of Norcross, Georgia ("OFS") (collectively, "Respondents"). *See id.* In addition, the Office of Unfair Import Investigations is a party in this investigation. *See id.*

On May 10, 2017, the ALJ issued Order No. 17, construing certain terms of the asserted claims. In particular, the ALJ construed "oligomer (plural or singular)" as "molecules composed of repeating structural units, wherein the molecules must include acrylate or methacrylate." *See* Order No. 17, App. A at 23-24, 35-36 (May 10, 2017). The ALJ also construed "average molecular weight" as "number average molecular weight." *Id.* at 36-38. The ALJ did not in Order No. 17 construe the term at issue here, namely, "at least two oligomers."

On May 23, 2017, MUV filed a motion for summary determination that its accused coatings [ ] and [ ] do not infringe the asserted claims of the '564 patent (hereinafter,

[1] Claim 10 of the '508 patent was subsequently terminated from the investigation. *See* Order No. 12 (Apr. 13, 2017), *unreviewed*, Comm'n Notice (May 11, 2017).

[2] As used hereinafter, the "asserted claims" for this opinion are claims 2-4, 9, 11, 12, and 15 of the '564 patent.

"MUV's Mot.").[3] Along with its motion, MUV also filed a memorandum in support thereof ("MUV's Mem.") and a statement of undisputed material facts ("SMF"). On June 1, 2017, DSM filed an opposition to MUV's motion ("DSM's Opp'n") and on June 5, 2017, the Commission Investigative Attorney ("IA") filed a response in support of MUV's motion ("IA's Resp.").

On July 7, 2017, the ALJ issued the subject ID (Corrected Order No. 32), granting MUV's motion. On July 13, 2017, DSM filed a petition for review of the subject ID ("DSM's Pet.") and on July 20, 2017, Respondents and the IA filed responses to DSM's Petition (respectively, "Respondents' Pet. Resp." and "IA's Pet. Resp.").[4]

B. Overview of the '564 Patent

The '564 patent, entitled "Coated Optical Fibers," issued on June 27, 2006, from a U.S. Patent Application filed November 21, 2001 with the United States Patent and Trademark Office ("USPTO"). The '564 patent claims priority (as a continuation-in-part) to a U.S. Patent Application filed November 22, 2000 (now abandoned). The '564 patent generally relates to "coated optical fibers comprising soft primary coatings . . . having a sufficient high resistance against cavitation." *See* '564 patent at Abstract. The '564 patent explains that "[t]he primary coating generally will be a radiation curable coating based on (meth)acrylate functional oligomers and radiation-curable monomers with photoinitiator(s) and additives." *See id.* at 11:1-4. The '564 patent further explains that, "[i]n contrast to the normal practice in radiation curable oligomer

[3] MUV's motion was actually filed on May 22, 2017 at 5:36 pm (after the 5:15:59 p.m. deadline for electronic filing) and therefore the effective filing date is the following business day, *i.e.*, May 23, 2017. *See* Handbook on Filing Procedures, *available at* www.usitc.gov/secretary/documents/handbook_on_filing_procedures.pdf. The ALJ granted leave for MUV to file its motion out of time. *See* Order No. 20 (May 23, 2017).

[4] Respondent OFS did not file a response to MUV's motion but joined MUV in its response to DSM's petition.

synthesis wherein the low Mw-fractions[5] are restricted to a minimum or avoided, it is preferred according to the present invention to modify the Mw-distribution by introducing a sufficient amount of a low Mw oligomer or multifunctional monomer to obtain the desired cavitation strength and/or strainhardening." *See id.* at 13:65-14:4.

The asserted claims include independent claims 2 and 15 and claims 3, 4, 9, 11, and 12 which depend (directly or indirectly) from claim 2. Claims 2 and 15 recite:

> **2.** Primary coating composition when cured having an equilibrium modulus of 1.2 MPa or less, a storage modulus at 23° C. (E'_{23}) and a cavitation strength at which a tenth cavitation appears (σ^{10}_{cav}) of at least about 1.0 MPa as measured at a deformation rate of 0.20% min^{-1}, said cavitation strength being at least about 1.4 times said storage modulus at 23° C., wherein said primary coating composition comprises:
>
> (a) 20-98% by wt, relative to the total weight of components (a) through (d), of ***at least two oligomers*** at least one of said oligomers having an average molecular weight that is at least twice the average molecular weight of another of said at least two oligomers, at least one oligomer having a number average molecular weight of about 1000 or higher;
>
> (b) 0-80% by wt, relative to the total weight of components (a) through (d), of one or more reactive diluents;
>
> (c) 0.1-20% by wt, relative to the total weight of components (a) through (d), of one or more photoinitiators for initiation of a radical polymerization reaction; and
>
> (d) optionally, one or more additives selected from the group consisting of amines, antioxidants, UV absorbers, light stabilizers, silane coupling agents, coating surface improvers, heat polymerization inhibitors, leveling agents, surfactants, colorants, preservatives, plasticizers, lubricants, solvents, fillers, aging preventives, and wettability improvers.
>
> **15.** A coated optical fiber comprising a glass optical fiber, a primary coating applied thereon, a secondary coating, and optionally an ink composition subsequently applied thereon, wherein said primary coating is obtained by curing a primary coating composition comprising:

[5] "Mw" in the context of the '564 patent specification refers to "molecular weight."

(a) 20-98% by wt, relative to the total weight of components (a) through (d), of ***at least two oligomers*** at least one of said oligomers having an average molecular weight that is at least twice the average molecular weight of another of said at least two oligomers, at least one oligomer having a number average molecular weight of about 1000 or higher;

(b) 0-80% by wt, relative to the total weight of components (a) through (d), of one or more reactive diluents;

(c) 0.1-20% by wt, relative to the total weight of components (a) through (d), of one or more photoinitiators for initiation of a radical polymerization reaction;

wherein the primary coating has a storage modulus at 23°C. (E'_{23}), has an equilibrium modulus of 1.2 MPa or less, and a cavitation strength at which a tenth cavitation appears (σ^{10}_{cav}) of at least about 1.0 MPa as measured at a deformation rate of 0.20% min^{-1}, said cavitation strength being at least about 1.4 times said storage modulus at 230C[sic].

All the asserted claims include the disputed "***at least two oligomers***" claim term.[6] In that regard, the parties generally agree that an "oligomer" in the context of the '564 patent means "[m]olecules composed of repeating structural units, wherein the molecules must include acrylate or methacrylate groups." *See* Revised Joint Claim Construction List at 5-6 (EDIS Doc. ID No. 609384). However, the parties disagree on the meaning of the claim phrase "***at least two oligomers***." *See id.* at 5-6, 6 n.2; *see also* ID at 3. In particular, the parties dispute whether the term "***at least two oligomers***" must include different repeating unit structures or whether oligomer molecules having the same repeating unit structures but different chain lengths can satisfy the "***at least two oligomers***" limitation. *See* ID at 3; *infra* sections V(B)(1)-(2).

[6] As noted *supra* p. 4, claims 3, 4, 9, 11, and 12 depend from claim 2 and thereby include the "***at least two oligomers***" claim limitation indirectly.

C. Accused Coatings [ ] and [ ]

DSM accused MUV's products [ ] of infringing the asserted claims of the '564 patent.[7] *See* ID at 4. [

]. *See* Respondents' Pet. Resp. at 5; SMF at ¶¶ 38, 39, 44 (undisputed by DSM, *see* DSM's Opp'n, Ex. J). [

]. *See* DSM's Pet. at 6. [

]. *See* SMF at ¶ 50; Respondents' Pet. Resp., Ex. 2, at 4 [

].

[

]

[

[7] [

]. *See* SMF at ¶¶ 38-39 (undisputed by DSM, *see* DSM's Opp'n, Ex. J).

].

See DSM's Pet. at 8, 10 [

]; SMF at ¶¶ 38, 40-42, 47, 48 (undisputed by DSM, *see* DSM's Opp'n, Ex. J).

[

]

In other words, DSM argues that oligomer molecules having the same repeating unit structures can satisfy the "***at least two oligomers***" limitation as long as the oligomer molecules differ in their chain lengths.

II. LEGAL STANDARDS

A. Standard of Review

The Commission may review an ID either upon petition by one of the parties or on its own motion. *See* 19 C.F.R. §§ 210.43, 210.44. Review will be ordered if it appears:

> (i) that a finding or conclusion of material fact is clearly erroneous;
>
> (ii) that a legal conclusion is erroneous, without governing precedent, rule or law, or constitutes an abuse of discretion; or
>
> (iii) that the determination is one affecting Commission policy.

See 19 C.F.R. § 210.43(b)(1), (d)(2).

In addition, the Commission will "order review of an initial determination or certain issues therein when at least one of the participating Commissioners votes for ordering review." *See* 19 C.F.R. § 210.43(d)(3).

B. Summary Determination Standard

Under Commission Rule 210.18, summary determination "shall be rendered if pleadings and any depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a summary determination as a matter of law." 19 C.F.R. § 210.18(b).

"[I]n deciding a motion for summary judgment, 'the evidence of the nonmovant is to be believed, and all justifiable inferences are to be drawn in his favor.'" *Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371, 1377 (Fed. Cir. 2007) (citing *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255 (1986)). "The summary judgment movant [] has the initial responsibility of identifying the legal basis of its motion, and of pointing to those portions of the record that it believes demonstrate the absence of a genuine issue of material fact." *Novartis Corp., v. Ben Venue Labs., Inc.*, 271 F.3d 1043, 1046 (Fed. Cir. 2001) (citing *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986)).[8] "Once the movant has made this showing, the burden shifts to the nonmovant to designate specific facts showing that there is a genuine issue for trial." *Id.* (citation omitted). "'[M]ere denials or conclusory statements are insufficient' to survive summary judgment." *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1337 (Fed. Cir. 2010) (citation omitted).

In addition, "[w]here . . . the parties do not dispute any relevant facts regarding the accused product but disagree over [claim interpretation], the question of literal infringement collapses to

[8] The standards for summary judgment in district courts apply to summary determinations at the U.S. International Trade Commission. *See Amgen Inc. v. Int'l Trade Comm'n*, 565 F.3d 846, 849 (Fed. Cir. 2009) (citing *Hazani v. United States Int'l Trade Comm 'n*, 126 F.3d 1473, 1476 (Fed. Cir. 1997)).

one of claim construction and is thus amenable to summary judgment." *Athletic Alternatives, Inc. v. Prince Mfg., Inc.*, 73 F.3d 1573, 1578 (Fed. Cir. 1996); *see also Howes v. Med. Components, Inc.*, 814 F.2d 638, 643 (Fed. Cir. 1987) ("Claim construction is a question of law and the mere existence of a dispute as to that legal issue does not preclude summary judgment.").

C. Claim Construction

Claim construction is a "matter of law exclusively for the court." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970-71 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996). Claim construction focuses on the intrinsic evidence, which consists of the claims themselves, the specification, and the prosecution history. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (*en banc*). In construing disputed terms, the Court should first look at the claims themselves, for "[i]t is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *See Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)).

In addition, the claims "must be read in view of the specification, of which they are a part." *Id.* at 1315 (quoting *Markman*, 52 F.3d at 979). As the Federal Circuit explained in *Phillips*, the specification "is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). The Federal Circuit concluded that "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Id.* at 1316 (quoting *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)).

In addition to the specification, courts "should also consider the patent's prosecution history, if it is in evidence." *Id.* at 1317 (quoting *Markman*, 52 F.3d at 980). The Federal Circuit explained that the prosecution history which is "part of the intrinsic evidence, consists of the complete record of the proceedings before the [USPTO] and includes the prior art cited during the examination of the patent." *Id.* (citation omitted). The Federal Circuit cautioned that "because the prosecution history represents an ongoing negotiation between the [USPTO] and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Id.* (citation omitted). "Nonetheless, the prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.* (citation omitted).

While extrinsic evidence "can shed useful light on the relevant art," it is "less significant" than the intrinsic record in determining the legally operative meaning of claim language." *See Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)). Importantly, the extrinsic evidence may not be used to contradict the claim language or the patent specification. *See Vitronics*, 90 F.3d at 1584 ("[E]xtrinsic evidence . . . may be used only to help the court come to the proper understanding of the claims; it may not be used to vary or contradict the claim language. Nor may it contradict the import of other parts of the specification.") (citations omitted).

The construction of a claim term is generally guided by its ordinary meaning. However, courts may deviate from the ordinary meaning when: (1) "the intrinsic evidence shows that the patentee distinguished that term from prior art on the basis of a particular embodiment, expressly disclaimed subject matter, or described a particular embodiment as important to the invention"; or

(2) "the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history." *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (Fed. Cir. 2009); *see also Omega Eng'g, Inc., v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) ("[W]here the patentee has unequivocally disavowed a certain meaning to obtain his patent, the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender."); *Rheox, Inc. v. Entact, Inc.*, 276 F.3d 1319, 1325 (Fed. Cir. 2002) ("The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution."). Nevertheless, there is a "heavy presumption that a claim term carries its ordinary and customary meaning." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citations omitted). The standard for deviating from the plain and ordinary meaning is "exacting" and requires "a clear and unmistakable disclaimer." *See Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1366-67 (Fed. Cir. 2012); *see also Epistar Corp. v. Int'l Trade Comm'n*, 566 F.3d 1321, 1334 (Fed. Cir. 2009) (requiring "expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope" to deviate from the ordinary meaning) (citation omitted).

Courts are not required to construe every claim limitation of an asserted patent. *See O2 Micro Intern. Ltd. v. Beyond Innovation Technology Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) (citations omitted); *see also US. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997) (stating that claim construction "is not an obligatory exercise in redundancy."). Rather, "claim construction is a matter of resolution of disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims, for use in the determination of infringement." *O2 Micro*, 521 F.3d at 1362 (quoting *U.S. Surgical*, 103 F.3d at

1568); *see also Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1347 (Fed. Cir. 2000) ("The construction of claims is simply a way of elaborating the normally terse claim language in order to understand and explain, but not to change, the scope of the claims") (citation omitted). In addition, "[a] determination that a claim term 'needs no construction' or has the 'plain and ordinary meaning' may be inadequate when a term has more than one 'ordinary' meaning or when reliance on a term's 'ordinary' meaning does not resolve the parties' dispute." *O2 Micro*, 521 F.3d at 1361.

III. ANALYSIS

The Commission has determined to review the ID, and on review, to affirm the ID's ultimate conclusions with respect to claim construction and non-infringement but to provide its own analysis and set aside the ID's analysis. Specifically, we agree with the ID that the construction of the term "at least two oligomers" means "more than one [oligomer]," with "different repeating unit structures." *See* ID at 10. And we agree with the ID's conclusion that under the adopted claim construction of the term "at least two oligomers," MUV's accused coatings [ ] and [ ] do not infringe the asserted claims of the '564 patent. *See id.* at 12. The Commission's reasoning follows below.

A. Claim Construction

The ID correctly concludes that "at least two oligomers" means "more than one [oligomer]," with "different repeating unit structures." However, as stated above, the Commission has determined to provide its own reasoning and set aside the ID's analysis.

First, the claim language supports the ID's construction and is inconsistent with DSM's proposed construction that "two molecules should be classed as different 'oligomers' either if they have different chain lengths, or if they have different structural repeating units." *See* DSM's Pet.

at 12; *see also Phillips*, 415 F.3d at 1312 ("It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'") (citation omitted). The asserted claims recite "20-98% by wt . . . of ***at least two oligomers*** at least one of said oligomers having an ***average molecular weight*** that is at least twice the ***average molecular weight*** of another of said at least two oligomers, at least one oligomer having a ***number average molecular weight*** of about 1000 or higher." *See supra* section I(B). Specifically, the claim language requires "20-98% by wt . . . of at least two oligomers" and requires each oligomer to have a certain "average molecular weight." This claim language shows that "oligomer" does not refer to a discrete oligomer molecule, as suggested by DSM, but to a number or population of oligomer molecules having a certain average molecular weight. Typically, the molecular weight distribution profile of an oligomer includes a range of different sizes or molecular weights and can include more than one peak for multimodal distribution profiles. *See, e.g.*, '564 patent at 13:55-59; *supra* section I(C) (GPC plot of [ ]); *see also* Respondents' Pet. Resp., Ex. 11, Overton Decl. at ¶ 9 ("[The] 'number average molecular weight' [] is one type of average molecular weight measurement for the mixture of different sized molecules in the oligomer.").

DSM relies on the GPC plot of [ ] and argues that each peak represents a separate oligomer. *See* DSM's Pet. at 8, 10. However, this argument (which relies on extrinsic evidence) cannot be reconciled with the claim language which requires "20-98% by wt . . . of ***at least two oligomers*** . . . , at least one oligomer having a number average molecular weight of about 1000 or higher." Indeed, nowhere does the claim language (or anything in the intrinsic record) refer to individual oligomer molecules or to individual peaks in a molecular weight distribution profile.

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Nor does the claim language recite actual molecular weight or even a peak average molecular weight to lend any credence to DSM's arguments. Rather, the claim language specifically requires "***number*** average molecular weight"; and "average molecular weight" was construed as "***number*** average molecular weight."[9] *See* DSM's Pet. at 7 n.2 ("The parties all agree, and the ALJ ruled in the *Markman* Order, that 'average molecular weight' in the '564 Patent refers to the ***number*** average molecular weight.") (citing Order No. 17) (emphasis added); *see also* Respondents' Pet. Resp., Ex. 11, Overton Decl. at ¶ 9.

The claim language (as well as the entire intrinsic record) also nowhere discloses selecting discrete molecular weight fractions from the molecular weight distribution profile, assigning each fraction to an individual oligomer, and calculating the average molecular weight of that individual fraction/oligomer as DSM suggests. Rather, the evidence shows that the number average molecular weight can be determined in a manner that does not discriminate between individual molecules or fractions of molecules (*i.e.*, the entire sample is considered to calculate the number average molecular weight). *See, e.g.*, Respondents' Pet. Resp., Ex. 6, PCT Publication WO

[9] *See also Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1338 (Fed. Cir. 2015) ("There are three different measures of molecular weight relevant to this appeal: peak average molecular weight (M_p), number average molecular weight (M_n), and weight average molecular weight (M_w). Each measure is calculated in a different manner . . . and in a typical polymer sample, Mp, Mn, and Mw have different values.").

98/33081 at 12:27-30 (describing the number average molecular weight for certain oligomers being determined by vapor pressure osmometry ("VPO"))[10]; *see also* SMF at ¶ 17 ("VPO does not provide a molecular weight distribution.") (undisputed by DSM, *see* DSM's Opp'n, Ex. J); Respondents' Pet. Resp., Ex. 11, Overton Decl. at ¶ 12 ("[A person having ordinary skill in the art] would understand that the claimed oligomer cannot refer to an individual molecule or some fraction of the molecules that make up the claimed oligomer because it is impossible to determine the claimed molecular weight of any individual molecule using th[e] [VPO] method."). On the other hand, there is no evidence anywhere in the intrinsic record to require the use of the GPC[11] technique or to support DSM's assertion that "[t]he number average molecular weight for each peak can be individually extracted from [] GPC plots." *See* DSM's Pet. at 8.

Thus, the Commission finds that the "number average molecular weight" of an oligomer is the average molecular weight measurement for the mixture of different-sized oligomer molecules having the same repeating unit structure. *See* Overton Decl. at ¶ 9; *see also* '564 patent at 12:1-10, 14:5-22, 26:38-44. Accordingly, the Commission agrees with the ID that the plain and ordinary meaning of the term "at least two oligomers," in light of the surrounding claim language further refining each of the claimed oligomers by reference to their "average molecular weight," requires the "at least two oligomers" to have "different repeating unit structures." In other words, the "at least two oligomers" must be distinguished based not on their chain length or molecular weight, but rather on the chemical structure of their repeating units.

The specification also supports the ID's conclusion. For example, the patent specification provides that:

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[10] WO 98/33081 corresponds to EP-A-0894277, which was incorporated in the '564 patent specification at 13:31-39. *See* SMF at ¶ 15 (undisputed by DSM, see DSM's Opp'n, Ex. J).

[11] "GPC" refers to Gel Permeation Chromatography which is a technique used to determine the "distribution of sizes of the oligomer molecules." *See* DSM's Pet., Ex. D, Bowman Decl. at ¶ 42.

> Suitable coating compositions preferably contain one or more of the following constituents: . . . one or more oligomers selected from the group consisting of polyether (urethane) acrylate, polyester (urethane) acrylate, polyether/polycarbonate copolymer based (urethane) acrylate, polyether/polyester copolymer based (urethane) acrylate and the like, of which, an ethylene oxide/butylene oxide based urethane acrylate and a polyether/polycarbonate copolymer based urethane acrylate are preferred.

See '564 Patent at 19:57-20:3. Thus, the specification characterizes oligomers and distinguishes between them based on the chemical structure of their repeating units. *See also id.* at 14:5-7 ("This can be achieved . . . by using at least two oligomers, preferably, oligomer diacrylates, with a different average molecular weight . . . .") (emphasis added); *id.* at 11:29-31 ("Preferably, the oligomer (A) is a urethane (meth)acrylate oligomer."); MUV's Mot., Ex. L, PCT[12] Publication No. WO 99/08975 at 11:6-16 ("The polymer which is the component (A) preferably contains a polyether polyol urethane-based polymer. . . . Examples of [] other polymers meeting the category of the component (A) include polyester polyol urethane-based polymers, polycaprolactone polyol urethane-based polymers, and the like.") (incorporated in the '564 patent at 13:34-39); MUV's Mot., Ex. K, PCT Publication No. WO 98/19189 at 9-20 (describing the oligomer component as a "mercapto-terminated urethane oligomer [] in combination with one or more acrylate- or methacrylate- terminated oligomers") (incorporated in the '564 patent at 13:31-39 via its counterpart EP-A-0895606, *see* SMF at ¶ 10 (undisputed by DSM, *see* DSM's Opp'n, Ex. J)); SMF at ¶ 11 (undisputed by DSM, *see* DSM's Opp'n, Ex. J). Notably, nowhere does the specification teach or suggest that two oligomers (plural) can be distinguished based on their molecular weight alone.

[12] The Patent Cooperation Treaty ("PCT") is an international patent law treaty, providing a unified procedure for filing patent applications in each contracting country.

A review of the prosecution history also contradicts DSM's position and supports the conclusion that the plain and ordinary meaning of "at least two oligomers" requires "more than one oligomer," with "different repeating unit structures." The history of the claim amendments shows that the patentee was unable to overcome the prior art when claim 2 recited "at least one oligomer." *See* Compl., App. E, Amendment and Response filed December 11, 2003 and Office Action mailed March 15, 2004 at 3 (rejecting claim 2 over Aloisio et al. U.S. Patent No. 6,215,934 ("Aloisio"), which discloses urethane acrylate oligomer). Subsequently, DSM overcame the rejections over the Aloisio prior art by amending claim 2 to recite "at least two oligomers." *See* Compl., App. E, Amendment and Response filed August 9, 2005. At no time did the patentee contradict the Examiner or clarify that "at least two oligomers" can include two oligomer molecules having the same repeating unit but different chain lengths (as suggested by DSM, *see, e.g.*, DSM's Pet. at 13). In addition, under such an interpretation, "at least two oligomers" would also be disclosed by Aloisio (*see, e.g.*, MUV's Mot., Ex. N, Aloisio at column 7, Formulation D, which includes "ARU-339[,] a difunctional urethaneacrylate oligomer which is commercially available from the Echo Resins Corp."). Indeed, as admitted by DSM's own expert, "it is common, and well understood by persons of ordinary skill in the art, that the oligomer component [(such as ARU-339)] included in a primary coating composition is described *not* by a single molecular weight, but instead by a molecular weight distribution . . . ." *See* DSM's *Markman* Br. (EDIS Doc. ID No. 607958), Ex. CXM-0002, Declaration of Prof. Erol Sancaktar at ¶ 23; *see also* IA's Pet. Resp. at 3-4; SMF ¶ 43 ("The synthesis of a target oligomer will generally result in a distribution of reactive oligomers.") (citing MUV's Mot., Ex. F, Initial Report of Prof. Christopher N. Bowman ("Bowman"), at 20) (undisputed by DSM, *see* DSM's Opp'n, Ex. J). The back and forth communications between the patentee and the Examiner during prosecution is consistent

with an interpretation that the two oligomers are distinguished based on the chemical structure of their repeating units rather than their chain lengths or molecular weights.

Similarly, during the prosecution of EP1274662 (the European counterpart of the '564 patent, *see* DSM's Pet. at 5, 9, 18; *see also* SMF at ¶ 26 (undisputed by DSM, *see* DSM's Opp'n, Ex. J)), DSM broadly argued that "[t]he commercial coating used for example 1 does not contain at least two oligomers with a different molecular weight." *See* DSM's Pet., Ex. G, EPO Prosecution Excerpt at 3. DSM never qualified its broad argument to the EPO or clarified that under specific circumstances the one oligomer component could satisfy the "at least two oligomers" limitation, *e.g.*, based on individual peaks in a molecular weight distribution profile. *See Gillette Co. v. Energizer Holdings, Inc.*, 405 F.3d 1367, 1374 (Fed. Cir. 2005) (finding an admission before the EPO can support a holding that those skilled in the art would construe the claims of the [asserted] patent to encompass certain embodiments).

Moreover, the bimodality feature disclosed in the '564 patent does not support DSM's position that "at least two oligomers" can mean oligomers with the same repeating unit structure but different molecular weights. Bimodality has nothing to do with the plain meaning of "at least two oligomers" but simply means that "the system network contains chains of at least two different lengths between the junctions of the network." *See* '564 patent at 13:62-64. In addition, nowhere does the specification (or any portion thereof cited in DSM's petition) teach or suggest that bimodality converts an oligomer (singular) into oligomers (plural). Furthermore, the Examiner recognized (and DSM did not deny) that the Aloisio prior art also disclosed a composition with a multi-modal molecular weight distribution. *See* Compl., App. E, Office Action mailed August 13, 2003 at 6 (recognizing that Aloisio teaches a primary coating composition comprising a difunctional crosslinking component (*i.e.*, hexanediol diacrylate) that

introduces bimodality into the composition) (citing Aloisio at column 7 (Formulation D), attached as MUV's Mot., Ex. N); *see also* Amendment and Response filed December 11, 2003 at 10. Notably, hexanediol diacrylate is one of the crosslinking components exemplified in the '564 patent specification as introducing a bimodal distribution into the composition. *See* '564 patent at 15:31-47; *id.* at claims 5 and 6; *see also* DSM's Pet., Ex. D, Bowman Decl. at ¶ 48 ("[B]imodality can arise from a single crosslinking component."). This further underscores that a person of ordinary skill in the art would understand, as the Examiner and DSM did, that the "at least two oligomers" are distinguished based on their repeating unit structures and not on the presence of multi-modal or bimodal features in the molecular weight distribution profile. At a minimum, it is well-settled law that a claim scope cannot encompass embodiments which were distinguished during prosecution. *See Edwards Lifesciences*, 582 F.3d at 1333.

Outside the context of this litigation, in 2013, prior to this investigation, DSM itself recognized that [

]. *See* Respondents' Pet. Resp., Ex. 2, at 4-5 [

] and Figure 6 (reproduced below).[13]

[13] This exhibit (Respondents' Pet. Resp., Ex. 2), produced in this investigation as DSM-ITC00399165-73, is DSM's competitive analysis of [ ]. *See* Respondents' Pet. Resp. at 6-7; SMF at ¶ 49 (undisputed by DSM, see DSM's Opp'n, Ex. J).

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Thus, DSM itself recognized that multi-modality does not convert an oligomer (singular) into oligomers (plural). Rather, consistent with the claim language, the specification, and the prosecution history, an oligomer in the context of the '564 patent is characterized by the chemical structure of its repeating units. Accordingly, the Commission finds that the ID correctly concludes that "at least two oligomers" means "more than one [oligomer,]" with "different repeating unit structures."[14]

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[14] The Commission also notes that it was not inappropriate for the ID to construe the term "at least two oligomers" at the summary determination stage even though the ALJ did not construe that term during the *Markman* proceedings. DSM's argument that "on motion for summary determination, the ALJ should have credited evidence provided by DSM's expert . . . over the extrinsic evidence provided by Respondents" (*see* DSM's Pet. at 17-18) is without merit. DSM was on notice of the IA and MUV's position that the claimed "at least two oligomers" have different repeating unit structures. *See* Respondents' *Markman* Br. at 18 (EDIS Doc. ID No. 607956); *see also* Revised Joint Claim Construction List at 5-6 (EDIS Doc. ID No. 609384); *see also id.* at 6 n.2; *Markman* Tr. at 132:16-23 (EDIS Doc. ID No. 609068). And DSM recognized that "[t]he actual dispute surrounding the construction of th[e] claim term [oligomer(s)] lies in the context of Claims 2 and 15 of the '564 Patent, which call for 'at least two oligomers.'" *See* DSM's *Markman* Br. at 58 (EDIS Doc. ID No. 607958); DSM's Suppl. *Markman* Br. at 2 (EDIS Doc. ID No. 609381); DSM's Pet., Ex. D, Bowman Decl. at ¶ 39. Therefore, DSM had ample opportunity to respond to the IA and MUV's position with respect to the "at least two oligomers" claim term. *See, e.g.*, DSM's Pet., Ex. D, Bowman Decl. at ¶¶ 39-49. Thus, the ID properly resolves the claim construction dispute with respect to the term "at least two oligomers" at this juncture, in the context of MUV's motion for summary determination of non-infringement. *See Athletic Alternatives*, 73 F.3d at 1578 ("Where . . . the parties do not dispute any relevant facts regarding the accused product but disagree over [claim interpretation], the question of literal infringement collapses to one of claim construction and is thus amenable to summary judgment."); *Howes*, 814 F.2d at 643 ("Claim construction is a question of law and the mere existence of a dispute as to that legal issue does not preclude summary judgment.").

B. Infringement

As discussed *supra* section I(C), DSM does not dispute the composition or chemical structure of the accused [ ]. And DSM does not dispute that its infringement theory fails under the ID's claim construction.

Rather, DSM disputes whether [ ] should be considered a single oligomer or "***at least two oligomers***" [ ]. *See* DSM's Pet. at 8, 10; SMF at ¶¶ 38, 40-42, 47, 48 (undisputed by DSM, *see* DSM's Opp'n, Ex. J). In such context, "[w]here . . . the parties do not dispute any relevant facts regarding the accused product but disagree over [claim interpretation], the question of literal infringement collapses to one of claim construction and is thus amenable to summary judgment." *Athletic Alternatives*, 73 F.3d at 1578.

Having found that the term "at least two oligomers" means "more than one oligomer, with different repeating unit structures," we also agree with the ID that the accused coatings [ ] and [ ] with [ ] oligomer do not literally infringe the asserted claims of the '564 patent.[15] Indeed, DSM failed to identify more than one oligomer with different repeating unit structures in the [ ] and [ ] accused coatings.

Accordingly, the Commission agrees with the ID's conclusion that under a construction of the term "at least two oligomers" as "more than one [oligomer]" with "different repeating unit structures," MUV's accused coatings [ ] and [ ] do not infringe the asserted claims of the '564 patent.

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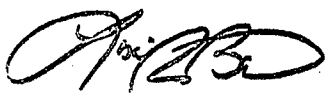
[15] DSM does not and cannot assert infringement under the doctrine of equivalents. *See* DSM's Pet. at 18; *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 736 (2002) ("[Prosecution history] [e]stoppel arises when an amendment is made to secure the patent and the amendment narrows the patent's scope").

IV. CONCLUSION

For the foregoing reasons, the Commission has determined to review the ID, and on review, to affirm the ID's ultimate conclusions on claim construction and non-infringement but to set aside the ID's analysis. The Commission provides its own reasoning as explained above.

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: August 16, 2017

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME

Inv. No. 337-TA-1031

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **COMMISSION OPINION** has been served by hand upon the Commission Investigative Staff, Claire K. Comfort, Esq., and the following parties, as indicated, on **August 16, 2017**.

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME	Inv. No. 337-TA-1031

COMMISSION OPINION

On July 6, 2017, the presiding Administrative Law Judge ("ALJ") in the above-identified investigation issued Order No. 33, an initial determination ("ID") granting Respondent Momentive UV Coatings (Shanghai) Co., Ltd.'s motion for summary determination that claims 16-18, 21, and 30 of U.S. Patent No. 7,706,659 ("the '659 patent")[1] are invalid for indefiniteness under 35 U.S.C. § 112, ¶ 2. The ID finds "no genuine disputes of material fact" that the term "molecular weight" is indefinite. *See* Order No. 33 at 1, 2, and 9. For the reasons set forth below, the Commission has determined to review the ID and on review, to reverse and vacate the ID.

I. BACKGROUND

A. Procedural Background

By publication in the Federal Register on December 5, 2016, the Commission instituted Investigation No. 337-TA-1031, based on a complaint filed by Complainants DSM Desotech, Inc. of Elgin, Illinois and DSM IP Assets B.V. of Herleen, Netherlands (collectively, "DSM" or "Complainants"). *See* 81 *Fed. Reg.* 87588-9 (Dec. 5, 2016). The Complaint alleges violations of section 337 based upon the importation into the United States, the sale for importation, and the

[1] The ID, at pages 1 and 9, mistakenly refers to U.S. Patent No. 7,076,659 instead of U.S. Patent No. 7,706,659.

sale within the United States after importation of certain UV curable coatings for optical fibers, coated optical fibers, and products containing same by reason of infringement of claims 1-8, 10-15, and 18-22 of U.S. Patent No. 6,961,508 ("the '508 patent"),[2] claims 1-10 and 13-15 of U.S. Patent No. 7,171,103, claims 2-4, 9, 11, 12, and 15 of U.S. Patent No. 7,067,564 ("the '564 patent"), and claims 1-3, 9, 12, 16-18, 21, and 30 of U.S. Patent No. 7,706,659 ("the '659 patent").[3] *See id.* The notice of investigation identifies two respondents: Momentive UV Coatings (Shanghai) Co., Ltd. of Shanghai, China ("MUV") and OFS Fitel, LLC of Norcross, Georgia ("OFS"). *See id.* In addition, the Office of Unfair Import Investigations is a party in this investigation. *See id.*

On May 10, 2017, the ALJ issued Order No. 17 construing certain terms of the asserted claims. In particular, the ALJ construed "molecular weight" as "the sum of the atomic weights of the atoms in the molecule." *See* Order No. 17, App. A at 38-39 (May 10, 2017). The ALJ also found that "[w]hether the scope of any claim containing this limitation is indefinite is left to be determined after all necessary evidence has been developed and submitted." *Id.* at 39.

On May 22, 2017, MUV filed a motion for summary determination that claims 16-18, 21, and 30 of the '659 patent are invalid for indefiniteness under 35 U.S.C. § 112, ¶ 2 (hereinafter, "MUV's Mot."). Along with its motion, MUV also filed a memorandum in support thereof ("MUV's Mem.") and a statement of undisputed material facts ("SMF"). On June 1, 2017, DSM filed an opposition to MUV's motion ("DSM's Opp'n") and on June 5, 2017, the Commission Investigative Attorney ("IA") filed a response in support of MUV's motion ("IA's Resp.").

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[2] Claim 10 of the '508 patent was subsequently terminated from the investigation. *See* Order No. 12 (Apr. 13, 2017), *unreviewed*, Comm'n Notice (May 11, 2017).

[3] Claims 1-3, 9, and 12 of the '659 patent are not the subject of Order No. 33 or MUV's motion. The "relevant claims" herein are claims 16-18, 21, and 30 of the '659 patent.

On July 6, 2017, the ALJ issued the subject ID (Order No. 33) granting MUV's motion. On July 14, 2017, DSM filed a petition for review of the subject ID ("DSM's Pet.") and on July 21, 2017, Respondents filed a response to DSM's Petition ("Respondents' Pet. Resp.").[4] On July 24, 2017, the IA also filed a response to DSM's Petition ("IA's Pet. Resp.").[5]

B. Overview of the '659 Patent

The '659 patent, entitled "Coated Optical Fibers," issued on April 27, 2010, from a U.S. Patent Application filed November 9, 2005 with the United States Patent and Trademark Office ("USPTO"). The '659 patent claims priority (as a continuation) to the '564 patent and (as a continuation-in-part) to a U.S. Patent Application filed November 22, 2000 (now abandoned). The '659 patent generally relates to "coated optical fibers comprising soft primary coatings . . . having a sufficient high resistance against cavitation." *See* '659 patent at Abstract. The '659 patent explains that "[t]he primary coating generally will be a radiation curable coating based on (meth)acrylate functional oligomers and radiation-curable monomers with photoinitiator(s) and additives." *See id.* at 10:61-64. The '659 patent further explains that, "[i]n contrast to the normal practice in radiation curable oligomer synthesis wherein the low Mw-fractions[6] are restricted to a minimum or avoided, it is preferred according to the present invention to modify the Mw-distribution by introducing a sufficient amount of a low Mw oligomer or multifunctional monomer to obtain the desired cavitation strength and/or strainhardening." *See id.* at 13:57-63.

[4] Respondent OFS did not file a response to MUV's motion but joined MUV in its response to DSM's petition.

[5] On July 19, the Chairman granted the IA's request for a one-day extension of time to file a response to DSM's petition. *See* Secretary's Letter dated July 19, 2017 (EDIS Doc. ID No. 617588).

[6] "Mw" in the context of the '659 patent specification refers to "molecular weight."

Respondents allege that the term "molecular weight" in claims 16-18, 21, and 30 (the relevant claims) of the '659 patent is indefinite. *See* MUV's Mem. at 2. Claims 16 and 30 of the '659 patent are independent and claims 17, 18, and 21 depend from claim 16. Claims 16 and 30 recite:

> **16.** Primary coating composition when cured having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less, a storage modulus at 23° C. (E'_{23}) and a cavitation strength at which a tenth cavitation appears (σ^{10}_{cav}) of at least about 1.0 MPa as measured at a deformation rate of 0.20 min^{-1}, said cavitation strength being at least about 1.4 times said storage modulus at 23° C., wherein said primary coating composition comprises:
>
> (a) 20-98% by wt. of at least one oligomer having ***a molecular weight*** of about 1000 or higher;
>
> (b) 0-80% by wt. of one or more reactive diluents;
>
> (c) 0.1-20% by wt. of one or more photoinitiators; and
>
> (d) 0-5% by wt. of additives.
>
> **30.** Primary coating having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less and a calculated volumetric thermal expansion coefficient α_{23} of $6.85x10^{-4}$ K^{-1} or less, wherein said primary coating is obtained by curing a composition comprising:
>
> (a) 20-98% by wt. of at least one oligomer having ***a molecular weight*** of 1000 or higher;
>
> (b) 0-80% by wt. of one or more reactive diluents;
>
> (c) 0.1-20% by wt. of one or more photoinitiators; and
>
> (d) 0-5% by wt. of additives.

Each of claims 16-18, 21, and 30 requires "at least one oligomer having ***a molecular weight*** of about 1000 or higher."[7] DSM and the IA argued, and the ALJ agreed, that the term "molecular weight" should be construed as "the sum of the atomic weights of the atoms in a

[7] Claims 17, 18, and 21 depend from claim 16 and thereby include the "molecular weight" claim limitation indirectly.

molecule." *See* Order No. 17, App. A at 38-39. However, the ID agrees with MUV and the IA that the term "molecular weight" is indefinite. *See* ID at 9. The ID reasons that "[t]he definition of 'molecular weight' in the *Markman* Order does not resolve the meaning of 'average molecular weight' or 'number average molecular weight' or whether any of those terms refers to one oligomer or to a distribution of oligomers." *See id.* at 8. In its petition for review, DSM states that the adopted construction refers to actual molecular weight and as such, it is not indefinite. *See, e.g.*, DSM's Pet. at 4-6. The IA and MUV disagree and argue that the claims are indefinite because it is unclear as to whether "molecular weight" refers to an average molecular weight, a theoretical molecular weight, or an actual molecular weight. *See* Respondents' Pet. Resp. at 1; IA's Pet. Resp. at 7.

II. LEGAL STANDARDS

A. Standard of Review

The Commission may review an ID either upon petition by one of the parties or on its own motion. *See* 19 C.F.R. §§ 210.43, 210.44. Review will be ordered if it appears:

> (i) that a finding or conclusion of material fact is clearly erroneous;
>
> (ii) that a legal conclusion is erroneous, without governing precedent, rule or law, or constitutes an abuse of discretion; or
>
> (iii) that the determination is one affecting Commission policy.

See 19 C.F.R. § 210.43(b)(1), (d)(2).

In addition, the Commission will "order review of an initial determination or certain issues therein when at least one of the participating Commissioners votes for ordering review." *See* 19 C.F.R. § 210.43(d)(3).

B. Summary Determination Standard

Under Commission Rule 210.18, summary determination "shall be rendered if pleadings and any depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a summary determination as a matter of law." 19 C.F.R. § 210.18(b).

"[I]n deciding a motion for summary judgment, 'the evidence of the nonmovant is to be believed, and all justifiable inferences are to be drawn in his favor.'" *Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371, 1377 (Fed. Cir. 2007) (citing *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255 (1986)). "The summary judgment movant [] has the initial responsibility of identifying the legal basis of its motion, and of pointing to those portions of the record that it believes demonstrate the absence of a genuine issue of material fact." *Novartis Corp., v. Ben Venue Labs., Inc.*, 271 F.3d 1043, 1046 (Fed. Cir. 2001) (citing *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986)).[8] "Once the movant has made this showing, the burden shifts to the nonmovant to designate specific facts showing that there is a genuine issue for trial." *Id.* (citation omitted). "'[M]ere denials or conclusory statements are insufficient' to survive summary judgment." *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1337 (Fed. Cir. 2010) (citation omitted).

C. Claim Construction

Claim construction is a "matter of law exclusively for the court." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970-71 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996).

Claim construction focuses on the intrinsic evidence, which consists of the claims themselves, the specification, and the prosecution history. *See Phillips v. AWH Corp.*, 415 F.3d

[8] The standards for summary judgment in district courts apply to summary determinations before the Commission. *See Amgen Inc. v. Int'l Trade Comm'n*, 565 F.3d 846, 849 (Fed. Cir. 2009) (citing *Hazani v. United States Int'l Trade Comm'n*, 126 F.3d 1473, 1476 (Fed. Cir. 1997)).

1303, 1314 (Fed. Cir. 2005) (*en banc*). In construing disputed terms, the Court should first look at the claims themselves, for "[i]t is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *See Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)).

In addition, the claims "must be read in view of the specification, of which they are a part." *Id.* at 1315 (quoting *Markman*, 52 F.3d at 979). As the Federal Circuit explained in *Phillips*, the specification "is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). The Federal Circuit concluded that "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Id.* at 1316 (quoting *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998)).

In addition to the specification, courts "should also consider the patent's prosecution history, if it is in evidence." *Id.* at 1317 (quoting *Markman*, 52 F.3d at 980). The Federal Circuit explained that the prosecution history which is "part of the intrinsic evidence, consists of the complete record of the proceedings before the [USPTO] and includes the prior art cited during the examination of the patent." *Id.* (citation omitted). The Federal Circuit cautioned that "because the prosecution history represents an ongoing negotiation between the [USPTO] and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Id.* (citation omitted). "Nonetheless, the prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of

prosecution, making the claim scope narrower than it would otherwise be." *Id.* (citation omitted).

While extrinsic evidence "can shed useful light on the relevant art," it is "less significant than the intrinsic record in determining the legally operative meaning of claim language." *See Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)). Importantly, the extrinsic evidence may not be used to contradict the claim language or the patent specification. *See Vitronics*, 90 F.3d at 1584 ("[E]xtrinsic evidence . . . may be used only to help the court come to the proper understanding of the claims; it may not be used to vary or contradict the claim language. Nor may it contradict the import of other parts of the specification.") (citations omitted).

The construction of a claim term is generally guided by its ordinary meaning. However, courts may deviate from the ordinary meaning when: (1) "the intrinsic evidence shows that the patentee distinguished that term from prior art on the basis of a particular embodiment, expressly disclaimed subject matter, or described a particular embodiment as important to the invention"; or (2) "the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history." *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (Fed. Cir. 2009); *see also Omega Eng'g, Inc., v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) ("[W]here the patentee has unequivocally disavowed a certain meaning to obtain his patent, the doctrine of prosecution disclaimer attaches and narrows the ordinary meaning of the claim congruent with the scope of the surrender."); *Rheox, Inc. v. Entact, Inc.*, 276 F.3d 1319, 1325 (Fed. Cir. 2002) ("The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution."). Nevertheless, there is a "heavy presumption that a claim term carries its ordinary and customary meaning." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (citations

omitted). The standard for deviating from the plain and ordinary meaning is "exacting" and requires "a clear and unmistakable disclaimer." *See Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1366-67 (Fed. Cir. 2012); *see also Epistar Corp. v. Int'l Trade Comm'n*, 566 F.3d 1321, 1334 (Fed. Cir. 2009) (requiring "expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope" to deviate from the ordinary meaning) (citation omitted).

D. Indefiniteness

Statutory definiteness requires that the patent "specification [] conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." *See* 35 U.S.C. § 112, ¶ 2.[9] "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. --, 134 S. Ct. 2120, 2124 (2014).

III. ANALYSIS

The Commission has determined that the ID errs by applying the common dictionary definition of "molecular weight." The record evidence demonstrates that "molecular weight" and "average molecular weight" are used interchangeably in the context of the '659 patent specification and that a person having ordinary skill in the art would understand "molecular weight," in the context of an oligomer component of the claimed primary coating composition, to mean "average molecular weight." In addition, because the '659 patent discloses one method of measuring average molecular weight only, namely "number average molecular weight," the

[9] The effective date of the '659 patent pre-dates the America Invents Act ("AIA") enacted by Congress on September 16, 2011. Thus, the pre-AIA version of the cited statute applies to the asserted patents.

Commission has determined to construe the claim term "molecular weight" as "number average molecular weight." Based on its construction, the Commission has further determined that the term "molecular weight" is not indefinite. Accordingly, the Commission has determined to review the ID, and on review, to reverse and vacate the ID.

A. Claim Construction

The Commission finds that the ID errs by applying the common dictionary definition of "molecular weight," as adopted in the *Markman* Order dated May 10, 2017. *See* Order No. 17, App. A at 38-39 ("Complainants' and Staff's construction which reflect a common dictionary definition (including chemical dictionary definitions), is adopted here."). While the common dictionary definition ("the sum of the atomic weights of the atoms in the molecule") may be proper in other contexts (*e.g.*, a discrete oligomer molecule, small molecules), it is inconsistent with the '659 patent's claim language, the specification, and the extrinsic evidence. Indeed, the intrinsic evidence, supported by relevant extrinsic evidence, shows that the claimed oligomer is a component or ingredient in the primary coating composition and that the oligomer exists in a range or distribution of molecular weights. The record evidence (as discussed more fully below) also demonstrates that "molecular weight" and "average molecular weight" are used interchangeably in the context of the '659 patent, and that a person of ordinary skill in the art would understand, with reasonable certainty, that "molecular weight," in the context of an oligomer component of the claimed primary coating composition, means "number average molecular weight."[10]

[10] The *Markman* "Order adopts the definition of a [person of ordinary skill in the art] that Complainants[] and Staff have agreed upon," *i.e.*, "[a] person of ordinary skill in the art would have at least a B.S. in Chemistry, Chemical Engineering, Materials Science or a related field, approximately three to five years of postgraduate experience, including some experience in one or more of photopolymerization reactions, molecular synthesis, polymer characterization, polymer chemistry, and optical fibers." *See* Order No. 17 at 13, 15.

First, the claim language is inconsistent with the ID's "common dictionary definition" construction ("the sum of the atomic weights of the atoms in the molecule") and with DSM's position that the term molecular weight means actual molecular weight. *See Phillips*, 415 F.3d at 1312 ("It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'") (citation omitted). The relevant claims recite a "[primary coating] composition compris[ing]:

> (a) ***20-98% by wt. of at least one oligomer having a molecular weight of about 1000 or higher***;
>
> (b) 0-80% by wt. of one or more reactive diluents;
>
> (c) 0.1-20% by wt. of one or more photoinitiators; and
>
> (d) 0-5% by wt. of additives."

Based on the claim language as well as the intrinsic and extrinsic evidence, it is evident that the claimed "at least one oligomer" does not refer to a single discrete oligomer molecule, but to an oligomer ingredient or component of the claimed primary coating composition (along with other ingredients including reactive diluents, photoinitiators, and/or additives), *i.e.*, a mixture or population of oligomer molecules. *Accord* Comm'n Op. at 13 (reviewing ID on summary determination of non-infringement) (Aug. 4, 2017). Thus, in the context of the relevant claims, "molecular weight" cannot refer to "actual molecular weight," as suggested by DSM, but instead refers to an average molecular weight which is how oligomer components of primary coatings are characterized by those skilled in the art. *See, e.g.*, MUV's Mot., Ex. A, Nairn Decl. at ¶ 19 ("A person of ordinary skill in the art would understand, based on the plain language of the claims, that the claimed oligomer refers to a distribution of molecules and that the molecular weight is an average molecular weight."); DSM's Pet., Ex. E, Sancaktar Decl. at ¶ 23 ("[E]ach oligomer molecule in a sample of oligomer may be made up of a different number of repeating structural

units. Naturally then, each oligomer molecule may have a different number of atoms within it, and therefore a different molecular weight. Accordingly, it is common, and well understood by persons of ordinary skill in the art, that the oligomer component included in a primary coating composition is described not by a single molecular weight, but instead by a molecular weight distribution . . . ."); Comm'n Op. at 17 (reviewing ID on summary determination of non-infringement) (Aug. 4, 2017) ("The synthesis of a target oligomer will generally result in a distribution of reactive oligomers.") (citing Initial Report of Prof. Christopher N. Bowman); *see also Teva Pharm. USA, Inc. v. Sandoz Inc.*, 789 F.3d 1335, 1338, 1341 (Fed. Cir. 2015) ("*Teva*") (although the patent claims recite "molecular weight" of a polymer component, the court noted that the parties agree it means "average molecular weight"). In the context of the claimed oligomer component or ingredient of the primary coating composition, "molecular weight" necessarily refers to an average molecular weight because the oligomer component exists in a range of individual oligomer molecules, having different chain lengths and corresponding actual molecular weights. And while "actual molecular weight" can properly refer to the molecular weight of an individual oligomer molecule, this term is inadequate to characterize an oligomer component.

This interpretation is consistent with the '659 patent specification, which uses "molecular weight" and "average molecular weight" interchangeably. For example, the specification explains that "[p]referably, the oligomer is a urethane (meth)acrylate oligomer" (*see* '659 patent at 11:23-24) and that "[p]referred oligomers are polyether based acrylate oligomers, polycarbonate acrylate oligomers, polyester acrylate oligomers, alkyd acrylate oligomers and acrylated acrylic oligomers" (*see id.* at 12:12-15). The specification further explains that:

> The ***number average molecular weight*** of the urethane (meth)acrylate used in the composition of the present invention is

> preferably in the range from about 1,200 to about 20,000, and more preferably from about 2,200 to about 10,000. If the ***number average molecular weight of the urethane (meth)acrylate is less than about 1000, the resin composition tends to vitrify at room temperature***; on the other hand, ***if the number average molecular weight is larger than about 20,000, the viscosity of the composition becomes high, making handling of the composition difficult.***

See id. at 11:62-12:4 (emphasis added). The specification also states that:

> The at least one oligomer preferably has a ***molecular weight of about 4000 or more***, more in particular of about 5000 or more. Generally, ***in view of viscosity requirements, the molecular weight is about 20,000 or less***, preferably about 15,000 or less, more preferably about 10,000 or less. Any oligomer can be used, but wholly aliphatic polyether urethane oligomers are preferred. Also, polyether/polyester and polyether/polycarbonate combined urethane acrylate oligomers are preferred.[11]

See id. at 15:38-46 (emphasis added); *see also id.* at 28:44-57 (claim 16) ("20-98% by wt. of at least one oligomer having a ***molecular weight of about 1000 or higher***") (emphasis added); *id.* 20:41-43 ("Coatings D to F each contain as the oligomer, an aliphatic polyether-polycarbonate based urethane acrylate oligomer having an ***average Mw of 4000*** . . . .") (emphasis added); claim 2 of the '564 patent (which recites "number average molecular weight of about 1000 or higher," and, as recognized by DSM, "otherwise parallels the '564 Patent's limitation," *see* DSM's Pet. at 2).[12] Thus, the references to the same lower (1,000) and upper (20,000) boundaries below which "the resin composition tends to vitrify at room temperature" and "above which the viscosity of the composition becomes high, making handling of the composition difficult," in the context of both "molecular weight" and "average molecular weight," shows that the specification uses "molecular

[11] For instance, in Example 3, "[a] primary coating composition was formulated using 38.8 wt% of an aliphatic polyether-polycarbonate based urethane acrylate oligomer having an average Mw of 4000 . . . ." *See* '659 patent at 26:26-28 (Example 3).

[12] DSM contrasts the '564 patent claims which "expressly refer[] to '*number average* molecular weight," *see* DSM's Pet. at 2 (emphasis in original), but claim differentiation is "a rule of thumb that does not trump the clear import of the specification." *See Eon-Net LP v. Flagstar Bancorp*, 653 F.3d 1314, 1323 (Fed. Cir. 2011).

weight" and "average molecular weight" interchangeably. And this interchangeable use of "molecular weight" and "average molecular weight" is also consistent with the understanding of persons having ordinary skill in this art. *See, e.g.*, MUV's Mot., Ex. A, Nairn Decl. at ¶ 19 ("A person of ordinary skill in the art would understand, based on the plain language of the claims, that the claimed oligomer refers to a distribution of molecules and that the molecular weight is an average molecular weight."); *Teva*, 789 F.3d at 1338, 1341 (although the patent claims recite "molecular weight" of a polymer component, the court noted that the parties agree it means "average molecular weight"); *Edwards*, 582 F.3d at 1329 ("The interchangeable use of the two terms is akin to a definition equating the two.").

DSM's argument that "molecular weight" refers to a "molecular weight fraction" is not supported by the intrinsic evidence. First, the claims require a "molecular weight" not a "molecular weight fraction." In fact, the only portion of the specification that refers to a molecular weight fraction (which DSM cites) is inconsistent with DSM's position. *See* '659 Patent at 13:57-63 ("In contrast to the normal practice in radiation curable oligomer synthesis wherein the low Mw-fractions are restricted to a minimum or avoided, it is preferred according to the present invention to modify the Mw-distribution by introducing a sufficient amount of a low Mw oligomer or multifunctional monomer to obtain the desired cavitation strength and/or strain hardening."). Indeed, the specification shows that the patentee merely distinguished the practice of avoiding "low Mw-fractions" and explained that the invention actually shows that "a sufficient amount of a low Mw oligomer" improves cavitation strength and/or strain hardening. *See id.* at 13:57-63. Here, "a low Mw oligomer" logically refers to an oligomer component having "low *average* molecular weight" because "a low *actual* molecular weight oligomer" does not make sense in the context of a mixture or population of oligomer molecules. Moreover, nowhere does

the specification, or any of the disclosed embodiments, support characterizing or selecting the molecular weight of an oligomer based on a fraction of the molecular weight distribution. *See, e.g.*, SMF at ¶ 19; *see also SanDisk Corp. v. Memorex Prods., Inc.*, 415 F.3d 1278, 1285 (Fed. Cir. 2005) ("A claim construction that excludes a preferred embodiment, moreover, 'is rarely, if ever, correct.'") (citation omitted). Instead, "[e]ach of the oligomer molecular weight values described in the 'Examples' of the '659 patent is an 'average Mw' (average molecular weight) or 'theoretical molecular weight.'" *See* SMF at ¶ 19 (citing '659 patent at 25:40 (Comparative Experiment A), 26:13 (Example 2), 26:28 (Example 3), 26:42 (Comparative Experiment C)); *see also Phillips*, 415 F.3d at 1316 ("The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction.") (quotation omitted). In addition, European patent application EP-A-0894277, which is incorporated in the '659 patent specification at 13:24-32, teaches measuring the number average molecular weight of oligomers by vapor pressure osmometry ("VPO"), *i.e.*, in a manner that does not discriminate between individual molecules or fractions of molecules (*i.e.*, the entire sample is considered to calculate the number average molecular weight). *See* Comm'n Op. at 14-15, 15 n.10 (reviewing ID on summary determination of non-infringement) (Aug. 4, 2017).[13]

The two references to "theoretical molecular weight" in the '659 specification (*see* '659 patent at 25:39-40 ("A coating was prepared using 0.50 wt % of a polyether urethane acrylate (theoretical molecular weight≈9000) . . . .") (Comparative Experiment A), 26:40-41 ("A coating was prepared using 60 wt % of a polyether urethane acrylate (theoretical molecular weight≈4000 . . . .)" (Comparative Experiment C)) do not diminish our analysis (or render the claims indefinite as

[13] The discussion of the VPO technique in EP-A-0894277 (incorporated in the '659 patent specification at 13:24-32) also contradicts DSM's assertion (based on extrinsic evidence) that Gel Permeation Chromatography ("GPC") is required to determine the claimed molecular weight of the claimed oligomer component. *See* DSM's Pet. at 3-4.

Respondents and the IA contend) because the relevant claims do not recite "theoretical molecular weight," but "molecular weight." In fact, those references further support our conclusion that "molecular weight" means "average molecular weight" in the context of the '659 patent claims and specification, and further contradict DSM's position that "molecular weight" refers to "actual molecular weight" or to a "molecular weight fraction." Indeed, a "theoretical molecular weight" of about 4000 or 9000 in the context of an oligomer refers to a "theoretical *average* molecular weight," rather than a "theoretical *actual* molecular weight," given the nature of the oligomer component which includes a distribution of molecules with different chain lengths. *See, e.g.*, DSM's Pet., Ex. E, Sancaktar Decl. at ¶ 23 ("[I]t is common, and well understood by persons of ordinary skill in the art, that the oligomer component included in a primary coating composition is described not by a single molecular weight, but instead by a molecular weight distribution . . . ."); *compare* '659 patent at 26:9-10 ("A coating was formulated using 69.7 wt% of a polyether urethane acrylate oligomer having a polyether backbone comprising on average two blocks polypropylene glycol having an average Mw of about 4000 . . . .") (Example 2).

In sum, "average molecular weight" is "[t]he construction [of 'molecular weight'] that stays true to the claim language and most naturally aligns with the patent's description of the invention." *See Phillips*, 415 F.3d at 1316 (quotation omitted). On the other hand, the common dictionary definition of "molecular weight" adopted by the ALJ, which corresponds to "actual molecular weight" (*see* DSM's Pet. at 4), is inconsistent with the intrinsic evidence and may even lead to inoperable embodiments. *See AIA Eng'g Ltd. v. Magotteaux Int'l S/A*, 657 F.3d 1264, 1278 (Fed. Cir. 2011) ("[A] construction that renders the claimed invention inoperable should be viewed with extreme skepticism."). For example, according to DSM, a primary coating composition comprising 20% by wt. of an oligomer fraction having an actual molecular weight of

about 1000 or higher would satisfy the "20-98% by wt. of at least one oligomer having a molecular weight of about 1000 or higher" limitation. *See* DSM's Pet. at 3. However, in that case, the average molecular weight of the oligomer component in the primary coating composition may still be below 1000 if a larger fraction of the oligomer component has an actual molecular weight of less than 1000. Consequently, the primary coating composition may be inoperable as it would tend to "vitrify at room temperature." *See* '659 patent at 11:66-12:1 ("If the number average molecular weight of the urethane (meth)acrylate is less than about 1000, the resin composition tends to vitrify at room temperature . . . .").

Thus, a person having ordinary skill in the art would understand, based on the language of the claims and in the context of the '659 patent specification, with reasonable certainty, that the plain meaning of "molecular weight" is "average molecular weight." In addition, "average molecular weight" was construed as "number average molecular weight" in the parent '564 patent and no other method of measuring average molecular weight is described or identified in the '659 and '564 patents.[14] *See Cloud Farm Assoc. LP v. Volkswagen Grp. of Am., Inc.*, 674 Fed. Appx. 1000, 1006 (Fed. Cir. 2017) ("The same term should be construed consistently throughout the same patent and any related patents sharing a common specification.") (citing *CVI/Beta Ventures, Inc. v. Tura LP*, 112 F.3d 1146, 1159 (Fed. Cir. 1997)); *see also* DSM's Opp'n, Ex. D, DSM's Resp. to SMF at ¶ 5 ("MUV conceded during the *Markman* proceedings that all references to "average molecular weight" mean "number average molecular weight.") (citing Respondents' *Markman* Br. at 30). Accordingly, the Commission has determined to construe the claim term "molecular weight" as "number average molecular weight."

[14] "Theoretical molecular weight" is distinct from a "measured value" as recognized by Respondents' expert, *see* MUV's Mot., Ex. A, Nairn Decl. at ¶ 23.

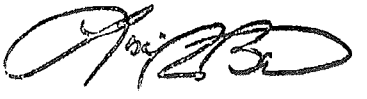
B. Indefiniteness

In view of our construction of the claim term "molecular weight" as "number average molecular weight," the Commission has also determined to reverse and vacate the ID's findings on indefiniteness. Indeed, none of the parties argued that the term "molecular weight," if construed as "number average molecular weight," would be indefinite. Nor did they argue that the same term in the context of the parent '564 patent was indefinite. *Compare Teva*, 789 F.3d at 1344-45 (finding the term "molecular weight" indefinite where the term could mean peak average molecular weight (Mp), number average molecular weight (Mn), or weight average molecular weight (Mw), and "[t]he claims do not indicate which measure to use").

IV. CONCLUSION

For the foregoing reasons, the Commission has determined to review the ID and on review, to reverse and vacate the ID.

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: August 11, 2017

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME

Inv. No. 337-TA-1031

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **COMMISSION OPINION** has been served by hand upon the Commission Investigative Staff, Claire K. Comfort, Esq., and the following parties, as indicated, on **August 11, 2017**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants DSM Desotech, Inc. and DSM IP Assets B.V.:

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On Behalf of Respondent Momentive UV Coatings (Shanghai) Co., Ltd.:

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On Behalf of Respondent OFS Fitel, LLC:

Bradley J. Olson, Esq.
BARNES & THORNBURG, LLP
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Washington, DC 20006

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME**	**Investigation No. 337-TA-1031**

NOTICE OF COMMISSION DETERMINATION TO REVIEW AN INITIAL DETERMINATION GRANTING RESPONDENT'S MOTION FOR SUMMARY DETERMINATION THAT COATINGS KS1-043 AND KS1-048 DO NOT INFRINGE U.S. PATENT No. 7,067,564, AND ON REVIEW, TO AFFIRM THE INITIAL DETERMINATION BUT SET ASIDE THE ANALYSIS

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to review an initial determination ("ID") (Corrected Order No. 32) of the presiding administrative law judge ("ALJ") granting Respondent Momentive UV Coatings (Shanghai) Co., Ltd.'s ("MUV") motion for summary determination that MUV's accused coatings KS1-043 and KS1-048 do not infringe the asserted claims of U.S. Patent No. 7,067,564. As explained in the Commission Opinion, the Commission has determined to review the ID, and on review, to affirm the ALJ's ultimate conclusions with respect to claim construction and non-infringement but to set aside the ALJ's reasoning.

FOR FURTHER INFORMATION CONTACT: Houda Morad, Office of the General Counsel, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436, telephone (202) 708-4716. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at *https://www.usitc.gov*. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *https://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on December 5, 2016, based on a complaint filed by Complainants DSM Desotech, Inc. of Elgin, Illinois and DSM IP Assets B.V. of Herleen, Netherlands (collectively, "DSM" or "Complainants"). *See* 81 *Fed. Reg.* 87588-9 (Dec. 5, 2016). The Complaint alleges violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, based upon the importation

into the United States, the sale for importation, and the sale within the United States after importation of certain UV curable coatings for optical fibers, coated optical fibers, and products containing same by reason of infringement of claims 1-8, 10-15, and 18-22 of U.S. Patent No. 6,961,508, claims 1-10 and 13-15 of U.S. Patent No. 7,171,103, claims 2-4, 9, 11, 12, and 15 of U.S. Patent No. 7,067,564 ("the '564 patent"), and claims 1-3, 9, 12, 16-18, 21, and 30 of U.S. Patent No. 7,706,659. *See id.* The notice of investigation identifies two (2) respondents, namely: Momentive UV Coatings (Shanghai) Co., Ltd. of Shanghai, China ("MUV") and OFS Fitel, LLC of Norcross, Georgia ("OFS") (collectively, "Respondents"). *See id.* The Office of Unfair Import Investigations is also a party in this investigation. *See id.*

On May 23, 2017, Respondent MUV filed a motion for summary determination that its accused coatings KS1-043 and KS1-048 do not infringe the asserted claims of the '564 patent. On June 1, 2017, DSM filed an opposition to MUV's motion and on June 5, 2017, the Commission Investigative Attorney ("IA") filed a response in support of MUV's motion.

On July 5, 2017, the ALJ issued the subject ID (Order No. 32) (corrected July 7, 2017) granting MUV's motion. On July 13, 2017, DSM filed a petition for review of the subject ID and on July 20, 2017, Respondents and the IA filed responses to DSM's Petition.

As explained in the Commission Opinion, the Commission has determined to review the ID, and on review, to affirm the ALJ's ultimate conclusions with respect to claim construction and non-infringement but to set aside the ALJ's reasoning.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in part 210 of the Commission's Rules of Practice and Procedure (19 CFR part 210).

By order of the Commission.

Lisa R. Barton
Secretary to the Commission

Issued: August 4, 2017

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME

Inv. No. 337-TA-1031

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Staff, Claire K. Comfort, Esq., and the following parties, as indicated, on **August 7, 2017**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants DSM Desotech, Inc. and DSM IP Assets B.V.:

Christine E. Lehman, Esq.
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On Behalf of Respondent Momentive UV Coatings (Shanghai) Co., Ltd.:

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On Behalf of Respondent OFS Fitel, LLC:

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME	Investigation No. 337-TA-1031

NOTICE OF COMMISSION DETERMINATION TO REVIEW AN INITIAL DETERMINATION GRANTING RESPONDENT'S MOTION FOR SUMMARY DETERMINATION THAT CLAIMS 16-18, 21, AND 30 OF U.S. PATENT No. 7,706,659 ARE INVALID FOR INDEFINITENESS UNDER 35 U.S.C. § 112, ¶ 2, AND ON REVIEW, TO REVERSE AND VACATE THE INITIAL DETERMINATION

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to review an initial determination ("ID") (Order No. 33) of the presiding administrative law judge ("ALJ") granting Respondent Momentive UV Coatings (Shanghai) Co., Ltd.'s motion for summary determination that claims 16-18, 21, and 30 of U.S. Patent No. 7,706,659 are invalid for indefiniteness under 35 U.S.C. § 112, ¶ 2. As explained in the forthcoming Commission Opinion, the Commission has determined to review the ID, and on review, to reverse and vacate the ID.

FOR FURTHER INFORMATION CONTACT: Houda Morad, Office of the General Counsel, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436, telephone (202) 708-4716. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at *https://www.usitc.gov*. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *https://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on December 5, 2016, based on a complaint filed by Complainants DSM Desotech, Inc. of Elgin, Illinois and DSM IP Assets B.V. of Herleen, Netherlands (collectively, "DSM" or "Complainants"). *See* 81 *Fed. Reg.* 87588-9 (Dec. 5, 2016). The Complaint alleges violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, based upon the importation into the United States, the sale for importation, and the sale within the United States after

importation of certain UV curable coatings for optical fibers, coated optical fibers, and products containing same by reason of infringement of claims 1-8, 10-15, and 18-22 of U.S. Patent No. 6,961,508, claims 1-10 and 13-15 of U.S. Patent No. 7,171,103, claims 2-4, 9, 11, 12, and 15 of U.S. Patent No. 7,067,564, and claims 1-3, 9, 12, 16-18, 21, and 30 of U.S. Patent No. 7,706,659 ("the '659 patent"). *See id.* The notice of investigation identifies two respondents, namely: Momentive UV Coatings (Shanghai) Co., Ltd. of Shanghai, China ("MUV") and OFS Fitel, LLC of Norcross, Georgia ("OFS") (collectively, "Respondents"). *See id.* The Office of Unfair Import Investigations is also a party in this investigation. *See id.*

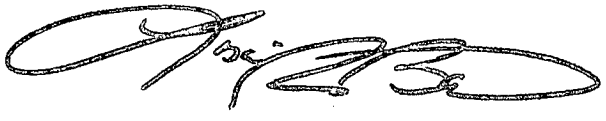
On May 22, 2017, Respondent MUV filed a motion for summary determination that claims 16-18, 21, and 30 of the '659 patent are invalid for indefiniteness under 35 U.S.C. § 112, ¶ 2. On June 1, 2017, DSM filed an opposition to MUV's motion and on June 5, 2017, the Commission Investigative Attorney ("IA") filed a response in support of MUV's motion.

On July 6, 2017, the ALJ issued the subject ID (Order No. 33) granting MUV's motion. On July 14, 2017, DSM filed a petition for review of the subject ID and on July 21, 2017, Respondents filed a response to DSM's Petition. On July 24, 2017, the IA filed a response to DSM's Petition.

As explained in the forthcoming Commission Opinion, the Commission has determined to review the ID, and on review, to reverse and vacate the ID.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in part 210 of the Commission's Rules of Practice and Procedure (19 CFR part 210).

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: August 7, 2017

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME **Inv. No. 337-TA-1031**

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Staff, Claire K. Comfort, Esq., and the following parties, as indicated, on **August 7, 2017**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants DSM Desotech, Inc. and DSM IP Assets B.V.:

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On Behalf of Respondent Momentive UV Coatings (Shanghai) Co., Ltd.:

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On Behalf of Respondent OFS Fitel, LLC:

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Public Version

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN UV CURABLE COATINGS FOR OPTICAL FIBERS, COATED OPTICAL FIBERS, AND PRODUCTS CONTAINING SAME**	**Inv. No. 337-TA-1031**

ORDER NO. 33: **INITIAL DETERMINATION GRANTING MUV'S MOTION FOR SUMMARY DETERMINATION THAT CLAIMS 16-18, 21 AND 30 OF U.S. PATENT NO. 7,076,659 ARE INVALID UNDER 35 U.S.C. § 112 [MOTION DOCKET NO. 1031-022]**

(July 6, 2017)

I. INTRODUCTION

On May 22, 2017, Respondent Momentive UV Coatings (Shanghai) Co., Ltd. ("MUV") moved for summary determination ("Motion") that asserted claims 16-18, 21, and 30 of U.S. Patent No. 7,706,659 ("the '659 patent") are invalid for claim indefiniteness under 35 U.S.C. §112, ¶ 2. (Motion Docket No. 1031-022; Mot. at 1.).[1] On June 1, 2017, Complainants DSM Desotech, Inc. and DSM IP Assets B.V. (collectively, "DSM") filed its opposition ("Opposition"). (Doc. ID No. 613428; Opp'n" at 1.). On June 5, 2017, Commission Investigative Staff ("Staff") filed its response ("Staff Response") in which it supports MUV's Motion. (Doc. ID No. 613431; Staff Resp. at 1.). OFS did not file a brief. Because there are no

[1] MUV certified pursuant to Ground Rule 2.2 that it attempted to resolve the issues in this Motion with Complainants DSM Desotech, Inc. and DSM IP Assets B.V. (collectively, "DSM"), who said they would oppose MUV's Motion; with Commission Investigative Staff ("Staff") who said she would reserve her position until she saw the papers; and with Respondent OFS, Fitel LLC ("OFS") whom MUV asserted does not oppose MUV's Motion. (Mot. at 2.).

genuine disputes of material fact, for the reasons explained below, MUV's Motion is *granted.*

II. THE CLAIM LANGUAGE AT ISSUE: SELECTED FACTS AND POSITIONS

The '659 patent, entitled "Coated Optical Fiber" claims primary coating compositions and primary coatings. (MUV's Statement of Undisputed Material Facts ("SUMF") at ¶ 2.). MUV contends that asserted claims 16-18, 21 and 30 of the '659 patent are invalid for claim indefiniteness pursuant to 35 U.S.C. § 112, ¶ 2 because claims 16-18, 21 and 30 of the '659 patent require a primary coating composition that comprises: "20-98% by wt. of at least one oligomer having a molecular weight of about 1000 or higher." (Memorandum ("Mem.") at 2 (citing SUMF at ¶ 3).). Claims 16 and 30 are independent claims. (*Id.*). Claims 17, 18 and 21 depend from claim 16. (*Id.*).

The disputed claim language at the heart of MUV's Motion and DSM's Opposition, is quoted from claim 16 of the '659 patent as follows, with the disputed language in bold:

> 16. Primary coating composition when cured having an equilibrium modulus, as measured according to ASTM D5026-95a, of about 1.2 MPa or less, a storage modulus at 23° C. (E'23) and a cavitation strength at which a tenth cavitation appears (σ10cav) of at least about 1.0 MPa as measured at a deformation rate of 0.20 min−1, said cavitation strength being at least about 1.4 times said storage modulus at 23° C., wherein said primary coating composition comprises:
>
> (a) 20-98% by wt. of at least one oligomer having a **molecular weight** of about 1000 or higher*;*
> (b) 0-80% by wt. of one or more reactive diluents;
> (c) 0.1-20% by wt. of one or more photoinitiators; and
> (d) 0-5% by wt. of additives.

(Mem. at 2-3 (citing SUMF at ¶ 4) (emphasis added).).

According to MUV, the '659 patent specification never defines the term "molecular weight." (*Id.* at 2.). The specification of the '659 patent describes the molecular weight of the claimed oligomer as a single value. For example, the specification at 11:62–12:4 describes yet another measurement, here a number average molecular weight, for the oligomer as:

> The number average molecular weight of the urethane (meth)acrylate used in the composition of the present invention is preferably in the range from about 1,200 to about 20,000, and more preferably from about 2,200 to about 10,000. If the number average molecular weight of the urethane (meth)acrylate is less than about 1000, the resin composition tends to vitrify at room temperature; on the other hand, if the number average molecular weight is larger than about 20,000, the viscosity of the composition becomes high, making handling of the composition difficult.

(*Id.* at 3 (citing SUMF at ¶ 5 (Compl. at Ex. 4 at 11:62–12:4).).

MUV cites to a number of passages in the '659 patent specification where there are different molecular weight measurement terms used to describe the measurements. (*Id.* (citing Compl. at Ex. 4 at 26:10-13 ("A coating was formulated using 69.7 wt % of a polyether urethane acrylate oligomer having a polyether backbone comprising on average two blocks polypropylene glycol having an average Mw of about 4000 . . . ."); 26:26-28 ("A primary coating composition was formulated using 38.8 wt % of an aliphatic polyether-polycarbonate based urethane acrylate oligomer having an average Mw of 4000 . . . ."); SUMF at ¶¶ 5-7).).

As MUV notes, the specification also describes a *theoretical molecular weight* for the oligomer as follows:

> **A coating was prepared using 0.50 wt % of a polyether urethane acrylate (theoretical molecular weight~9000), about 20 wt % of 8 times ethoxylated nonylphenol acrylate, 20 wt % laurylacrylate, 6 wt % of N-vinylcaprolactam, 1.5 wt % Lucirine TPO, 0.8 wt % Irganox 1035, 0.1 wt % diethanolamine and 0.3% Seesorb 102.**

(*Id.* at 3-4 (citing Compl. at Ex. 4 at 25:39-44; *id.* at 26:40-45 ("A coating was prepared using 60 wt ~% of a polyether urethane acrylate (theoretical molecular wt ≈ 4000 . . . ."); SUMF ¶¶ 8-9).).

According to MUV, as shown in the claim language quoted above, the "molecular weight" of the claimed oligomer can be determined by different measurements, including "number average molecular weight," "average molecular weight," or in certain places in the

claims, by "theoretical molecular weight of an individual molecule in the oligomer." (*Id.* at 2-3.).

Staff points to certain language of claim 30 of the '659 patent which is the same as the following claim 16 language:

> (a) 20-98% by wt. of at least one oligomer having a **molecular weight** of about 1000 or higher**;**
> (b) 0-80% by wt. of one or more reactive diluents;
> (c) 0.1-20% by wt. of one or more photoinitiators; and
> (d) 0-5% by wt. of additives.

(Staff Resp. at 2 (citing to claim 30 of '659 patent) (emphasis added).).

Staff notes that the *Markman* construction adopted for "molecular weight" means "the sum of the atomic weights of the atoms in a molecule." (*Id.* (citing Order No. 17 at 38-39); *see also* Opp'n at 4.). As Staff describes, oligomers "usually exist in a distribution of molecules with varying molecular weights." (Staff Resp. at 2.). As Staff notes, however, agreeing with MUV, there are "at least two vastly different possible meanings" for the claim term "molecular weight" even given its construction: (1) a reference to the actual molecular weight of the individual oligomer molecules; or (2) an average molecular weight for the oligomer taken as a whole (e.g., number average molecular weight). (*Id.* at 4.). Staff observes that DSM has elected the former definition whereas the patent specification includes support for the second interpretation. (*Id.* (citing '659 patent at 11:66–12:1).). According to Staff, this results in "irreconcilably different claim scopes." (*Id.*).

Because of the differences in those various meanings as described above, MUV also argues that depending upon which term is used and calculated within the claim specifications, the outcomes would be different, and therefore, the patentees have failed to inform with reasonable certainty about the scope of the invention. (Mem. at 2.). MUV argues that DSM's

interpretation of the claims excludes the preferred embodiments. (*Id.* at 8.).

DSM contends there are disputes of genuine fact that should be resolved during the evidentiary hearing and relies on the *Markman* Order's language that "with respect to all claim *scopes* Respondents claim are indefinite, no final determination will be made with respect to their invalidity for indefiniteness until all necessary evidence has been submitted. (Opp'n at 5 (citing *Markman* Order (Order No. 17) at 12) (emphasis in original).).

DSM also argues that MUV's claim construction position on "average molecular weight" undercuts Dr. Nairn's declaration (RXM-0003), which MUV relies on in its Motion. (*Id.* (citing SUMF ¶¶ 11-12).). DSM argues that MUV conceded during the *Markman* proceedings that "average molecular weight" as used in the '659 patent means "number average molecular" weight, and therefore, Dr. Nairn's opinions on the ambiguity of which average to use is moot. (*Id.* (citing Resp'ts *Markman* Br. at 30; RXM-0003).). With respect to that portion of the '659 patent specification that MUV and Dr. Nairn cite as reflecting the ambiguity in terms, DSM says that while the theoretical molecular weight of the oligomer is simply provided as a number, there is no instruction to use any theoretical molecular weight as a measurement technique on already synthesized oligomers. (*Id.*).

With respect to a possible ambiguity, DSM argues that the *Markman* construction of molecular weight does not call for any type of "average molecular weight." (*Id.* at 8.).

DSM argues that DSM's experts. Dr. Sancaktar and Dr. Bowman, have opined that a person of ordinary skill in the art would use Gel Permeation Chromatography ("GPC") to characterize the molecular weight distribution of the oligomers of the '659 patent. (*Id.* at 7 (citing Ex. A at ¶ 93; Ex. B at ¶¶ 41-48).).

III. LEGAL STANDARDS

A. Summary Determination

Summary determination under Commission Rule 210.18 is analogous to summary judgement under Federal Rule of Civil Procedure 56, and may be granted only where the evidence shows "that there is no genuine issue as to any material fact and that the moving party is entitled to summary determination as a matter of law." *See* 19 C.F.R. § 210.18(b). The party moving for summary determination bears the initial burden of establishing that there is an absence of a genuine issue of material fact and that it is entitled to judgment as a matter of law. *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986). Even if the moving party meets this burden, summary determination must be denied where the non-moving party "set[s] forth specific facts showing that there is a genuine issue for trial." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 256 (1986). Courts must examine all the evidence in the light most favorable to the non-moving party. *Id.* at 255. All "justifiable inferences" are to be drawn in the non-moving party's favor. *Id.*

B. Indefiniteness

"A patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). "When a claim term 'depends solely on the unrestrained, subjective opinion of a particular individual practicing the invention,' without sufficient guidance in the specification to provide objective direction to one of skill in the art, the term is indefinite." *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1260 (Fed. Cir. 2014) (quoting *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1350 (Fed. Cir. 2005). "A claim may, for

example, prove indefinite if its language 'might mean several different things' and the patent itself identifies 'no informed and confident choice . . . among the contending definitions.'" *Otsuka Pharm. Co. v. Zydus Pharms. USA*, 151 F. Supp. 3d 525, 545 (D.N.J. 2015) (quoting *Nautilus*, 134 S. Ct. at 2130 n.8). Thus, the level of ordinary skill in the art plays an important role in an indefiniteness analysis." *Tinnus Enterprises, LLC v. Telebrands Corp.*, 846 F.3d 1190, 1206 (Fed. Cir. 2017). To aid in determining the understanding of a skilled artisan, "a court considering an allegation of indefiniteness may rely on extrinsic evidence . . . including expert and inventor testimony, dictionaries, and learned treatises." *Hamilton Prods., Inc. v. O'Neill*, 492 F. Supp. 2d 1328, 1337 (M.D. Fla. 2007) (citing *Datamize*, 417 F.3d at 1348; *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 980 (Fed. Cir. 1995)).).

IV. ANALYSIS AND ORDER

MUV and Staff note that claims are indefinite when the scope of a claim depends on a given measurement but the patent specification does not specify which measurement to use, which, in turn, leads to inconsistent results—as in this case. (*See* Mem. at 5-6 (citing *Dow Chem. Co. v. NOVA Chems. Corp.*, 803 F.3d 620, 630 (Fed. Cir. 2015.); Staff Resp. at 3-4.). MUV and Staff both rely on *Teva Pharmaceuticals USA, Inc. v. Sandoz Inc.*, 789 F.3d 1335, 1338-45 (Fed. Cir. 2015) as being analogous to this case. (Mem. at 6; Staff Resp. at 4.). In *Teva,* the court found that "molecular weight" could refer to peak average molecular weight (M_p), to number average molecular weight (M_n) or to weight average molecular weight (M_w). (Mem. at 6.). Like Staff, MUV notes that whether a calculation using "number average molecular weight" or "molecular weight" of a given oligomer will result in different claim scopes. (*Id.* at 7; Staff Resp. at 4.). Staff notes that in this Investigation with the '659 patent, as in *Teva, supra*, there are uncertainties as to what form of molecular weight measurement would be used to determine

the claimed molecular weight of the oligomer. (Staff Resp. at 5.). Staff also notes that DSM's definition of a "molecular weight" that refers to the actual molecular weight of an individual oligomer molecule and not to any form of average molecular weight, is not supported. Staff notes that the '659 specification continually refers to an average weight for an oligomer. (*Id.*).

DSM argues that the indefiniteness inquiry should wait until the hearing because there are additional underlying facts. (Opp'n at 1.). However, it would appear that the facts are in, and it is a matter of looking at the claim specification to determine if the claim scope uses different measurements that lead to different results. *See Dow Chemical Co.,* 803 F.3d at 630.

DSM argues that whether the scope of the "20-98% by wt. of at least one oligomer having a molecular weight of 1000 or higher" is reasonably certain. (Opp'n at 4-6.). But that does not appear to be the issue of concern by itself; the problem seems to be that in various places in the same specification of the '659 patent, different molecular terms for measurement are used without necessarily suggesting why different measurements are used, and without defining them. (*See* Section II, *supra.*). The definition of "molecular weight" in the *Markman* Order does not resolve the meaning of "average molecular weight" or "number average molecular weight" or whether any of those terms refers to one oligomer or to a distribution of oligomers.

Moreover, it also does not seem to be an issue or in dispute whether Gel Permeation Chromatography ("GPC") is the appropriate *method* to use to determine the molecular weight distribution of a an oligomer. (Opp'n at 6.). As DSM itself notes, there is not a "single actual data set characterizing the molecular weight distribution of an oligomer across all of the thousands of documents produced by any party to this Investigation that is performed using anything other than GPC." (*Id.*). So, clearly there is no dispute there despite DSM's seeming

attempt to make it an issue where none exists.

Finally, it is not necessary for experts to replicate testing, or as DSM suggests, to perform actual experiments to eliminate a claimed dispute of fact. (*See* Opp'n at 7.). If the patent claim specification, as it does here, and as the *Teva* court found, gives a variety of different measurement terms in the same specification without stating whether the measurement is the "average" of the oligomer or co-polymer, or the weight that is not an "average," there is uncertainty. (*See, e.g.*, Staff Resp. at Ex. 1.). Here, as in *Teva*, the claim scopes leave it unclear as to which measurement is defining the scope of the claims. Therefore, for the forgoing reasons, asserted claims 16-18, 21, and 30 of U.S. Patent No. 7,076,659 are invalid for claim indefiniteness under 35 U.S.C. §112, ¶ 2 and MUV's Motion, Motion Docket No. 1031-022, is *granted.*

Within seven (7) days of the date of this document, each party shall submit to the Office of the Administrative Law Judges a statement as to whether or not it seeks to have any portion of this document deleted from the public version. The parties' submissions must be made by hard copy by the aforementioned date. Any party that does not respond will be considered to have waived its rights to redact information.

Any party seeking to have any portion of this document deleted from the public version thereof must submit to this office a copy of this document with red brackets clearly indicating any portion asserted to contain confidential business information by the aforementioned date.

The parties' submission concerning the public version of this document need not be filed with the Commission Secretary.

SO ORDERED.

Mary Joan McNamara
Administrative Law Judge

CERTAIN UV CURABLE COATING FOR OPTICAL FIBERS, COATED OPTIONAL FIBERS, AND PRODUCTS CONTAINING SAME

Inv. No. 337-TA-1031

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served by hand upon the Commission Investigative Attorney, Claire K. Comfort, Esq., and the following parties as indicated, on **July 21, 2017**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants DSM Desotech, Inc. and DSM IP Assets B.V.:

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☑ Via Express Delivery
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☐ Other:_____

On Behalf of Respondent Momentive UV Coatings (Shanghai) Co., Ltd.:

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On Behalf of Respondent OFS Fitel, LLC:

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