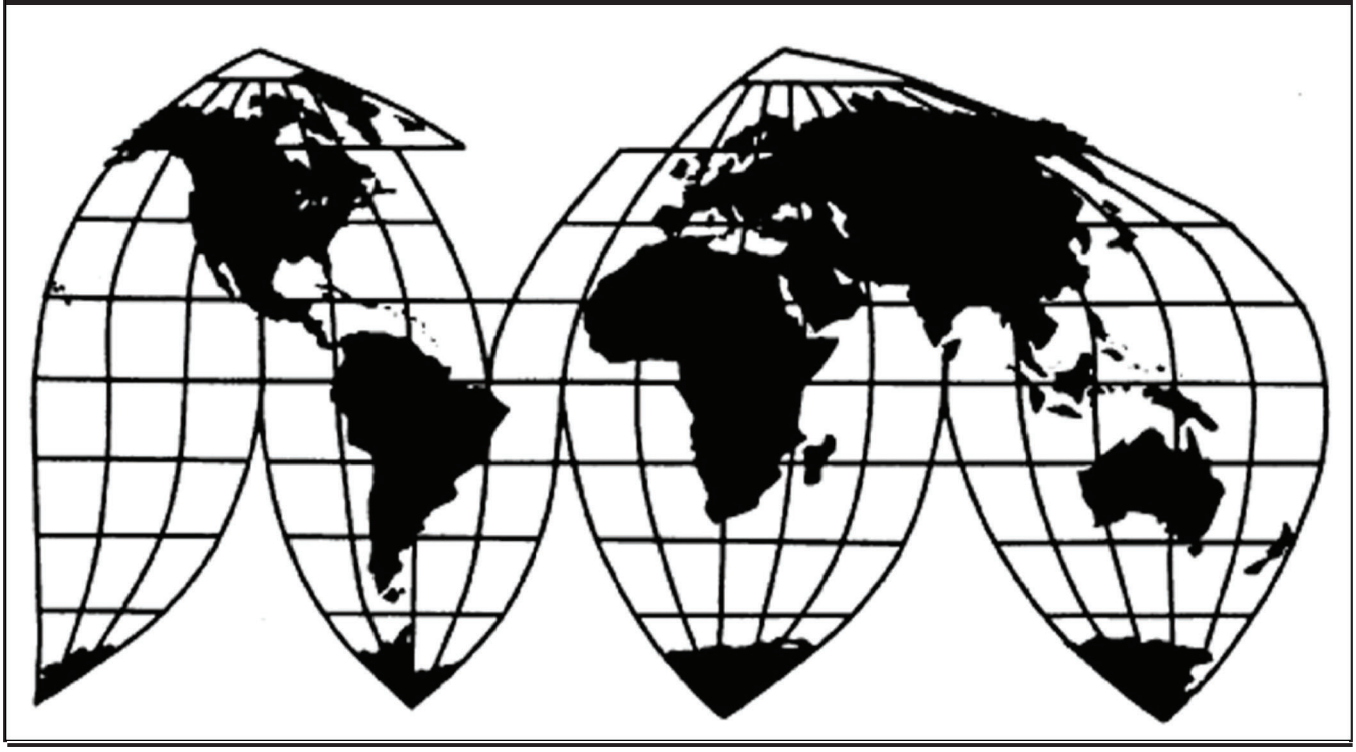
In the Matter of

CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF

Investigation No. 337-TA-1140

Publication 5260 **February 2022**

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

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Washington, DC 20436
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In the Matter of

CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF**	**Investigation No. 337-TA-1140**

NOTICE OF COMMISSION DETERMINATION TO REVIEW IN PART, TAKE NO POSITION ON THE ISSUES UNDER REVIEW, AND AFFIRM IN PART A FINAL INITIAL 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 ("Commission") has determined to review in part the final initial determination ("ID") issued by the presiding administrative law judge ("ALJ") on January 28, 2020, finding no violation of section 337 of the Tariff Act of 1930, as amended ("section 337"), in connection with the asserted patent. The Commission has determined to take no position on the issues under review. The Commission has also determined to affirm the ID's findings that the asserted patent claims are invalid. This investigation is terminated with a finding of no violation of section 337.

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 may be viewed on the Commission's electronic docket (EDIS) at *https://edis.usitc.gov*. For help accessing EDIS, please email *EDIS3Help@usitc.gov*. General information concerning the Commission may also be obtained by accessing its Internet server at *https://www.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: The Commission instituted this investigation on December 14, 2018, based on a complaint filed by Ingevity Corp. and Ingevity South Carolina, LLC, both of North Charleston, South Carolina (together, "Ingevity"). 83 FR 64356. The complaint, as supplemented, alleged violations of section 337 in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain multi-stage fuel vapor canister systems and activated carbon components thereof by reason of infringement of certain claims of U.S. Patent No. RE38,844 ("the '844 patent"). *Id*. The Commission's notice of investigation named as respondents MAHLE Filter Systems North

America, Inc. of Murfreesboro, Tennessee; MAHLE Filter Systems Japan Corp. of Saitama, Japan; MAHLE Sistemas de Filtracion de Mexico de C.V. of Monterrey, Mexico; MAHLE Filter Systems Canada, ULC of Tilbury, Canada (altogether, "MAHLE"); Kuraray Co., Ltd. of Tokyo, Japan ("Kuraray"); Kuraray America, Inc. of Houston, Texas; and Nagamine Manufacture Co., Ltd. of Manno, Japan ("Nagamine"). *Id.* The Commission subsequently amended the complaint and notice of investigation to add Calgon Carbon Corporation ("Calgon") as a respondent and to remove Kuraray America, Inc. as a respondent. 84 FR 11555 (Mar. 27, 2019). The remaining respondents are collectively referred to herein as "Respondents." The Office of Unfair Import Investigations is not participating in this investigation. 83 FR 64356.

On January 28, 2020, the ALJ issued the final ID, which finds that Respondents did not violate section 337. More particularly, the final ID found, *inter alia*: (1) Ingevity, its customers, and operators of the domestic industry articles have been shown to practice the asserted claims of the '844 patent; (2) the domestic industry requirement is satisfied with respect to the '844 patent; (3) Respondent MAHLE directly and/or indirectly infringes the asserted claims of the '844 patent; (4) Respondents Kuraray and Nagamine indirectly infringe the asserted claims; (5) the asserted claims of the '844 patent have been shown to be invalid under 35 U.S.C. 102 and/or 35 U.S.C. 103 over the Delphi prior invention, or the combination of the Delphi prior invention with other references; (6) the asserted claims of the '844 patent have been shown to be invalid under 35 U.S.C. 102 and/or 35 U.S.C. 103 over Meiller and/or Park and other references; (7) independent claim 18 of the '844 patent, and those depending therefrom, have been shown to be invalid under 35 U.S.C. 112 for indefiniteness, but independent claims 1, 31, and 43, and those depending therefrom, have not been shown to be invalid under 35 U.S.C. 112 for indefiniteness; and (8) patent exhaustion does not bar Ingevity's sought relief.

On February 10, 2020, the private parties filed petitions for review of the final ID, and on February 18, 2020, the private parties filed responses.

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

(1) Whether the asserted claims are invalid under 35 U.S.C. 103 over Meiller and/or Park and other references.

(2) Whether the asserted claims are invalid under 35 U.S.C. 112 for indefiniteness related to the claim terms identified by the parties as the Volume Terms, including the final ID's discussion of the scope of the Volume Terms.

(3) Whether the accused products infringe the asserted claims of the '844 patent, and whether Respondents indirectly infringe the asserted claims of the '844 patent.

(4) Whether Ingevity's sale of its HCA carbons to MAHLE that are later incorporated into a subset of Accused Canisters that also contain BAX carbons exhausts Ingevity's patent rights as to those Accused Canisters.

(5) Whether Ingevity satisfied the domestic industry requirement of section 337.

(6) Whether Ingevity demonstrated satisfaction of the importation requirement of section 337, as set forth in the final ID beginning on page 34 through the carryover paragraph on page 35.

(7) Whether Ingevity illegally tied the sales of its products to allowing its customers to practice the '844 patent.

The Commission has determined to not review the remainder of the final ID.

The Commission has determined to take no position on the issues under review. Accordingly, this investigation is terminated with a finding of no violation of section 337 based on the unreviewed findings of the final ID that the asserted claims have been shown to be invalid under 35 U.S.C. 102 and/or 35 U.S.C. 103 over the Delphi prior invention, or the combination of the Delphi prior invention with other references. This investigation is hereby terminated.

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: April 7, 2020

CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF **Inv. No. 337-TA-1140**

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served upon the following parties as indicated, on 4/7/2020.

Lisa R. Barton, Secretary
U.S. International Trade Commission
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Washington, DC 20436

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UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF**	**Inv. No. 337-TA-1140**

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

Administrative Law Judge Cameron Elliot

(January 28, 2020)

Pursuant to the Notice of Investigation and Rule 210.42(a) of the Rules of Practice and Procedure of the United States International Trade Commission, this is my Initial Determination in the matter of *Certain Multi-Stage Fuel Vapor Canister Systems and Activated Carbon Components Thereof*, Investigation No. 337-TA-1140.

[redacted]

TABLE OF CONTENTS **Page**

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TABLE OF ABBREVIATIONS

CDX	Complainants' Demonstrative Exhibit
CIB	Complainants' Revised Initial Post-Hearing Brief
CPB	Complainants' Pre-Hearing Brief
CPX	Complainants' Physical Exhibit
CRB	Complainants' Reply Post-Hearing Brief
CX	Complainants' Exhibit
Dep. Tr.	Deposition Transcript
Hr'g Tr.	Hearing Transcript
JX	Joint Exhibit
RDX	Respondents' Demonstrative Exhibit
RIB	Respondents' Initial Post-Hearing Brief
RPB	Respondents' Pre-Hearing Brief
RPX	Respondents' Physical Exhibit
RRB	Respondents' Reply Post-Hearing Brief
RX	Respondents' Exhibit

[redacted]

I. INTRODUCTION

A. Procedural Background

Complainants Ingevity Corp. and Ingevity South Carolina, LLC (altogether "Ingevity" or "Complainants") filed the complaint underlying this Investigation on November 8, 2018. The complaint alleged respondents MAHLE Filter Systems North America, Inc., MAHLE Filter Systems Japan Corp., MAHLE Sistemas de Filtración de México S.A. de C.V., MAHLE Filter Systems Canada, ULC (altogether "MAHLE"), Kuraray Co., Ltd., Kuraray America, Inc., and Nagamine Manufacturing Co., Ltd. ("Nagamine") import certain products that infringe one or more claims of U.S. Patent No. RE38,844 ("the 844 patent" or "the Asserted Patent").

By publication of a notice in the *Federal Register* on December 14, 2018, the U.S. International Trade Commission ordered that:

> Pursuant to subsection (b) of section 337 of the Tariff Act of 1930, as amended, an investigation be instituted 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 products identified in paragraph (2) by reason of infringement of one or more of claims 1-5, 8, 11, 13, 15, 18, 19, 21, 24, 28, 31, 33, 36, 38, 40, 43, 45, 48, 50, and 52 of the '844 patent; and whether an industry in the United States exists as required by subsection (a)(2) of section 337[.]

83 Fed. Reg. 64,356 (Dec. 14, 2018). On February 26, 2019, the presiding administrative law judge set a target date of May 28, 2020 for completion of this investigation via initial determination. Order No. 4. Upon motion from Ingevity, and also on February 26, 2019, the administrative law judge amended the notice of investigation to add additional respondent Calgon Carbon Corporation ("Calgon" or "CCC") and remove Kuraray America, Inc also via initial

determination. Order No. 5. On March 20, 2019 and March 22, 2019, the Commission determined not to review either Order No. 4 or Order No. 5, respectively. EDIS Doc. IDs 670666, 670922.[1]

On March 6, 2019, the presiding administrative law judge set a *Markman* hearing date of June 4, 2019 and the evidentiary hearing for November 4-8, 2019. Order No. 6. On March 18, 2019, upon submission from the parties, the presiding administrative law judge moved the evidentiary hearing to November 18-22, 2019. Order No. 7. On April 2, 2019, the presiding administrative law judge reassigned the investigation to me. EDIS Doc. ID 671952.

On June 4, 2019, I held a technology tutorial and *Markman* hearing, and on June 21, 2019, issued Order No. 15, construing certain terms of the Asserted Patent.

On September 19, 2019, Ingevity moved for partial summary determination on a number of issues (Motion Dkt. No. 1140-022) which I granted-in-part via initial determination on October 10, 2019 (Order No. 29)—an initial determination the Commission determined not to review (EDIS Doc. ID 692903).

On November 18-22, 2019, I held an evidentiary hearing. On November 18-19, specifically, I alerted the parties' of a discrepancy between the listing of asserted claims in the notice of investigation and the content of the parties' pre-hearing briefs. Hr'g Tr. at 139:14-141:3, 350:4-21. In that discussion, Ingevity explained it withdrew claims 15, 28, 40, and 52 from its allegations of infringement and I determined to treat this explanation as an oral motion to terminate the investigation with respect to those claims. *See id.* Respondents indicated they did not oppose the withdrawal. *See id.* I granted the motion (*see id.*), thereby terminating this investigation with respect to those claims, and that determination is part of this final initial determination.

[1] For the purposes of this initial determination, Kuraray Co., Ltd. and Calgon will be referred together as "Kuraray" (*see* RIB at xi); and MAHLE, Kuraray, and Nagamine will be referred to altogether as "Respondents."

[redacted]

Following the evidentiary hearing, and pursuant to the procedural schedule, the parties submitted initial and reply post-hearing briefs on December 6, 2019 and December 16, 2019 respectively. As of the date of this initial determination, no motions remain pending.

B. The Parties

Complainant Ingevity Corp. is a United States corporation organized and existing under the laws of Delaware and having its principal place of business in North Charleston, SC. EDIS Doc. ID 671535 at 3-4. Ingevity Corp. manufactures and sells activated carbon products (CX-0911C at Q/A 17) and wholly owns subsidiaries Ingevity South Carolina LLC, Ingevity Virginia Corp., and Ingevity Georgia LLC (CIB at 107). Ingevity Corp. handles the customers and sales of these products for these subsidiaries, which themselves operate the manufacturing plants in Covington, VA, Wickliffe, KY, and Waynesboro, GA. CIB at 51 (citing CX-0911C at Q/A 30-41); RIB at 101. In this way, and according to Ingevity, Ingevity Corp. "controls the use of the [844 patent] by overseeing its use by customers and granting licenses or authorizing others to practice the Patent" even though the 844 patent is technically owned by Ingevity South Carolina LLC. *See* CIB at 50-52 (citing, *inter alia*, CX-0911C at Q/A 138-45, 18-120).

Complainant Ingevity South Carolina LLC also exists under the laws of Delaware and has its principal place of business in North Charleston, SC. EDIS Doc. ID 671535 at 3-4. As mentioned, Ingevity South Carolina LLC is the owner of the 844 patent (CX-0911C at Q/A 12; RIB at 102) and a wholly owned subsidiary of Ingevity Corp. as Ingevity Corp. is its sole member. *Id.* at Q/A 13. One of Ingevity's officers, Mr. Ed Woodcock, testified that because of Ingevity Corp.'s status as the sole member of Ingevity South Carolina LLC:

[redacted]

[redacted]

[redacted]

Id. Mr. Woodock further notes "all of Ingevity Corporation's officers [redacted] *Id.* at Q/A 14. At the evidentiary hearing, Mr. Woodock clarified that Ingevity South Carolina LLC "does contain employees, operations assets" only that these employees and assets work in the [redacted] which "is completely separate from [redacted] Hr'g Tr. at 25:2-16. In this way, and relevant to this investigation, [redacted] CX-0911C at Q/A 16.

Respondent MAHLE Filter Systems North America, Inc. ("MAHLE America") is a company organized and existing under the laws of Delaware and has its principal place of business in Troy, MI with an additional business location in Murfreesboro, TN. EDIS Doc. ID 666047 at 5-6. MAHLE America "designs, develops, manufactures, tests, offers for sale and sells certain multi-stage fuel vapor canister systems in the United States." *Id.* at 6. MAHLE America manufactures fuel vapor canisters containing carbon adsorbents in the Murfreesboro, TN location. RX-0370C at Q/A 132. Ingevity supplies the carbon adsorbents used in many of these canisters (RX-0369C at Q/A 28-30) as do respondents Kuraray and Nagamine (discussed below) (*id.* at Q/A 31-34).

Respondent MAHLE Filter Systems Japan Corp. ("MAHLE Japan") is a company organized and existing under the laws of Japan, with a principal place of business in Tokyo, Japan. EDIS Doc. ID 666047 at 6-7. MAHLE Japan "designs, develops, manufactures, tests, offers for sale, and sells certain multi-stage fuel vapor canister systems." *Id.* at 7.

[redacted]

Respondent MAHLE Sistemas de Filtración de Mexico S.A. de C.V. ("MAHLE Mexico") is a company organized and existing under the laws of Mexico, with a principal place of business in Monterrey, Mexico. EDIS Doc. ID 666047 at 7. MAHLE Mexico "manufactures, offers for sale, and sells certain multi-stage fuel vapor canister systems." *Id.*

Respondent MAHLE Filter Systems Canada ULC ("MAHLE Canada") is a company organized and existing under the laws of Canada, with a principal place of business in Tilbury, Canada. EDIS Doc. ID 666047 at 8. MAHLE Canada "manufactures, offers for sale, and sells certain multi-stage fuel vapor canister systems." *Id.*

Respondent Kuraray Co., Ltd. ("Kuraray Japan") is a corporation organized and existing under the laws of Japan with a principal place of business in Tokyo, Japan. EDIS Doc. ID 669652 at 6. Kuraray Japan is a manufacturer of MPAC-1 ("MPAC-1" or "MPAC"), the carbon adsorbent at the center of this investigation. RX-0370C at Q/A 127-128; RX-0378C at Q/A 45-46. Kuraray Japan also buys MPAC from Nagamine, discussed below. RX-0378C at Q/A 39.

Respondent Calgon Carbon Corporation is a company organized and existing under the laws of Delaware, with a principal place of business in Moon Township, PA. EDIS Doc. ID 669652 at 6; EDIS Doc. ID 669648 at 6. Calgon is a wholly owned subsidiary of Kuraray. JX-0226C at 18:7-12. Calgon supplies MPAC-1 to MAHLE. RX-0370C at Q/A 130.

Respondent Nagamine Manufacturing Co., Ltd. is a company organized and existing under the laws of Japan, with a principal place of business in Kagawa-pref., Japan. EDIS Doc. ID 665433 at 6. Nagamine manufactures MPAC and sells it exclusively to Kuraray. RX-0378C at Q/A 39-48.

[redacted]

C. The Asserted Patent and Claims

The Asserted Patent relates to apparatuses and methods for providing multiple layers, or stages, of adsorbents in automotive evaporative emissions canisters. The following claims are at issue in this investigation:

Infringement Claims	Domestic Industry Claims
1-5, 8, 11, 13, 18, 19, 21, 24, 31, 33, 36, 38, 43, 45, 48, and 50	1-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 37, 38, 39, 41, 43, 45, 48, 49, 50, 51, and 53

See CIB at 6, 34-43.

The 844 patent is entitled, "Method for Reducing Emissions from Evaporative Emissions Control Systems." JX-0001 (also cited herein as "844 patent"). The application leading to the 844 patent was filed on October 21, 2003, and claims priority to a provisional application, 60/335,897, filed on November 21, 2001. *Id.* As indicated in its patent number, the 844 patent is a re-issue of U.S. Patent No. 6,540,815, and re-issued on October 25, 2005. *Id.*

By way of background, gasoline evaporation from motor vehicle fuel systems "is a major potential source of hydrocarbon air pollution." 844 patent at 1:28. Such emissions may occur when "a vehicle has been parked and subjected to diurnal temperature changes over a period of several days." *Id.* at 2:45-46. These temperature changes cause pressure fluctuations in the vehicle's fuel tank, which in turn cause gases to flow in and out of the fuel tank vent. Vapor emissions arising from this process are known as diurnal breathing loss emissions. *See id.* at 2:49.

Diurnal breathing loss emissions can be reduced by "canister systems" placed in the vent conduit "that employ activated carbon to adsorb and hold the vapor." 844 patent at 1:33-34. Adsorption is the process by which, in this case, gasoline vapor molecules weakly attach themselves to the adsorbent material in the canister. The adsorbent material is not limited to

[redacted]

activated carbon, but may consist of various organic and inorganic materials. *See id.* at 9:5-63. Vapor molecules are released, or desorbed, from the adsorbent material when fresh air flows from the atmosphere into the canister via the fuel tank vent. Although desorption occurs on a daily cycle in the case of diurnal breathing losses, it may also occur when the vehicle engine is operating. This is because the canister system contains a "vacuum purge connection" which pulls air through the canister and into the engine air intake, and in the process causes vapor molecules to diffuse into the purge air. *See id.* at 1:62-63.

The 844 patent discloses the use of multiple layers, or stages, of adsorbents, with successive stages possessing distinct adsorption characteristics. 844 patent at Abstract. In particular:

> On the fuel source-side of the canister, standard high working capacity carbons are preferred. On the vent-side, the preferred adsorbent volume exhibits a flat or flattened adsorbent isotherm on a volumetric basis in addition to certain characteristically desirable adsorptive properties across broad vapor concentrations, specifically relatively low incremental capacity at high concentration vapors compared with the fuel source-side adsorbent volume.

Id. at 3:46-53. Two approaches to achieving such "a flat or flattened adsorbent isotherm on a volumetric basis" are taught. *Id*. at 3:43-64. One approach comprises "employ[ing] an adsorbent with the desired isotherm properties" near the vent, that is, using a vent-side adsorbent material having a "relatively low incremental capacity at high concentration vapors compared with the fuel source-side adsorbent volume." *Id*. at 3:46-53, 3:57-58.

Several key claim terms generally pertain to the other approach: "a filler and/or bed voidages as a volumetric diluent." 844 patent at 3:55-56. The 844 patent refers to this approach as "volumetric dilution." *Id*. at 7:7. Volumetric dilution may be accomplished by adding a non-adsorbing filler to the adsorbent material, forming the adsorbent into a "high voidage shape," or using inert spacer particles, foams, fibers, and screens external to the adsorbent material, among other techniques. *Id*. at 10:6-24.

[redacted]

It stands undisputed that complainant Ingevity South Carolina LLC is the owner of the 844 patent. RIB at 102 (citing 844 patent; CX-0295C at ¶ 54; CX-0911C at Q/A 12; RX-0382C at Q/A 60).

D. Products at Issue

1. Domestic Industry Products

In its explanation of domestic industry, Ingevity has created two classes of products to which it assigns the moniker "domestic industry" or "DI": (1) "DI Products" which are the carbons Ingevity produces and sells, both high and low IAC-types (CIB at xiv, 48-49); and (2) "DI Canisters" which are canisters that contain one or more "DI Products" within their compartments and which are produced and sold by non-Ingevity entities (*id.* at xiv, 35-36). The constituents of these two classes are summarized below:

Ingevity's "DI Products"	
BAX 1100, BAX 1100LD, BAX 1500, BAX 1700, BAX LBE, HCA, HCA LBE	
Ingevity's "DI Canisters"	
Futaba	17300TLC A022M1; 17300TLA A022M1; 42035AL01C
Leehan	31400-F3500; 31400-S2500; 31400-D5500; 31400-D5600; 31400-S9000; 31400-H9500; 31400-H9600; 31400-M7600; 3QF201797A
Stant	ACO-8355; AAO-8355; ACO-8214; POR-AAO-8214; ACO-7452; AAO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO-4505-1; 0212025061; AAO-8156
Kayser	42698919; 42702737; 84493688; 84359221; 84316430; 84407925; 84413230; 84410850; 52029 779AB; 52029 779AD; 52029 780AD; 68350 418AA

[redacted]

MAHLE	[redacted]

CIB at xiv, 35-36 (citing CX-0909C at Q/A 2072-2077). Within this initial determination, and to keep a consistency with Ingevity's presentation of the issues, I will use the same identifiers for each class of products as Ingevity has; *i.e.*, "DI Products" to refer to Ingevity's carbons, and "DI Canisters" to refer to canisters.

2. Accused Products

The accused products in this case are canisters manufactured and sold by respondent MAHLE (*see* CIB at 11-12) and containing, *inter alia*, an MPAC adsorbent manufactured and sold by respondents Kuraray and Nagamine (*see id.* at 31-34). The MAHLE part numbers for the accused products are as follows: 72143779, 72144286, 72143181, 72143330, 72142062, 72142611, 72144043, 72143724, 72144116, 72143254, 72143506, 72143638, 72144272, 72143778, 72143303, 72144283, 72144313, 72143123, and F6235-011. *Id.* at 11-12; RIB at x (citing CX-0909C at Q/A 78). All of the foregoing are referred to in this initial determination as the "Accused Products."

Further, Ingevity, through its initial post-hearing brief and expert's witness statement, identifies a first subset of the Accused Products as manufactured by MAHLE within the United States. *See generally* CIB at xiii; CX-0909C at Q/A 1953. Ingevity identifies a second subset as manufactured by MAHLE outside the United States. *See generally* CIB at xiii; CX-0909C at Q/A 1955. Although Ingevity has not been entirely consistent in delineating between the members of the two groups (CIB at xiii (listing 72143303, 72144283, 72144286, 72144313, and F6235-011/F62350911 as domestic, imported, and not within the larger "Accused Domestic Canisters" group), CX-0909C at Q/A 1953 (listing licensed product 72142079)), I divine the following

[redacted]

classification from the record and will refer to the two groups in this initial determination as the "Domestic Accused Products" and "Foreign Accused Products":

"Domestic Accused Products"
72143779; 72143181; 72143330; 72142062; 72142611; 72144043; 72143724; 72144116; 72143254; 72143506; 72143638; 72144272; 72143423
"Foreign Accused Products"
72144286; 72143778; 72143303; 72144283; 72144313; F6235-011

See generally CIB at xiii, 11-12 (Table A); CX-0909C at Q/A 78 (Table 3), 1953, 1955; RIB at x (citing CX-0909C at Q/A 78 (Table 3)); RX-0370C at Q/A 86.

II. STANDARDS OF LAW

A. Standing

Commission Rule 210.12 states in relevant part "[f]or every intellectual property based complaint (regardless of the type of intellectual property involved), [the complaint must] include a showing that at least one complainant is the owner or exclusive licensee of the subject intellectual property." 19 C.F.R. § 210.12(a)(7). In determining whether this rule is met, the Commission looks to the standing requirement used by courts in patent infringement cases. *Certain Audio Processing Hardware, Software, and Products Containing the Same*, Inv. No. 337-TA-1026, Comm'n Op. at 9 (April 18, 2018) (public version) (citations omitted).

B. Inventorship

Inventorship of a patent is presumed to be correct. *Hess v. Advanced Cardiovascular Sys., Inc.*, 106 F.3d 976, 980 (Fed. Cir. 1997). The Patent Act provides a basis for invalidating a patent, however, if it is shown that the particular inventive entity "did not himself invent the subject matter

[redacted]

sought to be patented." 35 U.S.C. § 102(f) (pre-AIA). Accordingly, if nonjoinder of an actual inventor is proven, a patent is rendered invalid. *Hess*, 106 F.3d at 1349 (citations omitted). Overcoming the presumption to show nonjoinder requires proof by clear and convincing evidence. *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1358 (Fed. Cir. 2004). "[A] long line of decisions . . . holds that a person is a joint inventor only if he contributes to the conception of the claimed invention." *Id.* at 1359 (citing *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1352 (Fed. Cir. 1998)). Joint inventorship, however, also requires the alleged joint inventor to demonstrate "that his labors were conjoined with the efforts of the named inventors." *Id.*

C. Claim Construction

"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." *Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1347 (Fed. Cir. 2000). Although most of the disputed claim terms were construed in an earlier order, some of the issues presented below are only resolvable with additional claim construction. (*See* Order No. 15.)

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); *see also Markman v. Westview Instr., Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc). As the Federal Circuit in *Phillips* explained, courts must analyze each of these components to determine the "ordinary and customary meaning of a claim term" as understood by a person of ordinary skill in art at the time of the invention. 415 F.3d at 1313. "Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001).

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"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.'" *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)). "Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claims terms." *Id.* at 1314; *see Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) ("In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to 'particularly point [ ] out and distinctly claim [ ] the subject matter which the patentee regards as his invention."). The context in which a term is used in an asserted claim can be "highly instructive." *Phillips*, 415 F.3d at 1314. Additionally, other claims in the same patent, asserted or unasserted, may also provide guidance as to the meaning of a claim term. *Id.* "Courts do not rewrite claims; instead, we give effect to the terms chosen by the patentee." *K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1364 (Fed. Cir. 1999).

"[T]he 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.'" *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). "[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs." *Id.* at 1316. "In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor." *Id.* 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. In the end, "[t]he construction that stays true to the claim language and most naturally

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aligns with the patent's description of the invention will be ... 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 claims and the specification, the prosecution history should be examined, if in evidence. *Id.* at 1317; *see Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004). 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." *Phillips*, 415 F.3d at 1317; *see Chimie v. PPG Indus. Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005) ("The purpose of consulting the prosecution history in construing a claim is to exclude any interpretation that was disclaimed during prosecution.").

When the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence (*i.e.*, all evidence external to the patent and the prosecution history, including dictionaries, inventor testimony, expert testimony, and learned treatises) may be considered. *Phillips*, 415 F.3d at 1317. Extrinsic evidence is generally viewed as less reliable than the patent itself and its prosecution history in determining how to define claim terms. *Id.* "The court may receive extrinsic evidence to educate itself about the invention and the relevant technology, but the court may not use extrinsic evidence to arrive at a claim construction that is clearly at odds with the construction mandated by the intrinsic evidence." *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977 (Fed. Cir. 1999).

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

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(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 GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) ("the specification and prosecution history only compel departure from the plain meaning in two instances: lexicography and disavowal."); *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." *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1366-67 (Fed. Cir. 2012); *see 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).

The introductory language to a claim, known as its preamble, may or may not be treated as a limitation of the claim. It does so when it "recites essential structure or steps, or is 'necessary to give life, meaning, and vitality to the claim.'" *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 770 (Fed. Cir. 2018) (citing *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002)). It does not become a limitation when, for example, it "merely

describe[s] intended uses for what is otherwise a structurally complete invention [and] do not impart any structure into or serve as antecedents for the claims at issue." *Id.* at 771.

One technique patent drafters employ is to use a claim's preamble to recite those elements of the invention that were known or in the prior art, and then discuss the allegedly inventive elements in the body of the claim, in order to better distinguish those inventive aspects. This is known as a Jepson claim. *See Epcon Gas Sys., Inc. v. Bauer Compressors, Inc.*, 279 F.3d 1022, 1029 (Fed. Cir. 2002). Use of the Jepson claim "evidences the intention 'to use the preamble to define, in part, the structural elements of [the] claimed invention.'" *Id.* (citing *Rowe v. Dror*, 112 F.3d 473, 479 (Fed. Cir. 1997)). "Thus, the preamble is a limitation in a Jepson-type claim." *Id.*; *see Howmedica Osteonics Corp. v. Wright Medical Tech., Inc.*, 540 F.3d 1337, 1344-45 (Fed. Cir. 2008) (holding the Jepson format preamble "is a separate limitation from the geometric requirements appearing the body of the claim").

D. Infringement

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman*, 52 F.3d at 976.

A patentee may prove infringement either literally or under the doctrine of equivalents. Infringement of either sort must be proven by a preponderance of the evidence. *SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988). A preponderance of the evidence standard "requires proving that infringement was more likely than not to have occurred." *Warner-Lambert Co. v. Teva Pharm. USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005).

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Literal infringement, a form of direct infringement, is a question of fact. *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1332 (Fed. Cir. 2008). "To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly." *Microsoft Corp. v. GeoTag, Inc.*, 817 F.3d 1305, 1313 (Fed. Cir. 2016) (quoting *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1575 (Fed. Cir. 1995). 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).

Doctrine of equivalents is also a form of direct infringement. One rubric for evaluating if a claimed feature is not literally, but nonetheless equivalent to, a claimed feature is known as the function-way-result test. Under this test, the accused feature is equivalent to the claim limitation when "it performs substantially the same function in substantially the same way to obtain the same result." *Duncan Parking Techs., Inc. v. IPS Grp., Inc.*, 914 F.3d 1347, 1362 (Fed. Cir. 2019) (quoting *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608 (1950)). Another test is known as in the insubstantial differences test, where "[a]n element in the accused device is equivalent to a claim limitation if the only differences between the two are insubstantial." *Voda v. Gordia Corp.*, 536 F.3d 1311, 1139 (Fed. Cir. 2008). The Supreme Court has further instructed, "the proper time for evaluating equivalency . . . is at the time of infringement, not at the time the patent was issued." *Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 37 (1997).

In addition to direct infringement, Section 271 of the Patent Act also defines two categories of indirect infringement, active inducement of infringement and contributory infringement. 35 U.S.C. § 271. For indirect infringement violations under Section 337, the direct infringement element may occur after importation, so long as all the other elements of indirect infringement are

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met at the time of importation. *See Certain Vision-Based Driver Assistance System Cameras and Components Thereof*, Inv. No. 337-TA-907, Comm'n Op. at 19 (Dec. 1, 2015) (citing *Suprema, Inc. v. Int'l Trade Comm'n*, 796 F.3d 1338, 1348 (Fed. Cir. 2015)). It is well settled that "[a]bsent direct infringement of the patent claims, there can be neither contributory infringement ... nor inducement of infringement." *Met–Coil Sys. Corp. v. Korners Unltd., Inc.*, 803 F.2d 684, 687 (Fed.Cir.1986) (citations omitted).

As to the first category, Section 271(b) of the Patent Act prohibits inducement: "[w]hoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b). *See DSU Med. Corp. v. JMS Co.*, 471 F.3d 1293, 1305 (Fed. Cir. 2006) (en banc) ("To establish liability under section 271(b), a patent holder must prove that once the defendants knew of the patent, they actively and knowingly aided and abetted another's direct infringement.") (citations omitted). "The mere knowledge of possible infringement by others does not amount to inducement; specific intent and action to induce infringement must be proven." *Id.* (citations omitted). A defendant's belief regarding patent validity is not a defense to a claim of induced infringement. *Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920 (2015). Similarly, a defendant's willful blindness on the question of infringement will satisfy the knowledge requirement. *Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 765, 768-771 (2011).

As to the second category, Section 271(c) of the Patent Act prohibits contributory infringement. *See* 35 U.S.C. § 271(c). "Under 35 U.S.C. § 271(c), a party who sells a component with knowledge that the component is especially designed for use in a patented invention, and is not a staple article of commerce suitable for substantial noninfringing use, is liable as a contributory infringer." *Wordtech Sys., Inc. v. Integrated Networks Solutions, Inc.*, 609 F.3d 1308, 1316 (Fed. Cir. 2010). Contributory infringement is premised upon a finding that: (1) the entity

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sells, offers to sell, or imports into the United States a component of a product; (2) the component has no substantial non-infringing use; (3) the component constitutes a material part of the claimed invention; (4) the entity was aware of the patent and knew that the product may be covered by a claim of the patent; and (5) the use of the component in the product directly infringes the claim. *See Certain Gaming & Entm't Consoles, Related Software, & Components Thereof*, Inv. No. 337-TA-752, Final Initial Remand Determination at 8 (Mar. 22, 2013). As with inducement, willful blindness on the question of infringement will satisfy the knowledge requirement. *Global-Tech*, 563 U.S. at 765, 768-771.

E. Domestic Industry

In an investigation based on a claim of patent infringement, Section 337 requires that an industry in the United States, relating to the articles protected by the patent, exist or be in the process of being established. 19 U.S.C. § 1337(a)(2). Under Commission precedent, the domestic industry requirement has been divided into (i) a "technical prong" " (which requires articles covered by the asserted patent) and (ii) an "economic prong" (which requires certain levels of activity with respect to the protected articles or patent itself). *See Certain Video Game Systems and Controllers*, Inv. No. 337-TA-743, Comm'n Op. at 6-7 (April 14, 2011) ("*Video Game Systems*").

1. Technical Prong

The technical prong of the domestic industry requirement is satisfied when the complainant in a patent-based section 337 investigation establishes that it is practicing or exploiting the patents at issue. *See* 19 U.S.C. §§ 1337 (a)(2), (3); *Certain Microsphere Adhesives, Process for Making Same and Prods. Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm'n Op. at 8 (U.S.I.T.C. Jan. 16, 1996). "In order to satisfy the technical prong of the domestic industry requirement, it is sufficient to show that the domestic industry practices any

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claim of that patent, not necessarily an asserted claim of that patent." *Certain Ammonium Octamolybdate Isomers*, Inv. No. 337-TA-477, Comm'n Op. at 55 (U.S.I.T.C. Aug. 28, 2003). Historically, the Commission permits the complainant's products, and those of its licensees, to be considered for technical prong purposes. *See Certain Magnetic Tape Cartridges and Components Thereof*, Inv. No. 337-TA-1058, Comm'n Op. at 28-29 (April 9, 2019) (public version).

The test for claim coverage for the purposes of the technical prong of the domestic industry requirement is the same as that for infringement. *See Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109 (U.S.I.T.C. May 21, 1990), *aff'd*, Views of the Commission at 22 (U.S.I.T.C. Oct. 31, 1990); *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003). "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." *Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109. As with infringement, 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, ID at 44, Pub. No. 2575 (U.S.I.T.C. May 15, 1992). In short, the patentee must establish by a preponderance of the evidence that the domestic product practices one or more claims of the patent.

2. Economic Prong

The "economic prong" of the domestic industry requirement is satisfied when there exists in the United States, in connection with products practicing at least one claim of the patent at issue: (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, and licensing. 19 U.S.C. § 1337(a)(3). Establishment of the "economic prong" is not dependent on any "minimum monetary expenditure" and there is no need for complainant "to define the

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industry itself in absolute mathematical terms." *Certain Stringed Musical Instruments and Components Thereof*, Inv. No. 337-TA-586, Comm'n Op. at 25-26 (May 16, 2008) ("*Stringed Instruments*"). However, a complainant must substantiate the significance of its activities with respect to the articles protected by the patent. *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm'n Op. at 30 (Feb. 17, 2011) ("*Imaging Devices*"). Further, a complainant can show that its activities are significant by showing how those activities are important to the articles protected by the patent in the context of the company's operations, the marketplace, or the industry in question. *Id.* at 27-28. That significance, however, must be shown in a quantitative context. *Lelo Inc. v. Int'l Trade Comm'n*, 786 F.3d 879, 886 (Fed. Cir. 2015). The Federal Circuit noted that when the ITC first addressed this requirement, it found the word "'significant' denoted 'an assessment of the *relative* importance of the domestic activities.'" *Id.* at 883-4 (internal citation omitted) (emphasis added). In general, "[t]he purpose of the domestic industry requirement is to prevent the ITC from becoming a forum for resolving disputes brought by foreign complainants whose only connection with the United States is ownership of a U.S. patent." *Certain Battery-Powered Ride-On Toy Vehicles*, Inv. No. 337-TA-314, USITC Pub. No. 2420, Initial Determination at 21 (Aug. 1991).

The Commission "has long recognized that the 'its' in the phrase 'investment in its exploitation' in subparagraph (C) refers to the asserted patent or other intellectual-property right being asserted. That conclusion is supported by the clear text of the statute." *Certain Integrated Circuit Chips and Products Containing the Same*, Inv. No. 337-TA-859, Comm'n Op. at 36 (Aug. 11, 2014) ("*Integrated Circuit Chips*"). This connection between the investment and the patent is known as the "nexus" requirement. *Id.* at 38. "To the extent that the patented technology arises from endeavors in the United States, such a nexus would ordinarily exist." *Id.* at 39.

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"'Exploitation' is a generally broad term that encompasses activities such as efforts to improve, develop, or otherwise take advantage of the asserted patent." *Id.* Similarly, investments in plant and equipment, labor, and capital that may fairly be considered investments in research and development are eligible for consideration under subsections (A) and (B), in addition to subsection (C). *See Certain Solid State Storage Drives, Stacked Electronics Components, and Products Containing Same*, Inv. No. 337-TA-1097, Comm'n Op. at 14 (June 29, 2018) ("*Solid State Storage Drives*").

F. Invalidity

1. 35 U.S.C. § 102

Pursuant to 35 U.S.C. § 102, a patent claim is invalid as anticipated if:

> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant;
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States;
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent;"
>
> (g)(2) before such person's invention thereof, the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it.

35 U.S.C. § 102 (pre-AIA). "A patent is invalid for anticipation if a single prior art reference discloses each and every limitation of the claimed invention. Moreover, a prior art reference may anticipate without disclosing a feature of the claimed invention if that missing characteristic is necessarily present, or inherent, in the single anticipating reference." *Schering Corp. v. Geneva*

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Pharm., Inc., 339 F.3d 1373, 1377 (Fed. Cir. 2003) (citations omitted); *see Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1354 (Fed. Cir. 2012).

2. 35 U.S.C. § 103

Section 103 of the Patent Act states:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. § 103(a) (pre-AIA). "Obviousness is a question of law based on underlying questions of fact." *Scanner Techs. Corp. v. ICOS Vision Sys. Corp. N.V.*, 528 F.3d 1365, 1379 (Fed. Cir. 2008). The underlying factual determinations include: "(1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the claimed invention and the prior art, and (4) objective indicia of non-obviousness." *Id.* (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966)). These factual determinations are often referred to as the "Graham factors."

The critical inquiry in determining the differences between the claimed invention and the prior art is whether there is a reason to combine the prior art references. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-21 (2007). In *KSR*, the Supreme Court rejected the Federal Circuit's rigid application of the teaching-suggestion-motivation test. While the Court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does," it described a more flexible analysis:

> Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a

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> person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue . . . . As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

Id. at 418. Since *KSR*, the Federal Circuit has announced that, where a patent challenger contends that a patent is invalid for obviousness based on a combination of prior art references, "the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device . . . and would have had a reasonable expectation of success in doing so." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007); *see KSR*, 550 U.S. at 399 ("The proper question was whether a pedal designer of ordinary skill in the art, facing the wide range of needs created by developments in the field, would have seen an obvious benefit to upgrading Asano with a sensor.").

In addition to demonstrating that a reason exists to combine prior art references, the challenger must demonstrate that the combination of prior art references discloses all of the limitations of the claims. *Hearing Components, Inc. v. Shure Inc.*, 600 F.3d 1357, 1373-4 (Fed. Cir. 2010) (abrogated on other grounds by *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S.Ct. 2120 (2014)) (upholding finding of non-obviousness based on the fact that there was substantial evidence that the asserted combination of references failed to disclose a claim limitation); *Velander v. Garner*, 348 F.3d 1359, 1363 (Fed. Cir. 2003) (explaining that a requirement for a finding of obviousness is that "all the elements of an invention are found in a combination of prior art references").

"A reference qualifies as prior art for a determination under § 103 when it is analogous to the claimed invention." *Innovention Toys, LLC v. MGA Entm't, Inc.*, 637 F.3d 1314, 1321 (Fed.

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Cir. 2011) (citing *In re Clay*, 966 F.2d 656, 658 (Fed. Cir. 1992)). "Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved." *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004) (citing *In re Deminski,* 796 F.2d 436, 442 (Fed. Cir. 1986)). One way of evaluating whether a reference is reasonably pertinent is to consider if, "logically [it] would have commended itself to an inventor's attention in considering his problem." *K-TEC, Inc. v. Vita-Mix Corp.*, 696 F.3d 1364, 1375 (Fed. Cir. 2012) (citing *Innovention*, 637 F.3d at 1321)). The requirement for prior art to be analogous is "meant to defend against hindsight." *In re Khan*, 441 F.3d 977, 986-987 (Fed. Cir. 2006).

An obviousness determination should also include a consideration of "secondary considerations" such as "commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." *Graham*, 338 U.S. at 17-18. "For [such] objective evidence to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention." *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995); *see Merck & Cie v. Gnosis S.P.A.*, 808 F.3d 829, 837 (Fed. Cir. 2015). "Where the offered secondary consideration actually results from something other than what is both claimed and novel in the claim, there is no nexus to the merits of the claimed invention." *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011).

3. 35 U.S.C. § 112

Pursuant to 35 U.S.C. § 112, a patent claim is invalid for lack of written description if the patent's specification fails to "reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharm., Inc. v. Eli Lilly &*

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Co., 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). "[T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skilled in the art," *id.*, and "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," *id.* (citing *Capon v. Eshar*, 418 F.3d 1349, 1357-58 (Fed. Cir. 2005)).

Additionally, under 35 U.S.C. § 112, a patent claim 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). Indefiniteness can result from a single claim covering both an apparatus and a method of use of that apparatus, as "a manufacturer or seller of the claimed apparatus would not know from the claim whether it might also be liable for contributory infringement because a buyer or user of the apparatus later performs the claimed method using the apparatus." *IPXL Holdings v. Amazon.com*, 430 F.3d 1377, 1384 (Fed. Cir. 2005); *see UltimatePointer, L.L.C. v. Nintendo Co.*, 816 F.3d 816, 826 (Fed. Cir. 2016) (holding these types of claims may make it "unclear whether infringement . . . occurs when one creates an infringing system, or whether infringement occurs when the user actually uses the system in an infringing manner") (citation omitted). "[A]pparatus claims are not necessarily indefinite for using functional language," however, as in, for example, means-plus-function formatted claims. *MasterMine Software, Inc. v. Microsoft Corp.*, 874 F.3d 1307, 1313 (Fed. Cir. 2017) (citing *Microprocessor Enhancement Corp. v. Tex. Instruments Inc.*, 520 F.3d 1367, 1375 (Fed. Cir. 2008)). Another example may be when the claim merely recites "that the system 'possesses the recited structure which is capable of performing the recited functions.'" *Id.* at 1315-16 (quoting *Microprocessor Enhancement*, 520 F.3d at 1375). Overall, "the written description is

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key to determining whether a term of degree is indefinite." *Guangdong Alison Hi-Tech Co. v. Int'l Trade Comm'n*, 936 F.3d 1353, 1361 (Fed. Cir. 2019) (citing *Sonix Tech. Co. v. Publ'ns Int'l, Ltd.*, 844 F.3d 1370, 1378 (Fed. Cir. 2017)) (emphasis in original).

Further, under 35 U.S.C. § 112, a patent specification must contain a description "of the manner and process of making and using" the invention. 35 U.S.C. § 112. This is referred to as the enablement requirement, and a patent claim is sufficiently enabled only when the specification teaches "those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation." *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997). To determine whether the specification leaves a person of ordinary skill to perform undue experimentation, the Federal Circuit has identified the following factors to consider: (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*, 585 F.2d 731, 737 (Fed. Cir. 1988). "[I]t is not necessary that a court review all the *Wands* factors to find a disclosure enabling. They are illustrative, not mandatory." *Amgen, Inc. v. Chugai Pharm. Co., Ltd.*, 927 F.2d 1200, 1213 (Fed. Cir. 1991).

G. Patent Misuse

A "basic rule of patent misuse [is] that the patentee may exploit his patent but may not 'use it to acquire a monopoly not embraced in the patent.'" *Princo Corp. v. Int'l Trade Comm'n*, 616 F.3d 1318, 1327 (Fed. Cir. 2010) (quoting *Transparent-Wrap Mach. Corp. v. Stokes & Smith Co.*, 329 U.S. 637, 643 (1947)). "[E]xpress conditions accompanying the sale or license of a patented product, such as field of use limitations, are generally upheld" yet "[w]hen those contractual

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conditions violate public policy, however, as in the case of price-fixing conditions and tying restraints, the underlying patents become unenforceable, and the patentee loses its right to sue for infringement or breach of contract." *Princo*, 616 F.3d at 1328. Congress has specified, however, certain acts which do not constitute patent misuse within 35 U.S.C. § 271(d):

> (d) No patent owner otherwise entitled to relief for infringement or contributory infringement of a patent shall be denied relief or deemed guilty of misuse or illegal extension of the patent right by reason of his having done one or more of the following: (1) derived revenue from acts which if performed by another without his consent would constitute contributory infringement of the patent; (2) licensed or authorized another to perform acts which if performed without his consent would constitute contributory infringement of the patent; (3) sought to enforce his patent rights against infringement or contributory infringement; (4) refused to license or use any rights to the patent; or (5) conditioned the license of any rights to the patent or the sale of the patented product on the acquisition of a license to rights in another patent or purchase of a separate product, unless, in view of the circumstances, the patent owner has market power in the relevant market for the patent or patented product on which the license or sale is conditioned.

35 U.S.C. § 271(d). With respect to subsections (1)–(3), the Supreme Court has explained these reflect a "grant[] to patent holders a statutory right to control nonstaple goods that are capable only of infringing use in a patented invention, and that are essential to that invention's advance over prior art." Dawson Chem. Co. v. Rohm & Haas Co., 448 U.S. 176, 213 (1980) ("*Rohm & Haas*").

With respect to subsection (5), the Supreme Court has explained "[i]n all cases involving a tying arrangement, the plaintiff must prove that the defendant has market power in the tying product" and "a patent does not necessarily confer market power upon the patentee." *Ill. Tool Works Inc. v. Indep. Ink, Inc.*, 547 U.S. 28, 46 (2006). That "market power" is, generally, "when the seller has some special ability—usually called 'market power'—to force a purchaser to do something that he would not do in a competitive market." *Jefferson Par. Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 13–14 (1984), *abrogated by*, *Ill. Tool Works Inc. v. Indep. Ink, Inc.*, 547 U.S. 28 (2006). For example, "[w]hen the seller's share of the market is high . . . or when the seller

offers a unique product that competitors are not able to offer, . . . the Court has held that the likelihood that market power exists and is being used to restrain competition in a separate market is sufficient to make per se condemnation appropriate." *Jefferson Par.*, 466 U.S. at 17 (citations omitted).

H. Patent Exhaustion

"The longstanding doctrine of patent exhaustion provides that the initial authorized sale of a patented item terminates all patent rights to that item." *Quanta Computer, Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 625 (2008). Thus, "[w]hen a patent holder authorizes the sale of a product that embodies a patent's inventive elements, he forfeits the right to exact royalties at subsequent points along the product's distribution chain." *High Point SARL v. T-Mobile USA, Inc.*, 640 F. App'x 917, 929 (Fed. Cir. 2016).

I. Inventorship

"A patent is invalid if more or less than the true inventors are named." *Trovan, Ltd. v. Sokymat SA, Irori*, 299 F.3d 1292, 1301 (Fed. Cir. 2002). The standard for showing this form of invalidity, like others, is clear and convincing evidence. *Hess v. Adv. Cardiovascular Sys., Inc.*, 106 F.3d 976, 980 (Fed. Cir. 1997); *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1350 (Fed. Cir. 1998). That evidence must overcome the presumption that the inventors are correct. *See Canon Computer Sys., Inc. v. Nu-Kote Int'l, Inc.*, 134 F.3d 1085, 1088 (Fed. Cir. 1998). "[A] person will not be a co-inventor if he or she does no more than explain to the real inventors concepts that are well known in the current state of the art." *Caterpillar Inc. v. Sturman Indus., Inc.*, 387 F.3d 1358, 1377 (Fed. Cir. 2004) (citing *Fina Oil & Chem. Co. v. Ewen*, 123 F.3d 1466, 1473 (Fed. Cir. 1997)). Yet, the Federal circuit has held:

> All that is required of a joint inventor is that he or she (1) contribute in some significant manner to the conception or reduction to practice of the

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> invention, (2) make a contribution to the claimed invention that is not insignificant in quality, when that contribution is measured against the dimension of the full invention, and (3) do more than merely explain to the real inventors well-known concepts and/or the current state of the art. *See Fina Oil & Chem. Co. v. Ewen*, 123 F.3d 1466, 1473, 43 U.S.P.Q.2d 1935, 1941 (Fed. Cir. 1997); *see also* Ethicon, Inc. v. United States Surgical Corp., 135 F.3d 1456, 1460, 45 U.S.P.Q.2d 1545, 1548 (Fed. Cir. 1998).

Pannu, 155 F.3d at 1351. "[A] co-inventor need not make a contribution to every claim of a patent . . . . A contribution to one claim is enough." *Ethicon, Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1460 (Fed. Cir. 1998).

III. JURISDICTION AND IMPORTATION

In its initial post-hearing brief, in a section entitled "In Rem Jurisdiction," Ingevity states:

> Respondents did not challenge personal jurisdiction or due process in their pre-trial brief and only challenged In Rem Jurisdiction as to Nagamine. The record here establishes that Nagamine sells MPAC for importation. JX-0242C (Nagamine) at 74:1-21; Tr. (Hitomi) at 813:7-12; CX-0909C (Rockstraw) at Q/A 2017.

CIB at 3. Although there is no mention of MAHLE or Kuraray here, Ingevity elsewhere provides descriptions of importation by all three Respondents:

- Respondent MAHLE –
    - sells a group of canisters Ingevity refers to as the "Domestically Manufactured Canisters" "to auto OEMs in the United States. . . . In doing so, MAHLE NA sells an article that infringes after importation." CIB at 30 (citing CX-0909C at Q/A 1953-1954, 2024-2027).
    - imports a group of canisters Ingevity refers to as the "Accused Imported Canisters" "for testing, replacement parts, and prototypes of other products." CIB at 122-123 (citing JX-0230C at 42:8-16, 42:18-43:1, 43:3-44:22, 44:24-45:4, 45:6-46:1, 46:3-6; 46:10, 67:21-68:13; CX-0909C at Q/A 1947, 1955-58; CX-1151C at *60).

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- sells the "Accused Imported Canisters" "for importation by others." CIB at 123 (citing JX-0230C at 40:22-41:25, 42:5-6; CX-0909C at Q/A 2027).

- Respondent Kuraray –
  - imports MPAC. *See* CIB at 31 (citing JX-0244C at 52:18-20), 33 (citing CX-0909C at Q/A 2005; JX-0244C at 55:20-25; JZ-0230C at 67:7-12), 122 (citing CX-0296C; CX-0297C; RX-[]0379C at Q/A 21-30).
  - sells MPAC for importation. CIB at 122 (citing CX-0296C; CX-0297C; JX-0035C; CX-0034C; JX-0242C at 74:19-21; RX-[]0379C at Q/A 21-30).
- Respondent Nagamine –
  - "in providing MPAC to Kuraray . . . sells an article that infringes for importation." CIB at 34 (citing CX-0909C at Q/A 2021-2022, 2027); *see* CIB at 122 (citing CX-0296C; CX-0297C; JX-0035C; CX-0034C; JX-0242C at 74:19-21; RX-[]0379C at Q/A 21-30).

In their initial-post hearing brief, Respondents also dedicate a section to importation and *in rem* jurisdiction; like Ingevity, they do not discuss the importation-related activities of respondents MAHLE and Kuraray. RIB at 4-5. In this section, Respondents exclusively address Nagamine and contest whether the importation requirement is satisfied. *See id.* Respondents argue Nagamine "conducts all of its activities in Japan" and "manufactures MPAC in Japan and sells and delivers MPAC exclusively to Kuraray Japan in Japan." *Id.* at 4 (citing CX-0626C; RX-0378C at Q/A 44; RX-0379C at Q/A 30; RX-0382 at Q/A 80; JX-0134C; JX-0242C at 74:19-21). Again, however, the briefs contain additional statements and admissions related to this issue for respondents MAHLE and Kuraray:

- Respondent MAHLE –

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- does "not sell for importation, import, or sell after importation, any Accused Product." RIB at 119 (citing RX-0370C at Q/A 128-130-132, 135).
- "does not typically import Accused Canisters manufactured outside the U.S." RIB at 120 (citing RX-0370C at Q/A 145-148).

- Respondent Kuraray –
  - "is the only Respondent that imports MPAC or holds U.S. inventory." RIB at 121 (citing RX-0382C at Q/A 274; RX-0733C; RX-0734C).

It goes without saying that the above excerpts are not a clear presentation of the issue. Nevertheless, Ingevity has shown satisfaction of the importation requirement for all of the Accused Products such that the Commission has jurisdiction. *See Sealed Air Corp. v. Int'l Trade Comm'n*, 645 F.2d 976, 985 (C.C.P.A. 1981).

Specifically, CX-0296C and CX-0297C cited above are stipulations entered into between Ingevity and Kuraray regarding importation, although not identified by Ingevity in its initial brief as such. CX-0296C makes it clear that Kuraray manufactures MPAC in Japan, sold for importation "at least one unit" of MPAC into the United States, and also imported "at least one unit" of MPAC into the United States through the activities of Calgon. CX-0296C at ¶¶ 3-5. Further, the stipulation acknowledges Calgon "delivers MPAC from its United States inventories of MPAC solely to Mahle to support the Kuraray Respondents' sales of MPAC to Mahle." *Id.* at ¶ 12.

Respondents' witness on this issue, Mr. Jackson, testified that MAHLE receives all the MPAC it purchases from Kuraray in the United States [redacted] RX-0370C at Q/A 134. This MPAC is then distributed in different ways. A portion of the MPAC is used in the construction of the Domestic Accused Products. RX-0370C at Q/A 128-133; *see* CX-0909C at Q/A 1953. MAHLE then sells these canisters to original equipment manufacturers (OEMs), which

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are the various automobile manufacturers which install the fuel vapor canisters in their automobiles. JX-0230C at 33:33:8-24, 35:13-36:1; CX-0909C at Q/A 1954.

The remaining MPAC is shipped to MAHLE's other manufacturing facilities outside the United States; specifically, Canada, Mexico, and Japan. *See* RX-0370C at Q/A 134, 146, 148; JX-0230C at 60:26-61:24; *but see* JX-0230C at 61:25-62:9 (witness believing that MPAC [redacted]). These facilities construct the Foreign Accused Products. CX-0909C at Q/A 1955; RX-0370C at Q/A 148. The completed canisters are then sold to OEMs who pick them up from each respective facility. RX-0370C at Q/A 148; JX-0230C at 35:13-36:20. Mr. Jackson testified that it is the OEMs who import the vehicles containing the Foreign Accused Product into the United States. JX-0230C at 40:20-42:12, 46:23-47:11; RX-0370C at Q/A 148. It is not seriously disputed that MAHLE knows the identity of the vehicles into which each of its canisters goes (*see, e.g.*, RX-0370C at Q/A 86) and that these vehicles are known to be headed to the U.S. market (*see, e.g.*, CX-0909C at Q/A 2079; CX-0636C; JX-0230C at 39:22-41:6, 46:23-47:11, 288:3-289:15; RIB at 124 (discussing remedial orders affecting the U.S. market).

Further, there is evidence that MAHLE itself, at times, imports Foreign Accused Products into the United States for testing purposes because none of MAHLE's manufacturing facilities outside the United States have their own canister testing facilities. *See* JX-0230C at 42:13-46:10; *see also* JX-0230C at 71:3-7, 72:7-10. Respondents do not dispute, but add that it is not "typical" (RIB at 120; RX-0370C at Q147 ("there have been some instances where a small number of fuel vapor canisters containing MPAC-1 were shipped into the United States for testing purposes."))—a contention they have held since filing their responses to the complaint (*see* EDIS Doc. ID 666047 at 7 ("MAHLE Mexico is not typically the party that imports any fuel vapor canisters"), 8

[redacted]

("MAHLE Canada is not typically the party that imports any fuel vapor canisters")). Given the MAHLE witness's description of those extraterritorial facilities as lacking their own testing equipment (*see* JX-0230C at 42:13-47:11, 67:21-68:13), it is more likely than not that the Foreign Accused Products have been imported by MAHLE itself into the United States—with one exception. The exception is the F6235-011 canister manufactured by MAHLE in Japan, which Mr. Jackson testified never enters the U.S because its purchaser, [redacted] JX-0230C at 68:3-9.

I find the importation requirement under 19 U.S.C. § 1337(a)(1)(B) satisfied, and find the Commission has *in rem* jurisdiction over the Accused Products, which are fuel vapor canisters incorporating MPAC. Ingevity's claims of infringement, both direct and indirect, involve the use of MAHLE's Accused Products within the United States. The above evidence shows the Foreign Accused Products have been imported by themselves (for testing) or as part of OEM assembled vehicles. The evidence shows that MPAC, a significant component of the Domestic Accused Products, is also imported into the United States. Thus, given Ingevity's direct and indirect claims of infringement in this investigation, the Commission has *in rem* jurisdiction. *Cisco Sys., Inc. v. Int'l Trade Comm'n*, 873 F.3d 1354, 1359, 1362-63 (Fed. Cir. 2017).

Apart from *in rem* jurisdiction, there is a dispute between the parties as to whether the importation requirement has been satisfied as to MAHLE and Nagamine. Respondents present this dispute for Nagamine in a discussion of importation, arguing Nagamine "manufactures MPAC in Japan and sells and delivers MPAC exclusively to Kuraray Japan in Japan." RIB at 4-5. Respondents discuss MAHLE in the context of remedy, arguing that no exclusion order should apply to MAHLE because it "does not sell for importation, import, or sell after importation, any Accused Product." *Id.* at 119-120.

[redacted]

Section 337 makes it unlawful to import into the United States, sell for importation, or sell after importation articles that infringe, directly or indirectly, a valid U.S. patent. 19 U.S.C. § 1337(a)(1)(B). "Whether the Commission has jurisdiction over certain activities is a question of law, and the Commission has broadly interpreted its jurisdiction under section 337. . . . The Commission has held in the section 337 context that it has jurisdiction to act if there is some nexus between a respondent's activities and the importation of the products accused of infringement." *Certain Cigarettes and Packaging Thereof*, Inv. No. 337-TA-643, Comm'n Op. at 7 (Oct. 1, 2009) ("*Cigarettes*").

As noted above, per the parties' stipulation, Kuraray imports MPAC into the United States (CX-0296 at ¶ 7), with MPAC being central to Ingevity's claims of indirect infringement. Thus, the importation requirement is satisfied with respect to Kuraray and, should all other required elements be found, Kuraray would violate section 337.

As for respondent MAHLE, it sells the Domestic Accused Products after the MPAC contained within has been imported. This is a sale after importation. MAHLE also imports all but one of the Foreign Accused Products into the United States, and sells for importation all of the Foreign Accused Products to OEMs. Given Ingevity's claims of direct and indirect infringement, MAHLE would therefore violate section 337, should all other required elements be found.

As for respondent Nagamine, there is no evidence that it imports MPAC into the United States. Ingevity instead claims that "Nagamine sells its MPAC exclusively to Kuraray, which it knows to resell to MAHLE." CIB at 34 (citing JX-0242C at 74:1-21; Hr'g Tr. at 813:7-12; CX-0909C at Q/A 2017). Ingevity contends this is a sale for importation under the statute. *Id.* at 3.

Nagamine sells the MPAC it produces to Kuraray, and Kuraray imports that MPAC (as well as the MPAC produced by Kuraray) into the United States. JX-0242C at 74:9-21; RX-0378C

[redacted]

at Q/A 39, 44, 45. Whether this alone constitutes sale "for" importation, as opposed to mere sale followed by importation, is not entirely clear. The Commission's standard for evaluating sale for importation is both flexible and liberal. *Cigarettes*, Comm'n Op. at 8-9 (finding sale for importation by "broker" of gray market goods "even though it never owns or possesses" the goods). Assuming that sale for importation requires, at minimum, knowledge that the United States is the destination of the product sold, that requirement has been met. The evidence shows that [redacted] (RX-0378C at Q/A 25) and [redacted] (*id*. at Q/A 28-29; JX-0242C at 22:21-24:5). [redacted] (JX-0242C at 38:21-39:13) and that the [redacted] (*id*. at 37:19-38:1). Thus, given Ingevity's claims of direct and indirect infringement, Nagamine would violate section 337, should all other elements be found.

IV. U.S. PATENT NO. RE38,844

A. Level of Ordinary Skill in the Art

In Order No. 15, I determined that a person having ordinary skill in the art of the 844 patent at the time of invention "would have a bachelor's degree in chemistry, chemical engineering, or mechanical engineering, and at least one year of experience working with automotive emissions such that they are familiar with the phenomena of vapor adsorption and desorption and their measurement." Order No. 15 at 7. In its initial post-hearing brief, Ingevity challenges this description as improperly including reference to mechanical engineering:

> The ALJ preliminarily found that a POSITA might need experience with automotive emissions and might have a mechanical engineering background. Order No. 15 at 7. But the '844 Patent is not concerned with mechanical apparatuses or processes, and thus a POSITA should not be

[redacted]

> defined to include mechanical engineering. Tr. (Rockstraw) at 690:5-13 (mechanical engineering not appropriate). The Patent describes discoveries related to the use of adsorbents (in commercial practice, activated carbons) to capture fuel vapors—concepts directed to the chemical engineering arts. Experience using adsorbents generally would be sufficient without specific applications, such as in automotive emissions. Tr. (Rockstraw) at 184:24-185:4, 260:262:2.

CIB at 4.

I disagree. The 844 patent does not relate to the discovery of any particular adsorbent or its chemical properties. Rather it relates to the arrangement of two adsorbents, otherwise known, in a particular order within a fuel vapor system of an automobile. Ingevity itself states, "[h]ere, the novel aspect of the Patent is the combination of high-IAC and low-IAC adsorbent volumes in a particular configuration in a fuel vapor canister to reduce bleed emissions." CIB at 72.

The 844 patent is consistent with Ingevity's "particular configuration in a fuel vapor canister" description:

> Disclosed is a method for sharply reducing diurnal breathing loss emissions from automotive evaporative emissions control systems by providing multiple layers, or stages, of adsorbents. On the fuel source-side of an emissions control system canister, high working capacity carbons are preferred in a first canister (adsorb) region. In subsequent canister region(s) on the vent-side, the preferred adsorbent should exhibit a flat or flattened adsorption isotherm on a volumetric basis and relatively lower capacity for high concentration vapors as compared with the fuel source-side adsorbent.

844 patent at Abstract;

> The disclosed invention relates to the use of multiple beds (or layers, stages, or chambers) of adsorbent materials, which, in combination, significantly reduce DBL emissions while maintaining the high working capacity and low flow restriction properties of the canister system.

id. at 4:9-13. The figures of the 844 patent also demonstrate an emphasis on the use of adsorbents within a structure (*e.g.*, a canister) such that the flow of fuel vapor is directed into and through the adsorbents in a particular sequence. *See id.* at Figs. 1-3. The claims, where the actual invention is defined, are not directed to the mere use of an adsorbent with particular properties, but rather

[redacted]

the arrangement of volumes of those adsorbents with respect to the flow of fuel vapor. *See, e.g.*, cls. at 2-7. Indeed, independent claims 31 and 43, at issue here, include lengthy recitations (which are limiting, as discussed below) of the mechanical components of automotive fuel vapor systems, such as:

> a fuel tank for storing a volatile fuel, an engine having an air induction system and adapted to consume the fuel, a canister containing an initial volume of fuel vapor adsorbent material for temporarily adsorbing and storing fuel vapor from the tank, a conduit for conducting fuel vapor from the tank to a canister vapor inlet, a fuel vapor purge conduit from a canister purge outlet to the induction system of the engine, and a vent/air opening for venting the canister and for admission of air to the canister during operation of the engine induction system . . . .

Id. at cl. 31; *see id.* at cl. 43. Further still, an important aspect of the 844 patent is the technique known as volumetric dilution, which is a manner of affecting the adsorption properties of a volume of activated carbon. The patent states:

> Two approaches are described for attaining the preferred properties for the vent-side adsorbent volume. One approach is to use a filler and/or bed voidages as a volumetric diluent for flattening an isotherm. A second approach is to employ an adsorbent with the desired isotherm properties and to process it into an appropriate shape or form without necessarily requiring any special provision for dilution. Both such approaches provide a substantially lower emissions canister system without a significant loss in working capacity or an increase in flow restriction compared with prior art adsorbents used for automotive emissions control.

Id. at 3:53-64. Neither of these "approaches" is connected to the *chemical* properties of the carbon. The first has to do with filling a compartment with non-adsorbing materials to, effectively, waste otherwise usable space; and the second with the shape of the activated carbon pellets. The last statement emphasizes the value in minimizing any restriction on flow of the fuel vapor (*i.e.*, fluid flow) through the adsorbents. The shape of a solid structure and fluid flow around and through such shapes are undeniably mechanical engineering concepts. The latter would be known as fluid mechanics.

[redacted]

Ingevity's basis for challenging the relevance of mechanical engineering concepts to the person of ordinary skill seems to be based on Dr. Rockstraw's testimony that the concept of "incremental adsorption capacity" is not taught in the mechanical engineering curriculum he knows of (CIB at 4 (citing Hr'g Tr. at 690:5-[15])) and a lack of his own experience in automotive systems (CIB at 4 (citing Hr'g Tr. at 184:24-185:4, 260:3-262:2)). I do not find these grounds to be persuasive in light of the actual content of the 844 patent or even the automotive industry to which the patent pertains. Thus, there is no reason to diverge from the definition of a person of ordinary skill in the art as set forth in Order No. 15, and I apply it throughout this initial determination.

B. Claims-at-Issue

Claims 1-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 38, 39, 41, 43, 45, 48-51, and 53 of the 844 patent are at issue in this investigation, either through allegations of infringement or of the domestic industry technical prong, with claims 31-54 added by the reissue (844 patent at 1:5-8, 12:40-14:64):

> 1. A method for reducing fuel vapor emissions in automotive evaporative emissions control systems comprising the steps of contacting the fuel vapor with an initial adsorbent volume having incremental adsorption capacity at 25° C. of greater than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane and at least one subsequent adsorbent volume having an incremental adsorption capacity of less than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane.
>
> 2. The method of claim 1 comprising a single subsequent adsorbent volume.
>
> 3. The method of claim 1 comprising multiple subsequent adsorbent volumes.
>
> 4. The method of claim 2 wherein the initial adsorbent volume and the subsequent adsorbent volume are located within a single automotive evaporative emission control canister.

5. The method of claim 3 wherein the-initial adsorbent volume and the subsequent adsorbent volumes are located within a single automotive evaporative emission control canister.

. . . .

8. The method of claim 1 wherein the initial adsorbent volume and the subsequent adsorbent volume are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer having been activated by a process selected from the group consisting of chemical, thermal, and combined chemical/thermal activation methods.

. . . .

11. The method of claim 1 wherein the subsequent adsorbent volume exhibits adsorption capacities achieved by volumetric dilution.

12. The method of claim 11 wherein the volumetric dilution is accomplished by the addition of a non-adsorbing filler as a co-ingredient by an addition process selected from the group consisting of addition with the activated carbon raw material prior to activation, addition with the adsorbent before forming into a shaped particle or monolith, and a combination thereof.

13. The method of claim 11 wherein the volumetric dilution is accomplished by forming the adsorbent into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons.

14. The method of claim 11 wherein the volumetric dilution is accomplished by forming the adsorbent into a honeycomb or monolith shape.

. . . .

16. The method of claim 12 wherein the non-adsorbing filler is a solid after processing.

. . . .

18. In a method of reducing fuel vapor emissions in an automotive evaporative emissions control system comprising removing at least one volatile organic compound from a volatile organic compound-containing fuel vapor by routing the fuel vapor through a vapor adsorbent, the improvement comprising sequentially routing the fuel vapor through an initial adsorbent material-containing volume wherein the initial adsorbent material is characterized by an incremental adsorption capacity at 25° C. of greater than 35 g n-butane/L between vapor concentrations of 5 vol % and

50 vol % n-butane before routing the fluid stream through at least one subsequent adsorbent-containing volume prior to venting to the atmosphere wherein the subsequent adsorbent-containing volume is characterized by an incremental adsorption capacity at 25° C. of less than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane.

19. The method of claim 18 wherein the initial adsorbent volume and the subsequent adsorbent volume are located in a single automotive evaporative emissions canister.

. . . .

21. The method of claim 18 wherein the initial adsorbent volume and the subsequent adsorbent volume are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer and activated by chemical and/or thermal activation methods.

. . . .

24. The method of claim 18 wherein the subsequent adsorbent volume exhibits adsorption capacities achieved by volumetric dilution.

25. The method of claim 24 wherein the volumetric dilution is accomplished by the addition of a non-adsorbing filler as a co-ingredient by an addition process selected from the group consisting of addition with the activated carbon raw material prior to activation, addition with the adsorbent before forming into a shaped particle or monolith, and a combination thereof.

26. The method of claim 24 wherein the volumetric dilution is accomplished by forming the adsorbent into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons.

27. The method of claim 24 wherein the volumetric dilution is accomplished by forming the adsorbent into a honeycomb or monolith shape.

. . . .

29. The method of claim 25 wherein the non-adsorbing filler is a solid after processing.

. . . .

31. In an evaporative emissions control system for a vehicle comprising, in combination, a fuel tank for storing a volatile fuel, an engine having an air induction system and adapted to consume the fuel, a canister containing an

initial volume of fuel vapor adsorbent material for temporarily adsorbing and storing fuel vapor from the tank, a conduit for conducting fuel vapor from the tank to a canister vapor inlet, a fuel vapor purge conduit from a canister purge outlet to the induction system of the engine, and a vent/air opening for venting the canister and for admission of air to the canister during operation of the engine induction system, wherein the canister is defined by a fuel vapor flow path via the canister vapor inlet through the initial volume of vapor adsorbent within a first region of the canister toward the vent/air opening, and an air flow path through a subsequent volume of adsorbent within a second region of the canister at the vent/air opening and the first region at the purge outlet, such that fuel vapor formed in the tank flows through the vapor inlet into the initial volume of adsorbent where it is adsorbed and, during operation of the engine induction system, ambient air flows in a path to and through the vent/air opening and along the air flow path in the canister through the initial volume and the purge outlet to the induction system of the engine, the flow of air removing a portion of the adsorbed fuel vapor but leaving a residue of fuel in the initial volume,

the improvement wherein at least one subsequent volume of vapor adsorbent material comprises a volume of 1 % to 100 % of the first volume and is located either inside of the canister within the second region thereof or outside of the canister, and wherein the initial volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25° C. of greater than 35 g n-butane/L-bed between vapor concentrations of 5 vol % and 50 vol % n-butane before routing the air flow through at least one subsequent volume of vapor adsorbent material wherein the subsequent volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25° C. of less than 35 g n-butane between vapor concentrations of 5 vol % and 50 vol % n-butane.

. . . .

33. The system of claim 31 wherein the initial volume of vapor adsorbent material and the subsequent volume of vapor adsorbent material are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer having been activated by a process selected from the group consisting of chemical, thermal, and combined chemical/thermal activation methods.

. . . .

36. The system of claim 31 wherein the subsequent volume of vapor adsorbent material exhibits adsorption capacities achieved by volumetric dilution.

[redacted]

. . . .

38. The system of claim 36 wherein the volumetric dilution is accomplished by forming the adsorbent material into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons.

39. The system of claim 36 wherein the volumetric dilution is accomplished by forming the adsorbent into a honeycomb or monolith shape.

. . . .

41. The system of claim 37 wherein the non-adsorbing filler is a solid after processing.

. . . .

43. A canister operative for use in automotive systems for emission control defined by a canister vapor inlet to permit a fuel vapor flow path through an initial volume of vapor adsorbent within a first region of the canister toward a canister vent/air opening to permit a continued air flow path through a subsequent volume of adsorbent within a second region of the canister at the vent/air opening and the first region at a canister purge outlet, such that fuel vapor formed in a tank for storing volatile fuel flows through the canister vapor inlet into the initial volume of adsorbent where it is adsorbed and, during operation of an engine induction system, ambient air is caused to flow in a path to and through the vent/air opening and along the air flow path in the canister through the initial volume and the purge outlet to the induction system of the engine, wherein the flow of air removing a portion of the adsorbed fuel vapor but leaving a residue of fuel in the initial volume, and wherein at least one subsequent volume of vapor adsorbent material comprises a volume of 1% to 100 % of the initial volume and is located either inside of the canister within the second region thereof or outside of the canister, and wherein the initial volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25° C. of greater than 35 g n-butane/L-bed between vapor concentrations of 5 vol % and 50 vol % n-butane before routing the air flow through at least one subsequent volume of vapor adsorbent material wherein the subsequent volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25° C. of less than 35 g n-butane between vapor concentrations of 5 vol % and 50 vol % n-butane.

. . . .

45. The canister of claim 43 wherein the initial volume of vapor adsorbent material and the subsequent volume of vapor adsorbent material are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal

[redacted]

tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer having been activated by a process selected from the group consisting of chemical, thermal, and combined chemical/thermal activation methods.

. . . .

48. The canister of claim 43 wherein the subsequent volume of vapor adsorbent material exhibits adsorption capacities achieved by volumetric dilution.

49. The canister of claim 48 wherein the volumetric dilution is accomplished by the addition of a non-adsorbing filler as a co-ingredient by an addition process selected from the group consisting of addition with the activated carbon raw material prior to activation, addition with the adsorbent before forming into a shaped particle or monolith, and a combination thereof.

50. The canister of claim 48 wherein the volumetric dilution is accomplished by forming the adsorbent material into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons.

51. The canister of claim 49 wherein the volumetric dilution is accomplished by an adsorbent formed into a honeycomb or monolith shape.

. . . .

53. The canister of claim 49 wherein the non-adsorbing filler is a solid after processing.

54. The canister of claim 49 wherein the non-adsorbing filler is volatized or combusted to form voidages larger than 50 Å width within the shaped particle or monolith.

See CIB at 6, 34-43.

C. Claim Construction

As part of the *Markman* process, the following terms of the 844 patent were construed, either as-agreed between the parties or determined by Order No. 15:

Claim Term	Construction
"high voidage shapes"	"the Markush group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons"

[redacted]

"adsorption capacity"	"the mass of a particular gas adsorbed at a particular vapor concentration and temperature, at equilibrium, by a particular adsorbent volume"
"incremental adsorption capacity"	"the difference in adsorption capacity of the adsorbent volume between the conditions recited in the claims and expressed in the recited units"
"initial adsorbent volume" / "initial volume of adsorbent material" / "initial volume of vapor adsorbent material" / "initial volume of fuel vapor adsorbent material"	"a volume containing an adsorbent that comes before, with respect to the flow of vapors from the fuel tank, the subsequent adsorbent volume"
"subsequent volume of adsorbent" / "subsequent volume of adsorbent" / "subsequent volume of vapor adsorbent material" / "second volume of vapor adsorbent material"	"a volume containing an adsorbent that comes after, with respect to the flow of vapors from the fuel tank, the initial adsorbent volume"
"cylinder"	"a substantially cylindrical shape"
"trapped air spaces"	"internal air spaces operative as volumetric diluents"

See Order No. 15 at 14, 25, 29, 33, 34. Notably, I declined for reasons expressed in Order No. 15 to construe "adsorbent volume," or related terms "vapor adsorbent volume," "volume of vapor adsorbent material," and "volume of fuel vapor adsorbent material." *Id.* at 25, 29, 30. I similarly declined to construe "hollow cylinder." *Id.* at 32. These are now discussed below.

1. "Hollow Cylinder"

The parties identify the claim term "hollow cylinder" as needing construction and being relevant to, for example, the issues of infringement, technical prong domestic industry, and prior art-based invalidity. CIB at 5-6; *see generally* RIB at 27-28. Ingevity contends a "hollow cylinder" "should mean a cylinder with one or more voids in it" as "an example of 'special thin-walled cross-sectional shapes' that are extruded." CIB at 5 (citing 844 patent at 4:20-25, 7:18-22,

[redacted]

10:11-16). Respondents initially do not offer their own construction yet argue "hollow cylinder" is nonetheless not met by MPAC. *See* RIB at 27 (alleging Dr. Rockstraw does not analyze what "hollow" means), 28 (alleging Ingevity witnesses, fact and expert, "admit that MPAC is not hollow under the plain and ordinary meaning of the term. . . . The inquiry should end there . . . ." and arguing a mass-to-empty space comparison shows MPAC is not hollow). In their reply brief, Respondents are more explicit, arguing "hollow" means "empty." RRB at 6-7 (citing Hr'g Tr. at 247:24-248:2; JX-0252C at 281:15-17).

The 844 patent does not include any figures or written description of a "hollow cylinder." *See generally* 844 patent. It seems natural, then, that the term should be given a broad, plain and ordinary meaning consistent with the 844 patent claims' recitation of "cylinder" and "hollow cylinder" in a single limitation (implying "cylinder" alone is non-hollow). *See, e.g.*, 844 patent at cl. 13. Ingevity's proposed construction, "a cylinder with one or more voids," generally fits these criteria. However, to be operative the voids must provide for fluid passage from one end of the cylinder to the other. Respondents' expert, Mr. Lyons, testified that a cylinder with an open internal cavity but also an "X" or "criss-cross" solid carbon shape running down its center would not be hollow because that cylinder would not have an "empty space." *See* RX-0381C at Q/A 398-403; RRB at 7. But an "X" internal shape does not preclude the existence of an "empty space," as empty spaces are created in between each arm of the "X."

Combining these two observations, a cylinder with one or more voids or empty spaces, and that allows for fluid passage from one end of the cylinder to the other, is a cylinder possessing a generally understood (*i.e.*, plain and ordinary) characteristic of a "hollow" structure. In fact, to the extent Respondents take up their expert's construction of "hollow" as an "empty space," that actually comports with Ingevity's construction of "voids," as a void is by definition an empty

space. If there is reason to further narrow or restrict the nature of the voids within the cylinder (*e.g.*, the void must result in a cylinder wall of constant thickness), the parties have not presented it to me. I therefore construe "hollow cylinder" as a "cylinder with one or more voids or empty spaces that allow for fluid passage from one end of the cylinder to the other" and apply this construction for the purposes of this initial determination.

2. Claim Preambles

Related to claim construction, the parties recognize the possibility that the preambles of claims 1, 18, 31, and 43 may be limiting. *See* CIB at 21 ("to the extent any preamble is limiting, each are met . . . ."), 23, 38, 39; RIB at 37 ("Ingevity did not prove that the DI Products practice claims 31, 43, or any of their dependent claims, if the preambles are limiting"). Neither party, however, actually contends that the preambles are or are not limiting. *See generally* CIB; RIB; CRB; RRB; RX-0381C at Q/A 423, 435.

Nevertheless, the preambles of claims 1, 18, 31 and 43 are limiting. In claim 1, the preamble recites "reducing fuel vapor emissions" and the body of the claim refers to that same fuel vapor with antecedent basis language, "the steps of contacting *the* fuel vapor." 844 patent at cl. 1 (emphasis added). Further, the claim body's recitation of "initial" and "subsequent" has very little meaning when divorced from the preamble's recitation of "fuel vapor emissions in automotive evaporative emissions control systems." *Id.* I therefore find the preamble of claim 1 gives life and meaning to the remainder of the claim, so as to be limiting.

The preamble of Claim 18 is also limiting as it recites the same "reducing fuel vapor emission in an automotive evaporative emissions control system," with the body of the claim then referring to "the fuel vapor" routed through "initial" and "subsequent" adsorbents. 844 patent at cl. 18. Further, the preamble of claim 18 is followed by "the improvement comprising," which is Jepson formatting and another mark of a limiting preamble. 844 patent at cl. 18; *Epcon Gas,* 279

[redacted]

F.3d at 1029. Claim 31 is similar, including Jepson language "the improvement wherein," and otherwise reciting an extreme amount of structural language in the preamble that can only be viewed as intended to give meaning and life to the remaining body of the claim, especially as necessary context for "initial" and "subsequent" adsorbents later recited. *Id.* at cl. 31.

Lastly, the vast majority of claim 43 is limiting. Unlike claims 1, 18, and 31, a preamble in claim 43 is not easily identifiable, and there is also no Jepson formatting language separating the invention from conventional elements. *See* 844 patent at cl. 43. If there is a preamble, it would likely be "[a] canister operative for use in automotive systems for emission control defined by . . . ." *Id.* This language is enough, however, to differentiate claim 43 from claims 1, 18, and 31 such that it is clear claim 43 is directed to a canister apparatus, as opposed to a method of using a canister (claims 1, and 18), or a larger emissions control system within an automobile that includes a canister as a constituent (claim 31). With this direction in mind, there are only three phrases within the claim that are not limiting. These phrases are "formed in a tank for storing volatile fuel," "during operation of an engine induction system," and "to the induction system of the engine." These phrases describe structures which are obviously not part of a canister apparatus, but the environment in which the canister is expected to operate. As such, they do not lend essential meaning to the inventive features of the canister and are therefore not limiting. *Acceleration Bay*, 908 F.3d at 770. All other language, however, is limiting.

3. 35 U.S.C. § 112, ¶ 2 (Indefiniteness)

It is further appropriate at this time to discuss Respondents' two claims of indefiniteness. As I previously noted, the prehearing briefing on indefiniteness was not sufficiently fleshed out, so resolution of the issue—which Respondents first presented before the evidentiary hearing—was deferred. *See* Order No. 15 at 23-25. The parties have now briefed the issue much more thoroughly; the parties' positions are summarized below.

[redacted]

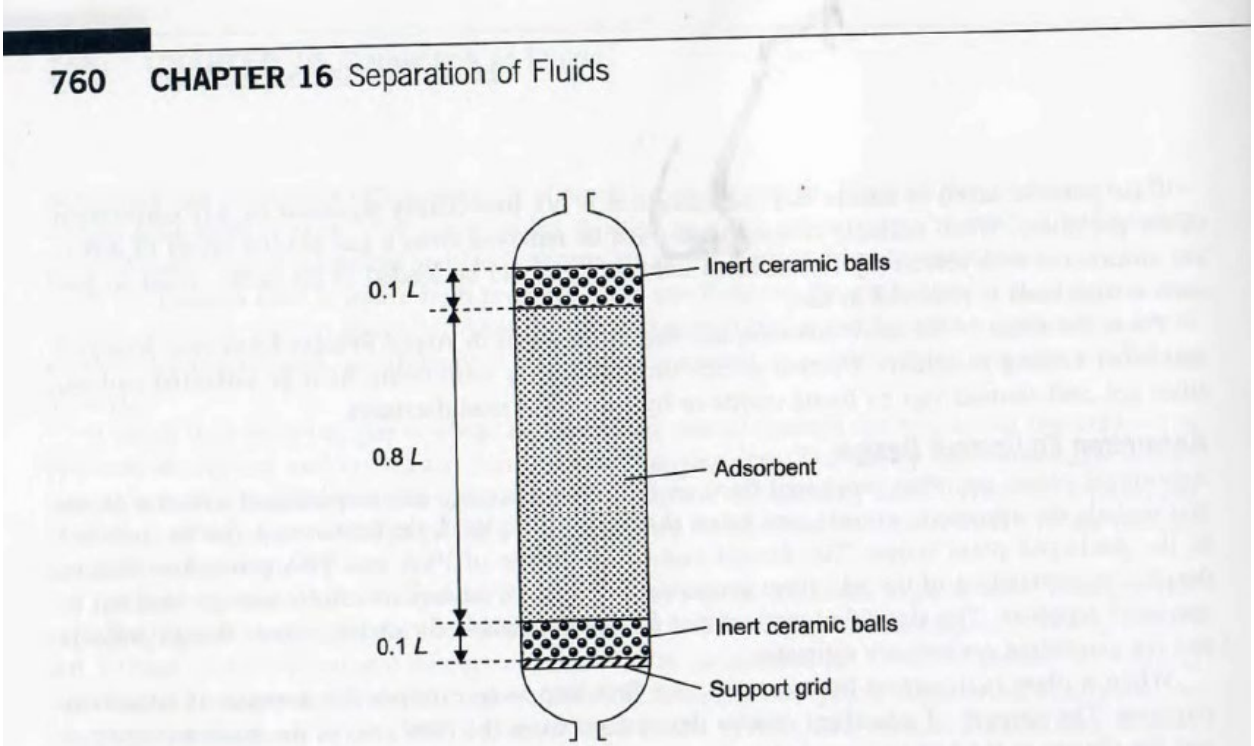
a. Volume Terms

First, Respondents identify a collection of claim terms referred to as the "Volume Terms" (RIB at xi, 38) as indefinite and note these appear in the ordered constructions for "adsorption capacity" and "incremental adsorption capacity" ("IAC") (*id.* at 39). This is important, according to Respondents, because IAC "is a function of volume, namely grams of n-butane per liter. . . . Thus, a change in the magnitude of the adsorbent volume necessarily changes the IAC of that adsorbent volume." RIB at 39 (citing RX-0380C at Q/A 170). Respondents argue that the effect of volumetric dilution on IAC eliminates reasonable certainty as to the scope of the Volume Terms because "it is not apparent whether or how to include those diluents or where any such adsorbent starts or ends." *Id.* at 40 (citing RX-0380C at Q/A 168-169). Respondents cite to various portions of the specification to show a lack of guidance on these questions (*see id.* at 40-42) and to Order No. 15's discussion of "trapped air spaces" and "air gaps" as an example of ambiguity affects the scope of the Volume Terms (*see id.* at 41-44 ("All of these different ways of treating the air gap in the calculations will lead to different IAC results, which, in some instances, will lead to different conclusions regarding infringement or non-infringement."), 44-45 (citing *Advanced Aerospace Techs., Inc. v. United States*, 124 Fed. Cl. 282 (Fed. Cl. 2015)). Respondents also view Ingevity and its witnesses as changing their explanations, or contradicting each other, on what would be the proper bounds for adsorbent volumes. *See id.* at 45-49 (citations omitted).

In response to this ground of indefiniteness, Ingevity argues Respondents' discussion of diluents is of no import because "the adsorbent volume is limited to adsorbent bed plus any diluents added to the bed, [such that] the bounds of the adsorbent volu[m]e are readily ascertainable so there is no ambiguity regarding what is and is not part of the volume." CIB at 53. Ingevity further contends that even if the Volume Terms of the independent claims are considered indefinite, that

problem is fixed by "claims 12-14 and their analogs (claims 25-27, 37-39, and 49-51) . . . because those claims' additional limitations clarify the boundaries of the 'adsorbent volume.'" *Id.*

Overall, however, Ingevity argues "'adsorbent volume' had a recognized meaning to a POSITA," with that meaning being "packed beds." *See* CIB at 54 (citing Hr'g Tr. at 704:12-18; CX-1143C at Q/A 87-90; 844 patent at 4:9-13, 4:31-32, 5:11-18, 6:6-14). Ingevity cites one publication in particular, CX-0959 ("Towler"), as showing a packed bed of adsorbent sandwiched between two layers of inert ceramic balls, yet referring to just that bed as the "adsorbent volume:"



> The *volume of each adsorbent bed* can be estimated from the mass of adsorbent and the adsorbent bulk density. Fixed beds of adsorbent are usually used, to give a sharp adsorption concentration profile. The adsorption vessel can then be sized as a cylindrical pressure vessel that contains the *adsorbent volume*, using the pressure vessel design methods given in Chapter 14. The head space is usually left empty and up to 20% of the volume between the tangent lines of the vessel is packed with inert material to ensure that a uniform flow profile is established at the entry and

[redacted]

> exit of the bed and to prevent "fingering" of contaminant through the bed (Figure 16.5).

Id. at 55 (citing CX-0959 at *10-11 (emphasis by Ingevity)); *see* CRB at 22 (discussing CX-0962).

Ingevity continues:

> Even Respondents' expert Mr. Lyons agrees that POSITA traditionally distinguish between adsorbent volumes and adjacent features such as an air gaps and foams. RX-0380C (Lyons) at Q/A 156, 179.
>
> But while POSITA exclude external design elements from the adsorbent bed or volume, they include interstitial spaces between adsorbent particles constituting the adsorbent bed. This is because all adsorbent beds pack in a way that results in such interstitial spaces and since interstitial spaces are necessary to permit the fluid stream to pass through the bed—and thus necessary to the functioning of the bed. CX-1143C (Rockstraw) at Q/A 100-103. Respondents' position on whether POSITA include interstitial spaces in adsorbent volumes has been a moving target. Respondents' expert Mr. Lyons initially testified that POSITA consider adsorbent volumes as "only the volume of the adsorbent material or substance itself." RX-0380C (Lyons) at Q/A 156. But now, Mr. Lyons testifies that the adsorbent volume does indeed include interstitial air spaces. Tr. (Lyons) at 494:19-24, 496:4-10.

CIB at 56. Perhaps more clearly, Ingevity states:

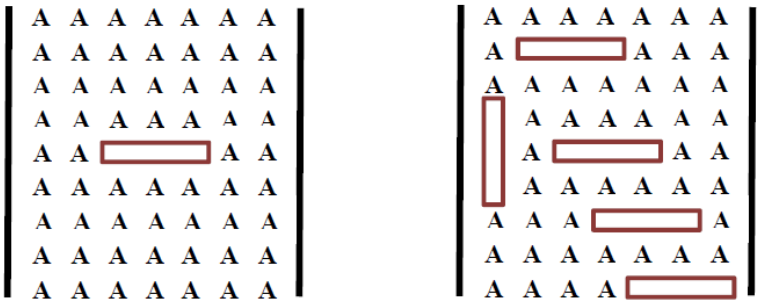
> In any event, before the Patent, and as seen in the foregoing art, POSITA already recognized the boundaries of adsorbent volumes in packed bed unit operations such as fuel vapor canisters—namely, that adsorbent volumes *include* the adsorbent particles constituting a packed bed and interstitial spaces in the packed bed but *exclude* adjacent design features such as air gaps, inert fillers, and support screens. CX-1143C (Rockstraw) at Q/A 106-08. POSITA recognized that an adsorbent volume is a collection of adsorbent particles and interstitial spaces where there is continuous contact between the constituent particles from one end of the bed to the other.

Id.; *see* CRB at 21 ("Ingevity has shown that adsorbent volumes begin where the adsorbent begins and end where the adsorbent ends.") (citing CX-1143C at Q/A 92-108). Ingevity then argues the 844 patent only expands the meaning of "adsorbent volume" to include diluents inserted within the adsorbent bed—and does not adopt a meaning which "expand[s] the geometric boundaries of the adsorbent volume . . . ." CIB at 57 (citing CX-1143C at Q/A 109-111); *see id.* at 57-62 (citing,

[redacted]

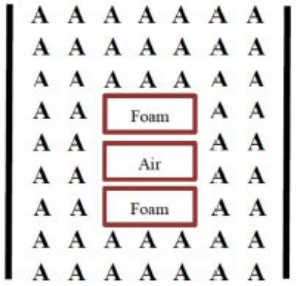
inter alia, 844 patent at 7:6-25). Ingevity argues this is the case even for that portion of the specification which refers to "plac[ing] multiple thin layers of non-adsorbing particles or porous mats (*e.g.*, foam), or simply trapped air space between layers of adsorbent" as a dilution technique. *See id.* at 58-59; 844 patent at 7:22-25; *see also* CRB at 24 ("Even if 'layers' and 'beds' are synonymous . . . considering foams or air spaces completely external to the adsorbent bed to constitute diluents contradicts the understanding in the art and the Summary of the Invention.").

Stepping back, Ingevity reasons that for any structure (or lack of structure, *i.e.*, air space) to affect IAC (*i.e.*, effect dilution) it must be in the adsorbent bed, and provides the following illustrations showing this technique as compared to a layer which would be external to the bed and thus not affecting IAC:

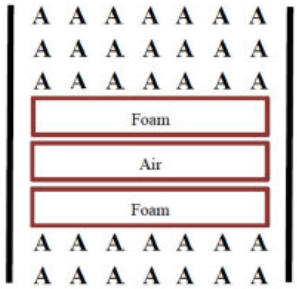
"foams or air spaces in adsorbent beds"

air space or foam not in adsorbent bed


[redacted]

CIB at 59 (citing CX-1143C at Q/A 130, 141-144); *see id.* at 59 ("In contrast, the foam or airspace [below] prevent[s] continuous contact between the adsorbent particles and thus separate two adsorbent beds from each other."), 63 ("the adsorbent volumes in the Patent *do not include features external to the adsorbent beds*" (emphasis in original)), 64 ("Because the trapped air spacer particles, trapped air spaces, fibers, and screens must be internal to the adsorbent bed in order to accomplish dilution, and the boundaries of the adsorbent bed are knowable, there is no indefiniteness introduced here with regards to the adsorbent volume."). Thus, according to Ingevity and its expert, the 844 patent's reference to "[a]lternative methods for diluting the vent-side region are . . . to place multiple thin layers of non-adsorbing particles or porous mats (*e.g.*, foam), or simply trapped air space between layers of adsorbent" (844 patent at 7:22-25), means the following top figure and not the bottom:

"multiple thin layers of non-adsorbing particles or porous mats (*e.g.*, foam), or simply trapped air space between layers of adsorbent"

NOT "multiple thin layers of non-adsorbing particles or porous mats (*e.g.*, foam), or simply trapped air space between layers of adsorbent"

[redacted]



CRB at 24 (citing CX-1143C at Q/A 168-169). Ingevity concludes: "[t]hat the Patent does not include within the ambit of its adsorbent volumes design features outside its packed beds is apparent from its failure to identify any such features in the embodiment of Figure 2 as part of any adsorbent volume." CIB at 60 (citing CX-1143C at Q/A 145-149).

In their reply brief, Respondents argue there is no merit to Ingevity's position that adsorbent volumes do not include features external to an adsorbent bed, citing the 844 patent's discussions of dilution through layers of non-adsorbing materials or air "between layers of adsorbent" and interchangeable references to "beds" and "layers." RRB at 16-17 (citing, *inter alia*, 844 patent at 7:22-25, 4:9-13; Hr'g Tr. at 633:6-634:12), 24-25 (contending foam or airspace within an adsorbent bed is not a "layer" as used in the patent). Respondents also refer to a separate Ingevity patent concerning similar subject matter, RX-0255C, as evidence that air gaps and foams which completely separate adsorbent beds are nonetheless understood to affect IAC values. *See id.* at 19-21; *see also id.* at 24-25. Respondents further dispute the idea that claims 12-14, and their analogs, avoid indefiniteness by more clearly identifying the boundaries of the adsorbent volume. *Id.* at 21-23.

Respondents have not shown indefiniteness by clear and convincing evidence for all asserted claims. The core of Respondents' first claim of indefiniteness is perceived ambiguity on "where the volumes begin and end" (RIB at 1, 38) and correspondingly "whether and to what

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extent the volumes are diluted by elements external to the adsorbent bed/layer" (*id.*) as prerequisites to evaluating IAC. At the outset, collectively grouping "Volume Terms" is overbroad. As shown in Respondents' preface, the members of the Volume Terms are actually quite diverse:

> Any claim term in the '844 patent purporting to require or describe a volume of adsorbent, including "adsorbent volume," "adsorbent material containing volume," "adsorbent-containing volume," "volume of fuel vapor adsorbent material," "volume of vapor adsorbent," "volume of adsorbent," "volume of vapor adsorbent material," "first volume," "subsequent volume," and "volume," individually or collectively.

RIB at xi; *see* CIB at 52-53. I previously noted that this diversity, particularly the distinction between "material" and "volume," may be relevant to evaluating indefiniteness. *See* Order No. 15 at 24-25.

The evidence cited by Ingevity, to the effect that a skilled artisan would have understood the term "adsorbent" (and, by extension, "material") as describing a contiguous body, is credible. In light of such evidence, Respondents have not met their burden of showing a fatal ambiguity exists in the terms "volume of fuel vapor adsorbent material," "volume of vapor adsorbent," "volume of adsorbent," and "volume of vapor adsorbent material" appearing in claims 31, 43, and those dependent thereon. A plain and ordinary reading of each term would be the contiguous three-dimensional space (*i.e.*, "volume") occupied by the adsorbing material (*i.e.*, "fuel vapor adsorbent material" / "vapor adsorbent" / "adsorbent" / "vapor adsorbent material").

As to the 844 patent's discussion of IAC dilution via "multiple thin layers of non-adsorbing particles or porous mats (*e.g.*, foam), or simply trapped air space between layers of adsorbent" highlighted by Respondents (RIB at 40 (citing 844 patent at 7:22-25)), certainly this statement suggests complete layers of non-adsorbing materials or non-adsorbing air space could be considered part of an "adsorbent volume" as diluents. Yet the patent's reference to "thin" indicates

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the size of the diluent is not significant compared to the volume of adsorbent, so as to exclude large air spaces or thick foam layers that clearly break up separate volumes of adsorbent. And the patent's reference to "between" suggests that these non-adsorbing structures are those located within an otherwise measurably distinct adsorbent volume.

As to Respondents' highlight of claim 15 and its recitation of diluents "external to the adsorbent" (RIB at 50-51), this phrase does not necessarily mean "external to the adsorbent volume." It may simply mean external to the pellets or pieces of adsorbent within the volume. The 844 patent specification reads, in mirrored language, "[t]he method claimed herein includes an embodiment wherein the volumetric dilution is accomplished by the use of inert spacer particles, foams, fibers, and screens *external to the vent-side adsorbent particles and monoliths*." 844 patent at 10:20-24 (emphasis added). Further, if there is ambiguity in this claim language that affects definiteness, the flaw would only apply to claim 15 (and its analogs 28, 40, and 52), and, as explained below, would not be determined in this investigation because these claims are not asserted for infringement or domestic industry purposes.

The Volume Terms "first volume," "subsequent volume," and "volume" appear in the claims only in reference to one of "volume of fuel vapor adsorbent material," "volume of vapor adsorbent," "volume of adsorbent," and "volume of vapor adsorbent material." *See* 844 patent at cls. 31, 33-36, 43, 45-48. There is therefore no indefiniteness problem with these terms either.

"Adsorbent volume" as it appears in claim 1 and claims dependent thereon, is also fairly read to have the same meaning of a contiguous three-dimensional space occupied by the adsorbing material. Apart from the claims, this term appears in the specification, and its usage would inform one of skill in the art that its boundaries are those of the adsorbent body's boundaries. *See* 844 patent at 3:46-53 ("On the fuel source-side of the canister, standard high working capacity carbons

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are preferred. On the vent-side, the preferred adsorbent volume exhibits a flat or flattened adsorbent isotherm on a volumetric basis in addition to certain characteristically desirable adsorptive properties across broad vapor concentrations, specifically relatively low incremental capacity at high concentration vapors compared with the fuel source-side adsorbent volume."), 4:39-42 ("Thus, when such a material is employed as an adsorbent volume on the vent-side region of a canister, purge is able to reduce the vapor concentration in the area of the purge inlet to a very low level."), 5:22-28 ("It is notable that the emission of vapor from the main, high-capacity fuel source-side volume of adsorbent into the auxiliary lower capacity vent-side volume is significantly affected by the presence of that vent-side volume. During purge, a vent-side adsorbent volume having a flat adsorption isotherm will give up a relatively small hydrocarbon load into the purge gas.").

Such boundaries are not clear in all claims, however. The plain and ordinary meanings of "adsorbent material containing volume" and "adsorbent-containing volume" are simply volumes that contain an adsorbent—as opposed to the volume the adsorbent takes up. Thus, the boundaries of the volumes are unrestricted and could conceivably include air plenums, head spaces, or other air handling passageways which delineate bodies of adsorbent. They could also include, for example, the "inert ceramic balls" as shown in the *Towler* reference discussed above, as that text mentions both a smaller "adsorbent volume" (space taken up by adsorbent) and a larger flow volume (space taken up by adsorbent and inert ceramic balls). CX-0959 at *11 ("The head space is usually left empty and up to 20% of the volume between the tangent lines of the vessel is packed with inert material to ensure that a uniform flow profile is established . . . ."). Given that IAC is defined in terms of adsorption capacity per unit of volume (*see* 844 patent at 5:46-55, 7:43-55, cl. 1), uncertainty over the boundaries of the volume (and, by extension, what materials, adsorbing or

[redacted]

non-adsorbing that are caught up in it) directly causes uncertainty over IAC. As IAC values within certain ranges are the crux of the 844 patent invention, this uncertainty is unreasonable for those seeking to determine if their method reads upon the claim. *Nautilus*, 134 S. Ct. at 2129. The 844 patent offers no guidance on where to draw these lines. *See generally* Order No. 15 at 19-22. Therefore "adsorbent material containing volume" and "adsorbent-containing volume," are indefinite limitations. *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1374 (Fed. Cir. 2014) ("[A] skilled artisan is still left to wonder what other forms of display are unobtrusive and non-distracting. . . . The specification offers no indication, thus leaving the skilled artisan to consult the "unpredictable vagaries of any one person's opinion.' . . . Such ambiguity falls within 'the innovation-discouraging 'zone of uncertainty' against which the Supreme Court has warned.'")

To be precise, these terms only appear in independent claim 18, and the indefiniteness only affects that portion of the claim referring to IAC of a "subsequent adsorbent-containing volume." The "initial" IAC value in this claim is not tied to volume at all and refers, uniquely among all claims, to an IAC of "initial adsorbent *material*." *See* 844 patent at cl. 18 ("routing the fuel vapor through an initial adsorbent material-containing volume wherein the initial adsorbent material is characterized by an incremental adsorption capacity at 25° C. of greater than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane"); Order No. 15 at 24-25. In this way, uncertainty over the boundaries of the initial "volume" may be diminished as it is IAC of the "material" which is evaluated—to the extent that evaluation is even possible. Regardless, the claim is still rendered indefinite through its recitation of an IAC value for an ambiguous "subsequent adsorbent-containing volume." While Ingevity does not discuss these two terms apart from all Volume Terms collectively, its overall argument on "adsorbent volume" as meaning the volume of an adsorbent bed (*see, e.g.*, CIB at 65 ("In the art, adsorbent volumes are equated with

[redacted]

adsorbent beds . . . .")) clearly applies directly to the Volume Terms of claims 1, 31, and 43. But under the principle of claim differentiation, it has little bearing on the plain and ordinary meanings of "adsorbent material containing volume" and "adsorbent-containing volume."

Claims dependent on claim 18 may also be invalid, either merely by virtue of that dependency, or for some additional reason. Although no party addresses the issue, the claims depending from claim 18 all possess an antecedent basis problem: while claim 18 uses the term "subsequent adsorbent-containing volume," those of its dependent claims at issue—specifically, claims 19, 21, and 24—use the term "subsequent adsorbent volume." 844 patent at cls. 19-24. Because of the lack of antecedent basis, it is not clear whether the "subsequent adsorbent volume" of the dependent claims refers to the entire "subsequent adsorbent-containing volume," or just to the adsorbent contained within the volume recited in claim 18, or to something else. If "subsequent adsorbent volume" refers to the entire volume, then it is fatally ambiguous, as explained; if it refers just to the adsorbent, then each dependent claim necessarily includes the fatal limitation of claim 18; and if it refers to something else, the intrinsic evidence sheds no light on what it might be.

Accordingly, I find claim 18 and those depending therefrom (i.e., claims 19, 21, 24-27, and 29) are invalid under 35 U.S.C. § 112 for indefiniteness.

b. IAC Calculations

Respondents' second ground of indefiniteness concerns a perceived ambiguity in the manner in which IAC is calculated. RIB at 51-56. Respondents take the position that "[i]f a claimed feature is one that is measured, and different testing methods provide different results, then the patent specification and prosecution history must identify which testing method to use or else the claim is indefinite." *Id.* at 51 (citing *Dow Chem. Co. v. Nova Chems. Corp. (Can.)*, 803 F.3d 620, 633-35 (Fed. Cir. 2015); *Honeywell Int'l, Inc. v. Int'l Trade Comm'n*, 341 F.3d 1332, 1339-41 (Fed. Cir. 2003)); *see id.* at 51-52 (citing *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 789

[redacted]

F.3d 1335, 1341-45 (Fed. Cir. 2015)). Respondents refer to an internal Ingevity report which utilized three different methods and came up with results "differ[ing] up to 4.5 g/L" (*id.* at 52-53 (citing, *inter alia*, RX-0395C)) and to a different report submitted to the EPO which also show "difference[s] of up to 4 g/L" (*id.* at 53 (citing RX-1098C), 56 (citing RX-0340C)). Respondents view these differences as significant in light of Dr. Rockstraw's reliance on IAC deviations as small as 0.035 g/L to find infringement. *Id.* at 53 (citing CX-0909C at Q/A 145). Respondents add that different techniques used within those methods add to the ambiguity, such as: use of adsorption or desorption data, data point interpolation, sample preparation, apparent density calculation, and use of significant figures. *See id.* at 53-55 (citations omitted).

Additionally, in their reply brief, Respondents respond to two studies appearing in Ingevity's discussion of the issue, CX-0285 and CX-0286, and argue they too "report[] very different values of adsorption capacity for the same materials." RRB at 27. Respondents reason this is the case because "unlike something more finite that can be measured using a ruler or a more complex electronic tool (such as the length of a pencil), adsorption capacity of an adsorbent is [a] more abstract measurement . . . ." *Id.* (citing RX-0380C at Q/A 210-231).

Here, Respondents have not met their burden to show the concept of adsorption capacity is subject to such measurement variability so as to be indefinite. In *Nautilus*, and referenced in *Dow*, the Supreme Court explained, "[i]t cannot be sufficient that a court can ascribe some meaning to the patent's claim; 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*." *Nautilus*, 134 S.Ct. at 2130 (emphasis added); *see Dow*, 803 F.3d at 630, 634 ("The question is whether the existence of multiple methods leading to different results without guidance in the patent or the prosecution history as to which method should be used renders the claims indefinite."). "At the time of the

[redacted]

patent application" bears emphasis because the two documents Respondents primarily hold up as evidencing "numerous different testing methods that provide significantly different results for the same samples" (RIB at 52-53) are Ingevity documents from 2014 (RX-0395C at *1) and 2015 (RX-1098C at *1). The 844 patent, on the other hand, was filed in the 2001 to 2003 timeframe (844 patent) and neither RX-0395C nor RX-1098C represents or describes the adsorption capacity measurement methods discussed as known in the relevant time frame by those of ordinary skill (or, for example, by those in industry or the like).

Respondents demonstrate an awareness of this timing requirement. In a discussion of apparent density measurement options, they state, "[a] PHOSITA reading the '844 patent would use the ASTM standard, so Ingevity's claim that the patent was incorrect and an undisclosed method (*for which there is no evidence it existed at the time of filing of the patent*) should be used renders the IAC terms indefinite." RIB at 55 (emphasis added). Respondents' expert, Mr. Lyons, similarly remarks "[a]t the time of the alleged inventions, and even today, there was and is no industry standard method for measuring adsorption capacity or incremental adsorption capacity." RX-0380C at Q/A 204; *see* RX-0380C at Q/A 210. Yet Mr. Lyons cites no evidence to show what those supposedly known but non-standard methods would have been and what their results would have produced. *See generally* RX-0380C at Q/A 203-231. Instead, his testimony consists of speculation. *See id.* at Q/A 215 ("Given the '844 patent's apparent failure to disclose a process for computing the apparent density of non-granular materials (according to Ingevity), different PHOSITAs would compute different apparent densities, and thus different IAC values, for the same material."), 231 ("there are many different methods for calculating adsorption capacity . . . do not provide any guidance to a PHOSITA as to which method to select."). Indeed, he practically admits he has no relevant information here. *Id.* at Q/A 205 ("[I]n addition to the lack of clarity in

[redacted]

the intrinsic record, there is also nothing in the extrinsic record or knowledge of the PHOSITA that would shed further light on these questions regarding the volume terms."). To the extent Mr. Lyons, or Respondents, seek to rely on Dr. Rockstraw's testimony to fill this gap and show what would have been known (*see, e.g.*, RX-0380C at Q/A 212 ("[A] number of general methods for measuring n-butane isotherms of adsorbent materials were well known, as documented by Ingevity's expert, Dr. Rockstraw."), that testimony has not been clearly identified or explained.

If there is an exception to this timeframe issue, it would be the first sentence of RX-0395C which reads "prior to 2014, all incremental butane working capacity data for patent application or potential infringement questions had been generated with the McBain apparatus and test method." RX-0395C at *1; *see* RX-0395C at *3. Yet this singular statement is not sufficient, because it is limited to what was known by Ingevity itself, and is still divorced in time from the early 2000s. The document is not referenced at all by Mr. Lyons in support of his indefiniteness opinion. *See* RX-0380C at Q/A 207-231. RX-0395C and RX-1098C therefore shed little light on what choices a person of ordinary skill at the time of the 844 patent application would have both known and been able to select between. *Dow*, 803 F.3d at 634 ("The question is whether the existence of multiple methods leading to different results without guidance in the patent or the prosecution history as to which method should be used renders the claims indefinite.").

Even assuming that these two documents, in addition to CX-0285 and CX-0286, reflect what a person of ordinary skill would have known at the relevant time, the present circumstances do not resemble those that contributed to the indefiniteness holdings in *Dow* and *Teva*. In *Dow*, the court very clearly explained the steps of each method of measuring strain hardening slope and why they produce different results. *See Dow*, 803 F.3d at 633. Here, Respondents report the different results Ingevity obtained by these methods, but there is no discussion of why the

differences arise or why they would have arisen when performed by a person of ordinary skill. RIB at 51-56. Such a discussion would be helpful to clearly and convincingly demonstrate the quandary a person of ordinary skill would have been in to determine if their device or method infringes, but it is not given.

In *Teva*, the term "molecular weight" was held indefinite because, *inter alia*, the term had no meaning to one of skill in the art—instead more precise terms such as "peak average molecular weight," "number average molecular weight," and "weight average molecular weight" were known. *Teva*, 789 F.3d at 1338. Further, each of these was held to be "calculated in a different manner" and "in a typical polymer sample, M_p, M_n, and M_w have different values." *Id.* "Adsorption capacity," and correspondingly, "incremental adsorption capacity," are different. This is not a term with no known meaning. It is the mass of butane adsorbed by a given volume under certain conditions. 844 patent at Fig. 3. Further, regardless of the experimental setup, the overall goal of the measurement techniques is the same—to measure the mass gained by a sample as it is exposed to butane vapor—as described both by Ingevity in its representations to the EPO and by Respondents' expert. Ingevity stated, "[r]egarding the measurement of the adsorption isotherms itself it is true that there exist different methods. However, all these methods have in common that they measure the weight gain of an adsorbent when equilibrated under a partial equilibrium pressure of vapor." RX-1098C at *10. Mr. Lyons concurs:

> Application of these methods to materials such as activated carbon usually requires that a sample be finely divided, specially prepared to remove water and any other adsorbed species, *and weighed*. The sample is then placed into a temperature controlled apparatus, the design of which varies depending on the specific methodology used. The concentration of n-butane gas in the apparatus is then increased beginning from low levels and *the mass of n-butane adsorbed is measured*.

RX-0380C at Q/A 212 (emphasis added).

[redacted]

In contrast, the present record matches the principle set out in *Ethicon Endo-Surgery, Inc. v. Covidien, Inc.*, 796 F.3d 1312 (Fed. Cir. 2015). In a very similar context of measuring clamping pressure on tissue, the Federal Circuit held:

> [T]he definiteness requirement of 35 U.S.C. § 112 mandates only that one skilled in the art must be able to understand which pressures are relevant to the claims and how those pressures can be measured, so to discern the scope of the claimed average pressure range with reasonable certainty. *See Nautilus*, 134 S.Ct. at 2124. If such an understanding of how to measure the claimed average pressures was within the scope of knowledge possessed by one of ordinary skill in the art, there is no requirement for the specification to identify a particular measurement technique.

Ethicon, 796 F.3d at 1319. Here, it is clear a person of skill in the art reading the 844 patent would understand the value relevant to the claims—mass of butane adsorbed by a volume—and the record shows that that person would likely know the general means of obtaining that value, involving varying degrees of accuracy. *See* RX-0380C at Q/A 212 (describing overall process that was supposedly known). The record does not support Respondents' view that adsorption capacity is "abstract." RRB at 27.

Those further "options" within the different adsorption capacity "tests" outlined by Respondents (*see* RIB at 53-56) do not alter this conclusion. Respondents refer to RX-0395C to show the differences between the use of desorption and adsorption data (*id.* at 53-54); but as Ingevity notes, the document clearly states desorption data is superior. RX-0395C at *8. Respondents discuss different means of data interpolation (*id.* at 54), but this is a choice occurring after experimental data is gathered (*see* RRB at 30 ("The analysis of the data, however, will differ depending on how the dots in the plot are connected.")). It establishes no ambiguity in measuring or knowing what is meant by "adsorption capacity." Respondents' concern over significant figures (RIB at 55) is similarly unpersuasive.

[redacted]

Respondents' consideration of sample preparation is also not persuasive; the only example given is destructive preparation, observed to have been done by Ingevity in some circumstances, but otherwise not alleged to have been employed by persons of ordinary skill at the relevant time. *Id.* at 54; RX-0380C at Q/A 214. Indeed, it seems very likely persons of ordinary skill would know the importance of *not* destroying a sample before adsorption capacity testing.

Respondents' discussion of apparent density (RIB at 54-55) is rooted in an alternative to an ASTM test mentioned in the 844 patent—an alternative Ingevity's expert, Dr. Rockstraw, employed in *this* investigation and not alleged to have been used at the relevant time by the relevant persons. Further, the record is clear that ASTM D2854 is simply not appropriate for some types of adsorbents, like Ingevity's monolithic honeycomb structures or others with packing constraints. *See* JX-0222 at *1 ("Select a 100, 250, or 500 mL graduated cylinder appropriate for the particle size of the activated carbon to be tested. The inside diameter of the cylinder shall be at least 10 time the mean particle diameter (MPD) as determined by Test Method D 2862."). Finally, I agree with Ingevity that the testimony of Drs. Hitomi, LaBine, and Yamasaki on this point (RIB at 55-56) is self-serving and thus cannot be accorded much weight.

Therefore, Respondents have not shown the claims of the 844 patent are indefinite over the use of the term "adsorption capacity."

D. Infringement

According to Ingevity's post-hearing briefing, the use, manufacture, or sale of the following Accused Products are alleged to infringe the asserted claims of the 844 patent:

Claims	**Accused Products Alleged to Infringe**
1, 18, 31, 43 (independent)	All
4, 5, 19 (dependent)	All

[redacted]

2 (dependent)	[redacted]
3 (dependent)	[redacted]
8, 21, 33, 45 (dependent)	All
11, 24, 36, 48 (dependent)	All
13, 38, 50 (dependent)	All

See CIB at 6, 21-25.

Significantly, Ingevity does not *explicitly* allege that any Respondent itself directly infringes an asserted claim of the 844 patent. *Compare* CIB at 6-29 *with* CX-0909C at Q/A 1944. Rather, Ingevity asserts that "MAHLE's Accused Canisters, or their intended use, directly infringes at least claims 1-5, 8, 11, 13, 18-19, 21, 24, 31, 33, 36, 38, 43, 45, 48, and 50 of the '844 Patent. MAHLE, Kuraray, and Nagamine indirectly infringe the '844 Patent by contributory and/or induced infringement." *Id.* at 6. Nevertheless, certain statements in Ingevity's discussion of indirect infringement could be viewed as alleging respondent MAHLE NA directly infringes the "Canister Claims," which are claim 43 and those depending therefrom. *See* CIB at 31 (discussing Kuraray "actively inducing MAHLE NA to directly infringe . . . . at least the Canister Claims"), 32 ("MAHLE NA's direct infringement . . . . intends for MAHLE NA to directly infringe"), 33 ("used by MAHLE NA to directly infringe"), 34 ("MAHLE NA's direct infringement"). As discussed above, claim 43 is a canister apparatus claim, such that the

[redacted]

manufacture, use, or sale of canisters which meet the recited language would constitute direct infringement. Thus, I interpret Ingevity's briefing to allege that of the Respondents, only MAHLE is a direct infringer and only for claim 43 and those claims depending therefrom.

1. Direct Infringement

Ingevity has shown by a preponderance of the evidence direct infringement through the manufacture, use, or sale of the following Accused Products:

Claims	Accused Products Determined to Infringe
1, 18, 31, 43 (independent)	All, except: [redacted]
2 (dependent)	[redacted]
3 (dependent)	[redacted]
4, 19 (dependent)	All that infringe the preceding independent and dependent claims
5 (dependent)	All that infringe the preceding independent and dependent claims, except: [redacted]

[redacted]

8, 21, 33, 45 (dependent)	All that infringe the preceding independent and dependent claims
11, 24, 36, 48 (dependent)	All that infringe the preceding independent and dependent claims
13, 38, 50 (dependent)	All that infringe the preceding independent and dependent claims, except: [redacted]

a. Undisputed Claims

Respondents do not contest Ingevity's claims of direct infringement under the following claims, apart from their dependency on others for which direct infringement is disputed: 2, 3, 4, 5, 8, 11, 19, 21, 24, 33, 36, 45, and 48. *See* RIB at 5, 26, 27; RRB at 7-13. In view of the testimony of Dr. Rockstraw that all the relevant Accused Products include the limitations recited in these claims, and there being no clear disagreement from Respondents as to that fact, I find that those identified Accused Products meet the limitations of the dependent claims as alleged, subject to certain exceptions discussed below and as reflected in the table above. *See* CX-0909C at Q/A 240-1939; CIB at 23-26.

b. Disputed Claims

Respondents do contest Ingevity's claims of direct infringement under the following claims: 1, 13, 18, 31, 38, 43, and 50. *See* RIB at 5, 26, 27, 29; RRB at 7-13. Of these claims, claims 1, 18, 31, and 43 are independent, and claims 13, 38, and 50 are dependent. For the reasons discussed below, Ingevity has shown direct infringement of the following claims as reflected in the table above: 1, 13, 18, 31, 38, 43, and 50.

[redacted]

i. Claim 1

For reference, claim 1 of the 844 patent requires:

> 1. A method for reducing fuel vapor emissions in automotive evaporative emissions control systems comprising the steps of contacting the fuel vapor with an initial adsorbent volume having incremental adsorption capacity at 25° C. of greater than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane and at least one subsequent adsorbent volume having an incremental adsorption capacity of less than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane.

844 patent at cl. 1.

Several disputes exist between the parties concerning whether Ingevity and its expert, Dr. Rockstraw, have sufficiently shown the Accused Products meet the limitations of the claim—specifically, the incremental adsorption capacities required for both the "initial adsorbent volume" and the "subsequent adsorbent volume."

First, the "subsequent adsorbent volume" limitation. To show this limitation is met, Dr. Rockstraw explains he directed a third party testing lab, Particle Testing Authority ("PTA"), also known as Micromeritics Instruments ("Micromeritics"), "to perform static volumetric measurements of the adsorption capacity" on samples of the adsorbents which are contained within each Accused Canister. CX-0909C at Q/A 72. The returned data consisted of adsorption isotherms for two samples of each adsorbent (*id.* at Q/A 87), which are a collection of data points reflecting the amount of adsorbate (*i.e.*, butane) adsorbed by the adsorbent at the temperature specified in the claim (*i.e.*, 25°C) and at varying pressures (*id.* at Q/A 88-90, 137-138). Dr. Rockstraw then applied commonly understood conversion factors onto this data to arrive at the mass of butane adsorbed per mass of adsorbent (*i.e.*, g/g) for each data point. *Id.* at Q/A 91.

The returned data, however, did not include points corresponding exactly to the 5% and 50% n-butane levels specified in the claim. CX-0909C at Q/A 91. Thus, to determine the mass of butane adsorbed per mass of adsorbent at 5% and 50%, Dr. Rockstraw used two-point

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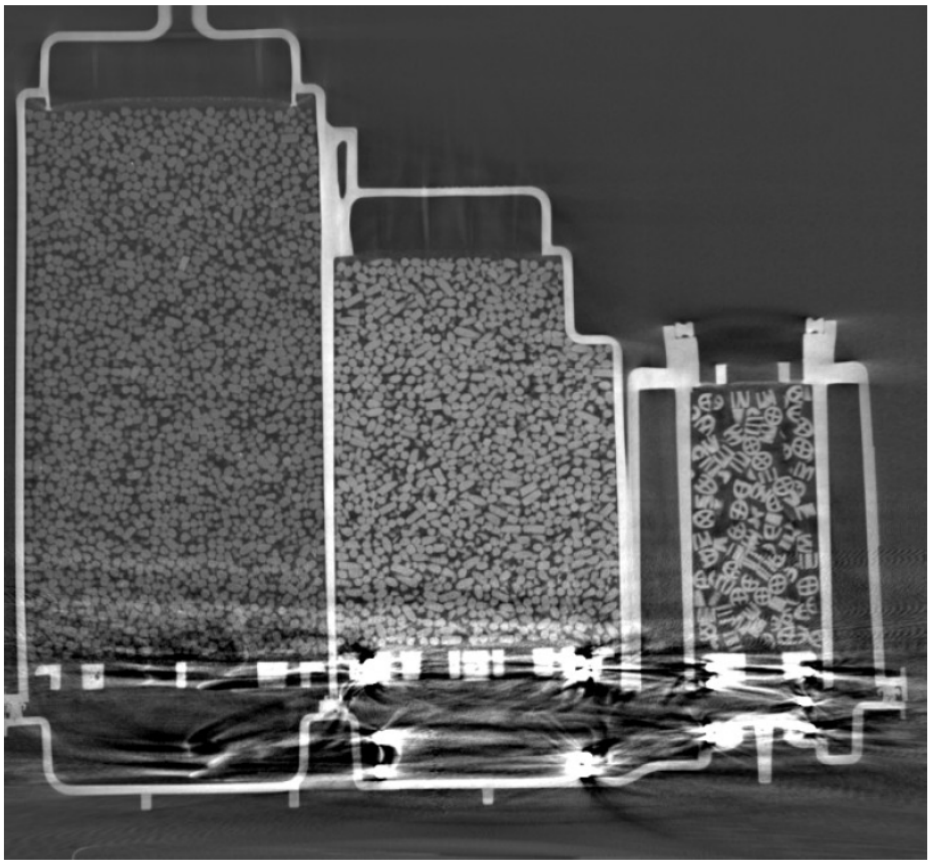
interpolation wherein a straight line is drawn between the two nearest PTA data points on either side of the 5% and 50% levels, respectively. *Id.* at 91, 141. The given butane percentage (5%, 50%) is then input to the equation of this line to return the mass of butane adsorbed. *Id.* at Q/A 91-94, 142. As this adsorption capacity is expressed in units of mass of butane adsorbed per mass of adsorbent (*i.e.*, g/g), a conversion is needed to arrive at the units specified in the claim (g/L). To do this, Dr. Rockstraw multiplied each mass-per-mass value by an apparent density value. CX-0909C at Q/A 95.

It is at this point Dr. Rockstraw's procedure becomes tailored to what has been identified in the Accused Products as the "subsequent adsorbent volume"—specifically, Respondents' MPAC. CX-0909C at Q/A 100. Dr. Rockstraw explains that due to the size and shape of MPAC relative to the chamber in which it is contained within the Accused Products, the otherwise standard apparent density measurement technique known as ASTM D2854 is not appropriate. *See id.* at Q/A 105-113. Yet, as he testified, "[a]pparent density is a fairly basic principle, it is the mass per unit of apparent volume. Thus, if one can accurately determine mass and apparent volume, one can calculate apparent density." *Id.* at Q/A 114. To determine apparent density outside of ASTM D2854, Dr. Rockstraw "measured the mass for each volume of MPAC in both samples of each canister that MAHLE has produced in this matter" using an "Ohaus Stout scale, model 2200GX0.01G, which measures mass with accuracy to one hundredth of a gram." *Id.* at Q/A 115-116; *see id.* at Q/A 130-131. This is the first portion of the apparent density calculation (*i.e.*, mass of adsorbent).

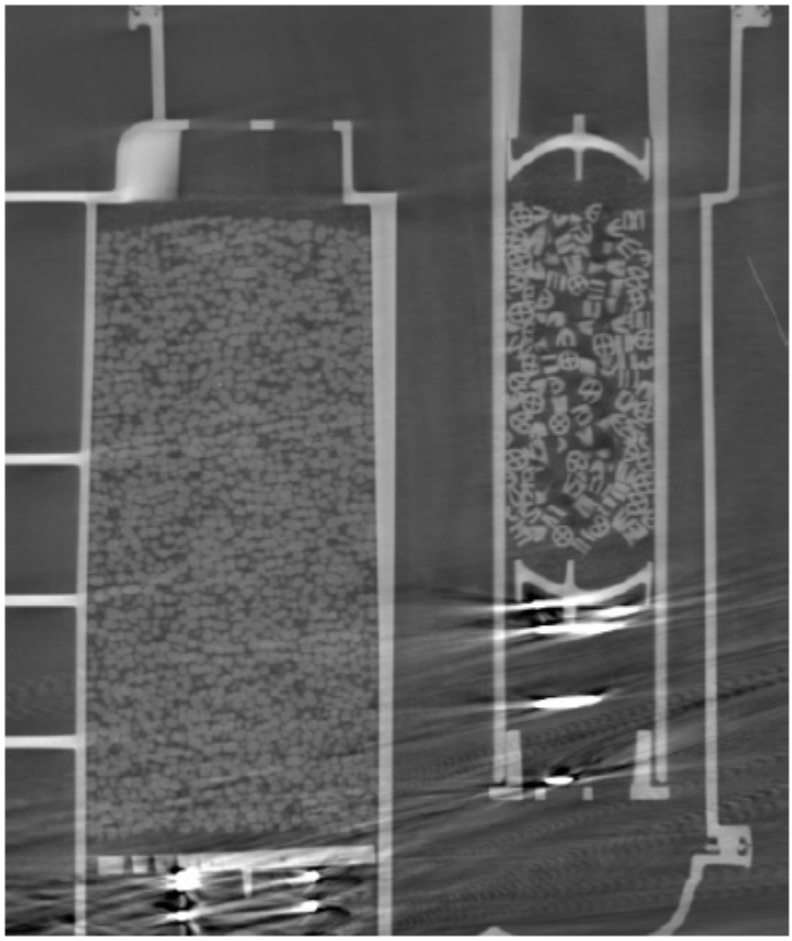
For the second portion (*i.e.*, apparent volume), Dr. Rockstraw employed a second outside testing company, North Star Imaging ("NSI"), "to determine the boundaries of the volumes containing MPAC" within each Accused Product and then calculate that volume. CX-0909C at

[redacted]

Q/117-118. According to Dr. Rockstraw, NSI used "Computed Tomography (CT) X-Ray Inspection" to produce three-dimensional images showing those boundaries and employed additional software to compute the volume of that bounded space. *Id.* at Q/A 122-129. Below are two such images generated by NSI for Accused Products MAHLE Part Nos. 72144286 and 72143724, where the chamber containing MPAC can be seen on the far right:



[redacted]



CIB at 50 (citing CX-0906), 51 (citing CX-0908). Dr. Rockstraw then divided the measured mass of each volume of MPAC by its measured volume to arrive at apparent density, and presented these calculated values in a table. CX-0909C at Q/A 131 (Table 6).

Dr. Rockstraw did not immediately apply the apparent density measurements for each Accused Product MPAC volume to his gathered mass-per-mass adsorption capacity values, however. Instead, he "used the [5%-50%] differences for all 29 samples to calculate an average g (butane) / g (MPAC) increment in adsorption capacity mean difference, its standard deviation, and 99% confidence intervals." CX-0909C at Q/A 143. This computation resulted in a single incremental adsorption capacity (g/g) value of 0.99668. *Id.* at Q/A 144. It was this value to which he then applied the apparent density measurements for each Accused Canister MPAC volume to

[redacted]

arrive at an incremental adsorption capacity value in the units expressed in the claim. *Id.* at Q/A 145 (Table 7).

Below is Dr. Rockstraw's Table 7, showing these values of incremental adsorption capacity for each "subsequent adsorbent volume" in each canister MAHLE supplied to Ingevity in this investigation:

Table 7 – The IAC of Each Volume of MPAC

Canister			1st MPAC Volume			2nd MPAC Volume		
Identification by MAHLE	OEM	Model	IAC (g/gAC)	Density (g/cm³)	IAC (g/L)	IAC (g/gAC)	Density (g/cm³)	IAC (g/L)
[redacted]			0.99668	0.35374	35.256	0.99668	0.33957	33.844
			0.99668	0.34369	34.255	0.99668	.33299	33.188
			0.99668	0.33141	33.031			
			0.99668	0.31447	31.343			
			0.99668	0.34960	34.844	0.99668	0.33013	32.903
			0.99668	0.36041	35.922	0.99668	0.32863	32.754
			0.99668	0.36168	36.048	0.99668	0.36185	36.064
			0.99668	0.35043	34.927	0.99668	0.36210	36.089
			0.99668	0.33122	33.012			
			0.99668	0.33801	33.689			
			0.99668	0.33506	33.395			
			0.99668	0.32727	32.619			
			0.99668	0.32618	32.510			
			0.99668	0.34492	34.377			
			0.99668	0.34759	34.643			
			0.99668	0.35068	34.951			

[redacted]

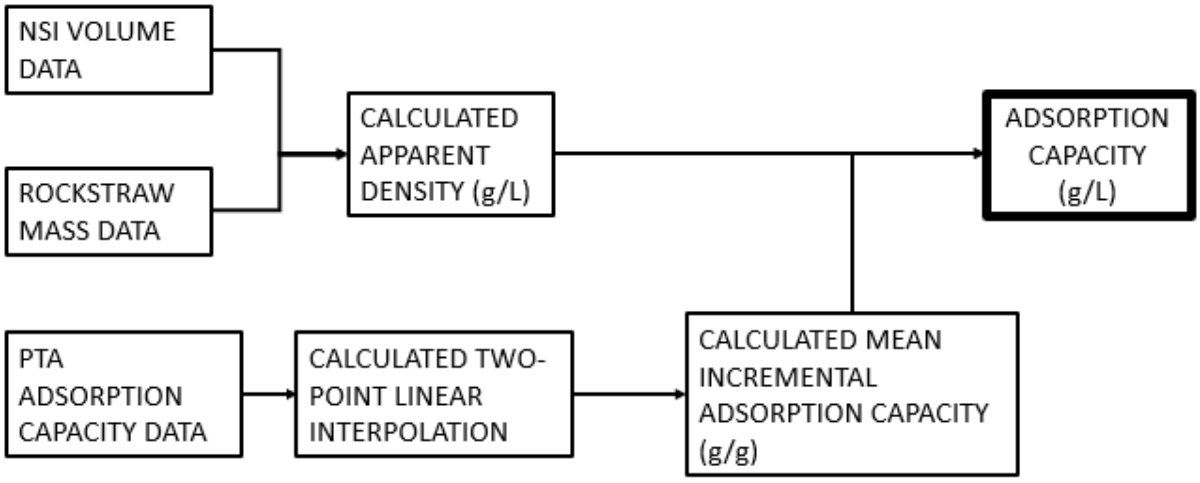
[redacted]	0.99668	0.33093	32.984			
	0.99668	0.32882	32.772			
	0.99668	0.34440	34.325			
	0.99668	0.34774	34.659			
	0.99668	0.31283	31.179	0.99668	0.34685	34.570
	0.99668	0.31510	31.405	0.99668	0.32881	32.772
	0.99668	0.32564	32.456	0.99668	0.35576	35.458
	0.99668	0.31986	31.880	0.99668	0.35945	35.826
	0.99668	0.31119	31.015	0.99668	0.33235	33.124
	0.99668	0.30944	30.841	0.99668	0.33039	32.930
	0.99668	0.32349	32.242	0.99668	0.33675	33.563
	0.99668	0.32336	32.229	0.99668	0.34262	34.148
	0.99668	0.32521	32.413	0.99668	0.32459	32.351
	0.99668	0.32279	32.171	0.99668	0.33410	33.299

[redacted]	0.99668	0.32121	32.014	0.99668	0.32926	32.817
	0.99668	0.31663	31.558	0.99668	0.33634	33.522
	0.99668	0.35737	35.618			
	0.99668	0.35081	34.965			
	0.99668	0.34716	34.601			
	0.99668	0.35351	35.234			
	0.99668	0.32515	32.407			
	0.99668	0.31882	31.776			
	0.99668	0.32641	32.533			
	0.99668	0.32825	32.716			

CX-0909C at Q/A 145 (Table 7). As shown, at least one sample of each Accused Product contains a volume of MPAC with an incremental adsorption capacity under 35 g/L. Thus, Ingevity claims it has shown satisfaction of the "subsequent adsorbent volume" IAC limitation for each and every Accused Product. *See* CIB at 19-20.

Dr. Rockstraw's process is illustrated as follows:

[redacted]



Respondents criticize nearly every step in this process as improper, leading to an overall claim that Dr. Rockstraw's conclusions are unreliable. Their criticisms are unpersuasive, however; I consider each below.

Regarding Dr. Rockstraw's use of volume data from NSI, Respondents argue "Dr. Rockstraw first arbitrarily identified the carbon beds/layers in each Accused Canister without regard for the concept of volumetric dilution via 'non-adsorbing particles or porous mats (*e.g.*, foam) or simply trapped air space between layers of adsorbent.'" RIB at 7 (citing 844 patent at 7:18-25; CX-0909C at Table 3; Hr'g Tr. at 631:23-633:13, 216:6-218:8). But Dr. Rockstraw's use of 3-D scanning to measure the volume of the space which MPAC takes up within the canister takes into account trapped air spaces between the MPAC pieces when that space is filled with MPAC. Further, there is no evidence that any non-adsorbing particles are added to the MPAC, and the X-ray imagery of the canisters shows there are no, to quote the 844 patent, "thin layers" (844 patent at 7: 22-25) of porous mats or foam used either. And if such diluents are present in any Accused Products, and Dr. Rockstraw improperly excluded them in his volume determinations, neither Respondents nor Mr. Lyons have indicated which canisters those would be. *See* RIB at 7-8; RRB at 8-9; RX-0381C at Q/A 89-129, 366.

[redacted]

Respondents also argue "a PHOSITA in 2001 would not know whether, or how, to generate and use a CT image to measure canister volumes," the technique is not used in industry, and is otherwise not disclosed in the 844 patent. RIB at 7-8 ("his volume measurement technique was beyond the skill and knowledge of the PHOSTIA, and the results are unreliable."). Setting aside what a PHOSITA would have done or would have been capable of in 2001, these facts have no bearing on the reliability of Dr. Rockstraw's testing. Indeed, I would hope any testifying expert would use the most accurate or reliable techniques available to them, within reason, to determine physical characteristics critical to a claim of patent infringement.

Respondents argue that Dr. Rockstraw's "MPAC region volumes are also not representative of the Accused Products, particularly since he did not statistically analyze the measured volume differences between identical regions in samples of canisters." RIB at 8 (citing RX-0381C at Q/A 222; CX-0909C at Table 6). This reasoning appears in many of Respondents' criticisms of Dr. Rockstraw's process, and it is not persuasive. Not only do Respondents fail to provide any evidence that such a statistical analysis would have made a difference (*see* RX-0381C at Q/A 222), but a provided sample's inability to represent a population of products is a fault of the sample's provider—in this case, MAHLE (*see* CIB at 17 (citing CX-0909C at Q/A 117-129)).

With respect to Dr. Rockstraw's mass data used to arrive at apparent density, Respondents argue his weighed values differ from MAHLE's specifications to such a degree as to show unreliability. Specifically, Respondents observe "[i]n nearly half the regions, the difference between his MPAC mass measurements and MAHLE's specifications exceeds MAHLE's variance tolerance." RIB at 8 (citing RX-0381C at Q/A 131-134). Respondents reason that either Dr. Rockstraw's mass measurement "is flawed" or "MAHLE's manufacturing variance is much larger than its specified variance tolerances," and the latter is "unlikely," so that it must be the mass

[redacted]

measurements which are unreliable. *See id.* (citing RX-0381C at Q/A 137-138; Hr'g Tr. at 855:25-856:12). Not so; direct weighing with a high precision scale is much more likely to be reliable evidence of a substance's mass than a manufacturing tolerance. *See* CX-0909C at Q/A 115.

Respondents also attack Dr. Rockstraw's failure "to statistically characterize or account for the distribution of MPAC mass in the various canister regions, and in fact, did not even attempt to establish a typical value for the MPAC mass in each region." RIB at 8-9 (citing RX-0381C at Q/A 139, 222). Again, Respondents leave it entirely unsaid how this would have made a difference, and to the extent this is an argument that MAHLE's produced samples do not reflect the "population" of all respective models (*see* CX-0381C at Q/A 139 ("Dr. Rockstraw cannot reasonably contend that the MPAC mass measurements are representative of the full population of each MAHLE canister type . . . .")), that fault lies with MAHLE as the provider of the sample.

Next, Respondents argue the combined use of CT-scanning for volume and scale-measured mass to arrive at apparent density is unreliable because it is not the same as the ASTM D2854 apparent density test referenced in the 844 patent and used in industry. *See* RIB at 9-12 (citing, *inter alia*, JX-0222). Respondents contend Dr. Rockstraw's reliance on "wall effects" as requiring deviation from ASTM D2854 is not supported in the evidence. *See id.* at 10-12. To be sure, "wall effects" have not been conclusively shown for all MPAC volumes within the Accused Products, but this has little relevance. ASTM D2854 is a method ultimately used for determining the volume a given mass takes up when stacked in a bed, as opposed to the volume of that mass by itself. *See* JX-0222 at *1. The document describes the experimental setup:

> 4.1 This test method provides a method for determining the packed density of a bed of granular activated carbon. Determination of the packed density is essential when designing vessels to hold the material and for ordering purposes when procuring materials to fill existing vessels.

[redacted]

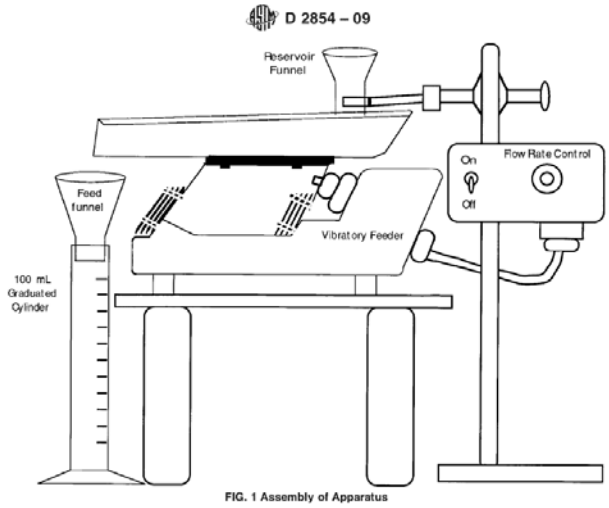


FIG. 1 Assembly of Apparatus

Id. at *1-2. The test involves using the vibratory feeder to place granular adsorbent into the graduated cylinder to any preferred level (but to more than 50% cylinder capacity, and within certain mL/s speed range), and then weighing that amount in a "balance pan." *Id.* at *2.

Dr. Rockstraw's use of CT scanned volumes and scale-measured masses accomplishes the same tasks (*i.e.*, determination of the bed mass contained within a three-dimensional volume) and Respondents do not argue that ASTM D2854 is more accurate. Indeed, it is not clear why ASTM D2854 would be more accurate than mass and volume measurements performed on the actual adsorbent and canister at issue—as Dr. Rockstraw has done with highly accurate equipment. CX-0909C at Q/A 115, 126.

Respondents repeat their criticism of Dr. Rockstraw's failure to "statistically characterize" mass and volume differences between "identical regions of identical canister samples." RIB at 12 (citing [RX-0381C] at Q/A 140-142, 226). This "population" argument (RX-0381C at Q/A 142) is not persuasive for the same reasons discussed with respect to MPAC distribution. Further, even if Mr. Lyons's regression-based apparent density approach is followed (RX-0381C at Q/A 242), the result is an apparent density of 0.344 g/cm^3, which when multiplied with Dr. Rockstraw's mean adsorption capacity of 0.99668 g/g, yields an infringing IAC value of 34.2 g/L.

[redacted]

With respect to the adsorption capacity data returned from PTA, Respondents contend Dr. Rockstraw improperly relied on only desorption data, as opposed to adsorption data or a combination of both. *See* RIB at 13-14. Respondents claim this choice "not coincidentally, yielded lower IAC values (*i.e.*, more likely below the 35 g/L threshold) than the adsorption data." *Id.* at 13 (citing Hr'g Tr. at 238:7-18; RX-0381C at Q/A 254-255). Respondents argue the 844 patent "suggests using adsorption data—the measurement is called incremental adsorption (not desorption) capacity, and the title of Figure 3 is 'n-Butane Adsorption Isotherm at 25°C." *Id.* at 13-14 (citing 844 patent at Fig. 3; RX-0381C at Q/A 201). Respondents add "both Mr. Lyons and Ingevity's expert in parallel litigation testified that adsorption and desorption data should be the same and yield equivalent IAC results, and any difference suggest flaws in the underlying isotherm measurements." *Id.* at 14 (citing RX-0381C at Q/A 200, 202).

In response, Ingevity states:

> Respondents acknowledge "[a]n isotherm is a series of adsorption capacities at different material concentrations and constant temperature." ROB at 13; RX-0381C (Lyons) at Q/A 190. This applies to both the adsorption branch and the desorption branch of the isotherm. *Id.*; CX-0909C (Rockstraw) at Q/A 48-49, 92, 96. The only difference being that the adsorption branch takes measurements while concentration is increasing, while the desorption branch takes measurements while concentration is decreasing. *Id.* In both, adsorption capacity is measured. *Id.* Thus, Respondents' assertion that the adsorption branch should be used because IAC stands for incremental adsorption capacity is contrived and fundamentally flawed. Both measure the same physical property—adsorption capacity. But the desorption branch better approximates real-world conditions because it includes the "heel" an adsorbent acquires during the adsorption branch. JX-0001 at 2:42–44. POSITA knows that designing a real-world system necessitates data that most accurately reflects real-world situations. CX-0909C (Rockstraw) at Q/A 92; RX-0395C.0008.

CRB at 8. Ingevity adds that the ASTM D5228 standard referenced in the 844 patent also instructs technicians to evaluate butane working capacity (a related metric to adsorption capacity) "after a

[redacted]

specified purge" because "[t]he difference between the mass adsorbed at saturation and the mass remaining after the purge (the heel) is the BWC." *Id.* at 9 (citing JX-0009 at ¶ 1.1, 4.1).

Ingevity's position is the more persuasive. The MPAC samples delivered to PTA for testing were essentially "clean" samples taken from the Accused Canister samples provided by MAHLE—as in not yet exposed to butane fuel vapor. Thus, the adsorption data PTA provided to Dr. Rockstraw would not represent real-world conditions while the desorption data, recorded subsequently as the canister is purged, would come closer to such conditions. Ingevity's reference to ASTM D5228, cited in the 844 patent specification and thus qualifying as intrinsic evidence, supports this understanding. The document states its test method, where adsorption is evaluated following purge (JX-0009 at ¶ 4.1, 12.1-12.2) is for "*new* granular activated carbon" (*id.* at ¶ 1.1 (emphasis added)). Additionally, the Williams prior art reference, RX-0067, relied on by Respondents' in one invalidity theory, also repeatedly discusses the need to "precondition" the canister (*i.e.*, "loading to either breakthrough [(earlier defined)] or 1.5 times breakthrough with 50% n-butane") before diurnal bleed emissions testing. *See, e.g.*, RX-0067 at *3, 4 (discussing "pre-conditioning for the compressed diurnal test consisted of six gasoline vapor load / purge cycles . . . ."), 5, 7.

Respondents' evidence to the contrary is superficial, amounting mostly to a "suggest[ion]" to use adsorption data based on the use of the word "adsorption" in "adsorption capacity." RIB at 13. And Mr. Lyons offers no technical basis for his adsorption data preference (*see id.* at Q/A 200- RX-0381C at Q/A 200-204) while also agreeing desorption data can be appropriate (RX-0381C at Q/A 200). Further, Respondents' use of deposition testimony taken in outside litigation from a Dr. Ritter (RIB at 14; RX-0381C at Q/A 202-203) contradicts at least the intent of Order No. 35. Thus, the references to that transcript have been disregarded.

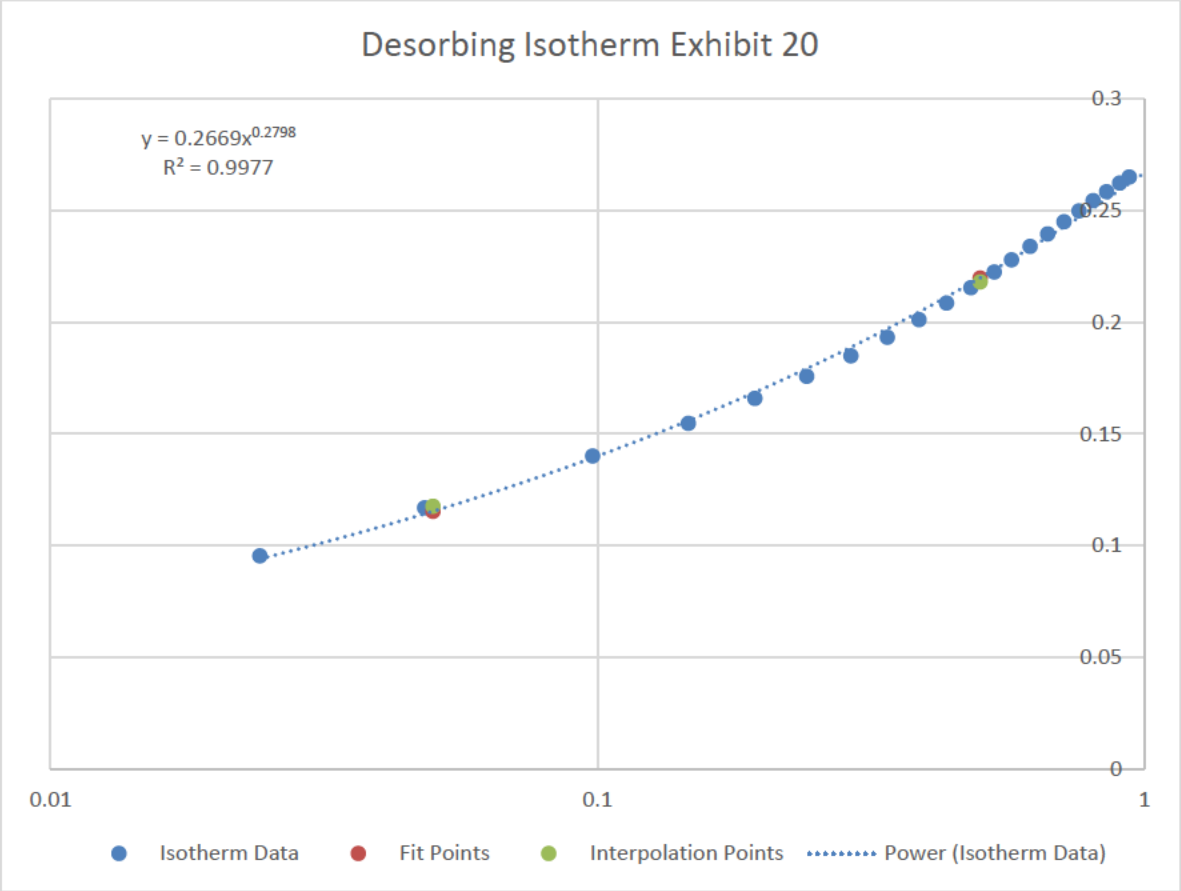
[redacted]

Respondents' further argument that PTA's non-identical adsorption capacity measurements, in combination with a lack of "riffle splitting" preparation and the limitation of one tested sample per Accused Canister, as indicating Dr. Rockstraw's overall results "are not representative of all Accused Products" (RIB at 14 (citing RX-0381C at Q/A 194-197, 204-209, 223-224)) is moot. As will be clear below, my determinations on infringement for this investigation are on a product-by-product basis and not on all Accused Products collectively.

With respect to Dr. Rockstraw's use of two-point interpolation, and given the circumstances, it is more appropriate and reliable than any of Respondents' proposed alternatives. Respondents argue "both the intrinsic record and analyses by other PHOSITAs suggest a preference for alternative methods." RIB at 17. Respondents contend the use of four-point interpolation, Freundlich Fit regression, and Dubinin-Radushkevich ("D-R") Fit regression would be more appropriate and show how ultimate IAC values would be affected in combination with the remainder of Dr. Rockstraw's procedure. *See id.* at 18-21. Respondents further describe how the same fit techniques can be used with alternate apparent density values (calculated by Mr. Lyons or Kuraray) to result in higher than 35 g/L IAC values for every single MPAC region in all sample canisters. *Id.* at 23-24 (citing RX-0381C at Q/A 174-179, 235-244, 299-298).

The nature of the data set provided by PTA does not support use of Respondents' regression techniques, or the use of four-point interpolation over two-point. The parties effectively agree that the reason interpolation or regression is required in the first place is because PTA did not measure adsorption capacity directly at the 5% and 50% levels recited in the claim. *See* RIB at 17; CIB at 20-21. Yet, as shown in Dr. Rockstraw's and Mr. Lyons's data set exhibits (RX-1292C; CX-0451 through CX-0507), PTA did test at one data point remarkably close to the 5%, or 38 Torr, level, as shown below:

[redacted]



RX-1292C at Tab (Exhibit 20); *see* CX-0451 at Cell B92.

Given this proximity, the low "noise" in the data, and the high degree of local linearity of the entire data set, it is more reasonable to use two-point interpolation over any of Freundlich Fit regression, D-R Fit regression, of four-point interpolation, because the nature of two-point interpolation guarantees a calculated capacity value closest to what was actually measured. "When there is more than one method of measurement and the patent does not explicitly discuss the methods, persons experienced in the field are reasonably deemed to select the method that better measures the parameters relevant to the invention." *Osram GmbH v. Int'l Trade Comm'n*, 505 F.3d 1351, 1357–58 (Fed. Cir. 2007) (citing *Howmedica Osteonics Corp. v. Tranquil Prospects, Ltd.*, 401 F.3d 1367, 1372 (Fed. Cir. 2005)). The other techniques lose this benefit through the influence of more distant data points; four-point interpolation uses the next two furthest data points

while the regression techniques use the entire data set. The regression techniques in particular may be the most appropriate for determining adsorption capacity with fewer data points, data with more noise, or for modeling systems in advance of testing (*see* RX-0355 at *1 ("reliable prediction of adsorption parameters and quantitative comparison of adsorbent behavior for different adsorbent systems), *3 (D-R Fit "usually applied to distinguish the physical and chemical adsorption of metal ions")), but the data points from PTA are not few and possess a strikingly low noise level (*see* RX-1292C).

Respondents' expert, Mr. Lyons, also makes reference to Figure 3 of the 844 patent as supposedly showing, and thus promoting, a regression analysis (RX-0381C at Q/A 248-249), but this mischaracterizes the graph. The isotherm lines shown are not all continuous as regressions are; some contain sharp pointed turns indicative of interpolation. 844 patent at Fig. 3. Mr. Lyons also refers to RX-0395C, an Ingevity testing document, to show the use of four-point interpolation in determining adsorption capacities at pressures between sampled data points. RX-0381C at Q/A 252. Yet this document does not explain why four-point interpolation is used over other methods (as compared to its discussions of McBain vs. ASAP2020 testing, or the use of adsorption vs. desorption data). It also shows four-point interpolation applied to a data set in which the target pressure levels (38 and 380 Torr, corresponding to 5% and 50% butane levels) are not close to the sampled pressure levels as the PTA testing had done for the 5%, or 38 Torr, level. *Compare* RX-0395C at *6-7, 14 *with* CX-0451 at Cell B92 (36.6 Torr); *see, e.g.*, CX-0463 at Cell B92 (37 Torr).

The best case for using four-point interpolation over two-point is perhaps at the higher 50% concentration level, where the PTA data points are not as close to the target pressure of 380 Torr. *See, e.g.*, CX-0451 at Cell B82, B83. Yet Ingevity contends "[t]he 2-point and 4-point linear interpolations are nearly identical" here (CRB at 14 (citing RX-1292C)) and this evidence bears

[redacted]

this out. I reviewed four data sets at random (CX-0451, CX-0459, CX-0471, and CX-0491) to explore this contention. In each I adapted Cell B99 to show g/g at desorption 5% and 50% levels under two-point interpolation[2], and compared the values to Respondents' four-point interpolation values as contained in RX-1292C. In all four examples, there existed a noticeable difference at the 5% level but not at the 50% level, as in the table below:

	Two-Point Interpolation		**Four-Point Interpolation**	
	5% (38 Torr)	50% (380 Torr)	5% (38 Torr)	50% (380 Torr)
"Ex. 20" (RX-1292C); Sample 72143181A (CX-0451C)	0.1177	0.2181	0.1131	0.2180
"Ex. 24" (RX-1292C); Sample 72143506A (CX-0459C)	0.1169	0.2153	0.1123	0.2152
"Ex. 30" (RX-1292C); Sample 72143181B (CX-0471C)	0.1170	0.2153	0.1125	0.2151
"Ex. 40" (RX-1292C); Sample 72142611 (CX-0491C)	0.1134	0.2111	0.1090	0.2110

Therefore, for purposes of this investigation, two-point interpolation is demonstrably the best method to use on the PTA MPAC data to determine adsorption capacity at the 5% butane level, and no worse than any other method to determine adsorption capacity at the 50% level. Accordingly, with the reliability of all other steps in Dr. Rockstraw's process established above, I accept the IAC values as listed in his Table 7.

[2] To do this the cell's equation was modified to call directly upon the desorption result of Dr. Rockstraw's two point interpolation at each concentration level, instead of the difference of those levels as the equation is set up to do—*i.e.*, I substituted "A99" in the equation with "C98" (50% level) and then also "C99" (5% level). *See, e.g.*, CX-0451.

[redacted]

Even with these IAC values in hand, Respondents further argue they should be rounded to the nearest integer value (*i.e.*, without decimal) before comparison to the claims. RIB at 15-17. Respondents contend the 844 patent's disclosure of IAC values without decimals, in the claims and specification, supports this step, as does the Federal Circuit's holding in *San Huan New Materials High Tech., Inc. v. Int'l Trade Comm'n*, 161 F.3d 1347 (Fed. Cir. 1998). *See id.* (citing Hr'g Tr. at 232:19-234:10, 853:5-855:3). When this rounding is done, Respondents contend five Accused Products would not infringe. *Id.* at 17 (referring to MAHLE Part Nos. 712433[3]0, 72144043, 72144116, 72144283, 72144313).

But Respondents' cited expert testimony pertains to how commonly understood rules of significant figures would apply to calculations using the values reported in the 844 patent, as opposed to calculations affected by the technical limitations of the scientific equipment used in product testing. *See, e.g.*, Hr'g Tr. at 234:5-10 ("I would expect that the underlying data has significantly more than two significant digits. But for one of skill in the art that is studying the patent, *all they have available is the isotherms in figure format*, and you can only read two significant digits form that figure.") (emphasis added). Respondents have not pointed to any step in Dr. Rockstraw's mathematical operations, or any of the instruments used therein, that would require limiting significant figures to whole numbers. This sets the present circumstances apart from those, for example, in *San Huan*. That case does not stand for a general policy of "round[ing] [] measured values to whole numbers to assess infringement" "when claims specify numerical integers without decimals" as Respondents argue. RIB at 16. The discussion Respondents draw upon (RIB at 16-17) clearly references instrument and accuracy limitations as considerations leading to its holding:

> With respect to the E77C and H8 magnets, San Huan states that YBM conducted a complete chemical analysis only for magnet E77C# 2, having

[redacted]

> TRE content of 36.31%; and magnet H8# 9, having TRE content of 36.45%. The claim states a range of 30 to 36 weight percent TRE. San Huan argues that "`rounding' cannot be used to expand the scope of the claims." The Commission and YBM respond that the claims do not require accuracy to even one decimal place, and that the Commission consistently rounded weight percentages for TRE and iron to the nearest integer. YBM states that the undisputed instrument error for neodymium detection was .4 weight percent.
>
> It was not shown to be error, legal or scientific, for the Commission to recognize these limits of accuracy, and to round the measured weight percentages to the nearest integer. There is substantial evidence of infringement by the E77C and H8 magnets on the violation days at issue.

San Huan, 161 F.3d at 1361; *see Certain Neodymium-Iron-Boron Magnets, Magnet Alloys, and Articles Containing Same*, Inv. No. 337-TA-372, EDIS Doc. No. 43653, Recommended Determination at 70 n. 49 (Jan. 21, 1997) (public version) (discussing technical margins of error and impact of "consisting essentially of" claim language) ("*Neodymium*"); *Neodymium*, Inv. No. 337-TA-372, EDIS Doc. No. 43730, Comm'n Op. at 7, 23 (May 7, 1997) (public version) (explicitly noting instrument error in comparisons to claimed ranges). As noted above, Respondents have not shown any such accuracy limitations in Dr. Rockstraw's experimental setup or calculations.

One additional step is justified, however, before comparing Dr. Rockstraw's MPAC results to the claims. Respondents raise the valid point that the preponderance of the evidence standard requires Ingevity to show "that it is more likely than not (*i.e.*, greater than 50% likelihood) that an Accused Product infringes." *See, e.g.*, RIB at 15 (citing *Warner-Lambert Co. v. Teva Pharm., USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005)). Taking Dr. Rockstraw's data at face value, Respondents observe that only 1 of 2 samples for three Accused Products have been shown to have a "subsequent adsorbent volume" with IAC less than 35 g/L. *Id.* (citing CX-0909C at Q/A 145 (Table 7)). Thus, they contend, for those Accused Products (MAHLE Part Nos. 721433[3]0,

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72144283, 72144313) there is an exact 50% likelihood of infringement which is insufficient under the preponderance of the evidence standard. *Id.*

In response, Ingevity contends "Respondents misapprehend (or at least misapply) the meaning of 'preponderance of the evidence' throughout their infringement analysis." CRB at 10. Ingevity states:

> Respondents' primary citation provides "infringement must be proven by a preponderance of the evidence, which simply requires proving that infringement was more likely than not *to have occurred*." *Warner-Lambert Co. v. Teva Pharm. USA, Inc.*, 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005) (citation omitted; emphasis added); ROB at 16. Respondents' argument accepts that infringement occurs (in 50% of the specified canisters). Thus, the preponderance standard, when correctly applied, is met. ROB at 15. As is the case for all Accused Canisters, the evidence clearly shows, far beyond the preponderance standard, that infringement has occurred. IOB at § III.B.1. Respondents misapply this standard throughout their infringement analysis. ROB at 15, 17–21.

Id.

The best approach to resolving this dispute is analogous to Dr. Rockstraw's analysis. His expert infringement analysis, evaluated above, pertained to product samples produced to Ingevity by MAHLE as part of discovery in this investigation; *i.e.*, these samples are not the actual products which have been imported, but they are treated as representing the "population" of products going by the same model identifier which have been. The resulting data, particularly the data for those three Accused Products which have only one of two samples meeting the "subsequent adsorbent volume" claim limitation, produces IAC values so close to the 35 g/L threshold that subtle experimental tolerances could shift the result one way or the other. Much in the same way Dr. Rockstraw created an average IAC value for all MPAC volumes (CX-0909C at Q/A 143-144), to no apparent objection from Respondents, it is appropriate to average the IAC values across samples of the same Accused Product to determine whether or not the "population" of that product

[redacted]

infringes. Using averages of Dr. Rockstraw's data, two of the nineteen Accused Products do not infringe, as shown in the table below:

MAHLE Part No.	1st Volume IAC		Avg vol 1	2nd Volume IAC		Avg vol 2	Population Infringe?
	Sample 1 of 2	Sample 2 of 2		Sample 1 of 2	Sample 2 of 2		
72143779	35.256	34.255	34.756	33.844	33.188	33.516	X
72144286	33.031	31.343	32.187			0	X
72143181	34.844	36.922	35.883	32.903	32.754	32.829	X
72143330	36.048	34.927	35.488	36.064	36.089	36.077	NO
72142062	33.395	32.619	33.007			0	X
72142611	32.51	34.377	33.444			0	X
72144043	34.643	34.951	34.797			0	X
72143724	32.984	32.772	32.878			0	X
72144116	34.325	34.659	34.492			0	X
72143254	31.179	31.405	31.292	34.57	32.772	33.671	X
72143506	32.456	31.88	32.168	35.458	35.826	35.642	X
72143638	31.015	30.841	30.928	33.124	32.93	33.027	X
72144272	32.242	32.229	32.236	33.563	34.148	33.856	X
72143778	32.413	32.171	32.292	32.351	33.299	32.825	X
72143303	32.014	31.558	31.786	32.817	33.522	33.170	X
72144283	35.618	34.965	35.292			0	NO
72144313	34.601	35.234	34.918			0	X
72143423	32.407	31.776	32.092			0	X
F6235-011	32.533	32.716	32.625			0	X

Accordingly, all Accused Products except MAHLE Part Nos. 7214330 and 72144283 include the "subsequent adsorbent volume" limitation of claim 1. Respondents would also have me consider the "MPAC Material Specifications" which "require a BWC of 8.0-8.6 g/dL," as "circumstantial evidence that MPAC has an IAC of 35 g/L or more." RIB at 24 (citing, *inter alia*, JX-0029C; JX-0033C; JX-0034C; RX-0378C at Q/A 56-80; RX-0381C at Q/A 345). Respondents relatedly argue that five instances of their own in-house testing of MPAC over the years also produced "results [that] were 35 g/L or more (*i.e.*, non-infringing)." *See* RIB at 25-26 (citations omitted). Setting aside the proper weight to give BWC (butane working capacity) values in

[redacted]

determining IAC (discussed further below with respect to invalidity), and the reasonableness of Respondents' prior efforts to employ high-IAC values for MPAC (discussed further below with respect to indirect infringement), the material specifications and prior testing not observed by either expert is not worthy of more weight than the expert-driven experimental results taken from samples provided for the very purpose of this investigation.

Next, the "initial adsorbent volume" limitation of claim 1. Ingevity contends "each accused canister contains at least two adsorbent volumes consisting of Ingevity's BAX 1500, 1100, or 1100LD products." CIB at 12 (citing CX-0909C at Q/A 78, 84-86). Ingevity explains each of these volumes "comes before, with respect to the flow of vapors from the fuel tank, a subsequent adsorbent volume"—a point Respondents do not contest—and further contends that "each has a requisite IAC greater than 35 g/L." *Id.* at 13 (citing CX-0909C at Q/A 84-98).

Ingevity first notes that IAC for BAX 1100 and 1500 are reported in the 844 patent "as being greater than 35 g/L." CIB at 13 (citing 844 patent at 8:5-58). Ingevity also claims MAHLE has "admitted" BAX 1100 and 1500 has these values through MAHLE's dependence on the 844 patent's disclosures in a petition for *inter partes* review before the PTAB. *See id.* (citing RX-0131 at *19, 30, 69; CX-0909C at Q/A 86). But Respondents argue correctly that MAHLE's use of the 844 patent in that forum was as a prior art disclosure of adsorbents with the requisite IAC. RIB at 36. Indeed, this must be the case because petitions for *inter partes* review can only be based on prior art publications—and not prior art products. 35 U.S.C. § 31(b) ("A petitioner in an *inter partes* review may request to cancel as unpatentable 1 or more claims of a patent only on a ground that could be raised under section 102 or 103 and only on the basis of prior art consisting of patents or printed publications.").

[redacted]

Nevertheless, Ingevity explains it "confirmed the IAC values for adsorbent volumes containing BAX 1500, 1100, and 1100LD by preparing adsorption isotherms and computing IAC." *Id.* (citing CX-0909C at Q/A 86-98). This process did not exactly match the process used for MPAC as outlined above, however. While samples of BAX 1500, 1100, and 1100LD were provided to the same PTA testing company (CIB at 13), the samples did not come from the Accused Products as MPAC had, but rather directly from Ingevity's witness Dr. Miller (CX-0913C at Q/A 296-306). Like the MPAC procedure, PTA did perform isotherm measurements at 25°C on each sample and provided the results to Dr. Rockstraw. *Id.* at 14 (citing CX-0909C at Q/A 87-88; CX-0331; CX-0333; CX-0335; CX-0337; CX-0339; CX-0341). Dr. Rockstraw then applied the same two-point interpolation technique and other necessary conversions, as done for MPAC. *See id.* at 14-16 (citing, *inter alia*, CX-0909C at Q/A 88-94). As two samples of each of BAX 1500, 1100, and 1100LD were provided to PTA, Dr. Rockstraw averaged the IACs of each sample pair to arrive at one value for each version of BAX. CX-0909C at Q/A 94.

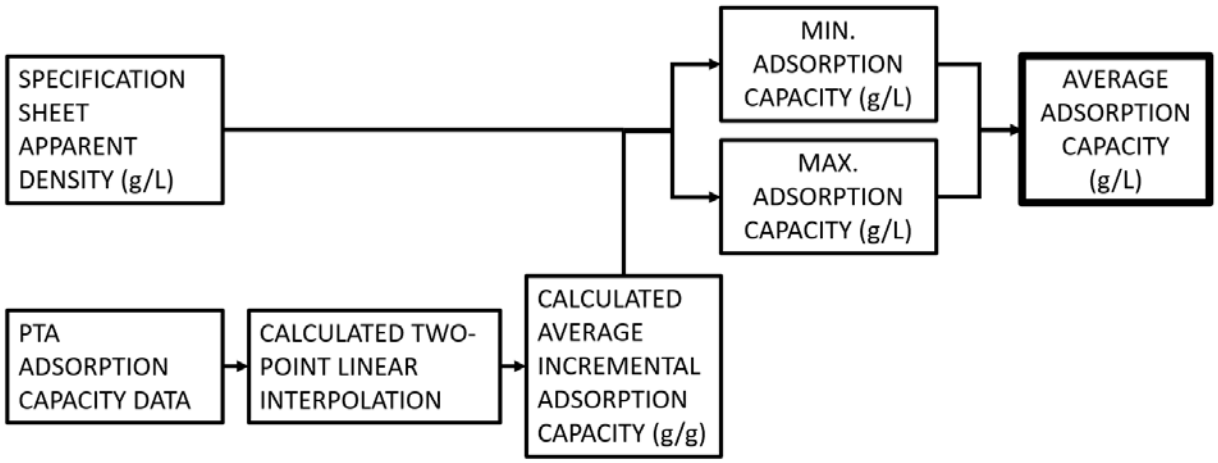
A different procedure was used for apparent density, however. Instead of the X-ray imaging and CT scanning discussed above, Dr. Rockstraw relied on apparent density ranges "reported by Ingevity" in its product specifications for BAX 1500, 1100, and 1100LD and supposedly generated by ASTM D2854. CX-0909C at Q/A 95 (citing CX-0701C; JX-0135C; CDX-0001.8C (exhibit not listed)). Due to these ranges, Dr. Rockstraw created IAC values (using PTA data) for each of the minimum and maximum apparent density values and "then averaged those IACs." *Id.* at Q/A 97. Ingevity concludes:

> The IAC values computed by Dr. Rockstraw are: BAX 1500 (80.33 g/L), BAX 1100 (51.40 g/L), and BAX 1100LD (44.74 g/L), each of which satisfies the initial adsorbent volume limitations as Dr. Rockstraw proved at trial. CX-0909C (Rockstraw) at Q/A 97–98.

CIB at 15.

[redacted]

Dr. Rockstraw's process is illustrated as follows:



On this issue, Respondents state "Dr. Rockstraw's opinion that BAX's IAC is greater than 35 g/L does not carry Ingevity's burden, especially in the face of Mr. Lyons' contrary analysis." RIB at 27. For more detail, Respondents refer to their discussion of domestic industry technical prong, because the same adsorbents are relied on for the same limitation (*see id.*), but describe their position briefly as:

> Dr. Rockstraw: (1) took no "in-canister" measurements of any BAX mass, volume, or apparent density (HT 230:5-14), and (2) did not account for the potential that BAX's IAC can be volumetrically diluted below 35 g/L (HT 107:20-108:6, 240:14-242:15), despite identifying layers of air, foam, and support screens (*i.e.,* volumetric diluents; *see* JX-0001, 7:18-25, 10:20-24, cls. 15, 28, 40, 52) between and adjacent to the BAX regions he identified in the Accused Canisters. (*See, e.g.,* HT 204:4-214:3; RDX-1000.)

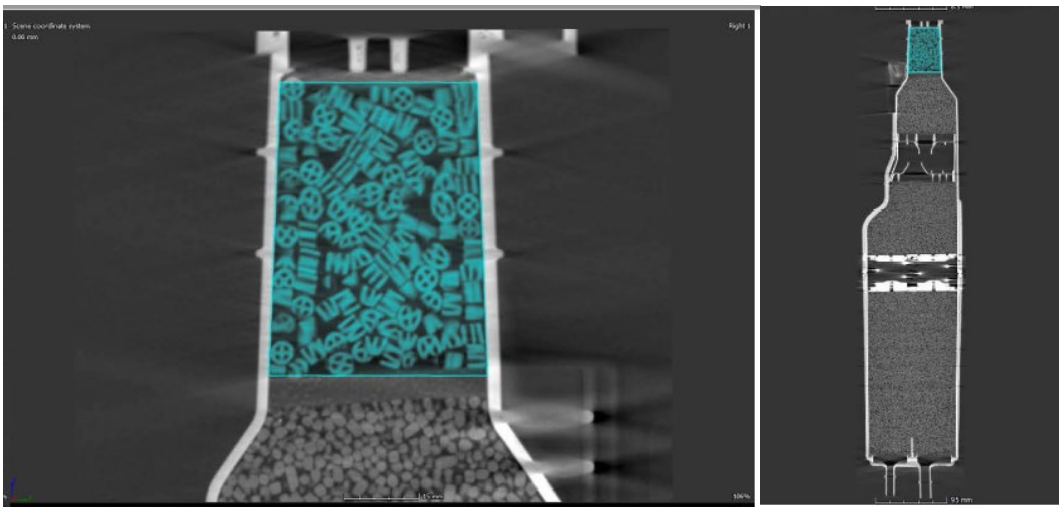
RIB at 27 n.11. None of Respondents' points are persuasive.

First, Respondents criticize Dr. Rockstraw for not using "in-canister mass or volume measurements" to calculate apparent densities—a failure Respondents describe as "both legally and factually wrong" (RIB at 30-31) because it "fail[s] to account for the fact that the IAC of any BAX product can be volumetrically diluted below 35 g/L, which [Dr. Rockstraw] and Mr. Williams confirmed" (*id.* at 31 (citing Hr'g Tr. at 107:20-108:6, 240:14-242:15; JX-0250C at

[redacted]

587:17-588:1; JX-0252C at 301:17-302:3; RX-0381C at Q/A 515-518). Respondents claim there is an insufficient showing that ASTM D2854 is appropriate for BAX given Dr. Rockstraw's concerns over "wall effects." *See id.* at 31-32. Respondents claim Dr. Rockstraw dismisses "wall effects" for BAX without support (*id.* at 31 (citing CX-0909C at Q/A 95, 2038-2039)) while also "admitt[ing] that BAX regions exhibit wall effects and contain volumetrically dilutive interstitial spaces" (*id.* at 32 (citing Hr'g Tr. at 231:1-16)).

Dr. Rockstraw's use of "specified" apparent density for BAX 1500, 1100, or 1100LD in arriving at IAC values is appropriate under the circumstances. Contrary to Respondents' suggestion (RIB at 31), it is easily seen in each of the images of the Accused Products that there is at least one BAX-containing chamber whose diameter exceeds ten times the MPD of the BAX pellet, so that wall effects do not affect the apparent density. CX-0358-359; CX-0363-364; CX-0368-369; CX-0373-374; CX-0378-379; CX-0383-384; CX-0388-389; CX-0393-394; CX-0398-399; CX-0403-404; CX-0408-409; CX-0413-414; CX-0418-419; CX-0423-424; CX-0428-429; CX-0433-434; CX-0438-439; CX-0443-444; CX-0448-449. It is also easily seen how very differently BAX rests within its chambers as compared to MPAC due to their dramatically different sizes, as in one example below:



[redacted]

CX-0363. Based on these images, it is more likely than not that BAX is settled into its chambers within the Accused Products in the same way it would settle in the graduated cylinder called for by ASTM D2584. JX-0222 at *2. And Respondents do not argue that ASTM D2584 cannot apply to BAX apparent density measurements.

As to Respondents' claim that Dr. Rockstraw did not account for volumetric dilution, the apparent density value already accounts for the interstitial air space which results from the granular adsorbent settling into a constrained bed. These spaces are visible in the imagery of the Accused Products, as shown above. Respondents' claims that "Dr. Rockstraw identified but ignored numerous other volumetric diluents between and adjacent to the BAX regions he identified in the Accused and DI Canisters" (RIB at 32 (citing, *inter alia*, RDX-1000)) and "it is likely that these volumetric diluents do in fact lower the IAC of the BAX regions below 35 g/L" (RIB at 35) are flawed, because they treat volumetric diluents "between and adjacent to" BAX regions as part of those BAX regions. This is essentially a re-framing of their indefiniteness argument, rejected above. As construed, "adsorbent volume" in claim 1 refers to the volume of space the adsorbent takes up. Respondents have not pointed to any such diluents within the volume of space taken up by BAX, so the IAC is not "likely" to be lower than 35 g/L.

With respect to Respondents' claim that "Dr. Rockstraw does not adequately explain" why two samples of BAX 1500, 1100, and 1100LD are sufficient to represent all such adsorbents used in the world, this is not persuasive given the absence of any contradicting evidence. *See* RX-0381C at Q/A 519-520, 532-534. Respondents' additional complaint that the IAC values reported in the 844 patent cannot be trusted to reflect the IAC of the product today (RIB at 35-36) is also of little import. Dr. Rockstraw does not rely solely on these values; he also relies on the testing data obtained from PTA. CX-0909C at Q/A 94.

[redacted]

Notably, Respondents' invalidity theory under § 102(g)(2) for the Delphi Epsilon Canister essentially relies on the truth of BAX 1100 having a BWC of 11 and BAX 1500 as having a BWC of 15, as each were sold at the time, with the assumption that such BWC values must mean an IAC of over 35 g/L. *See* RIB at 66 (citing JX-0239 at 189:11-190:17, 258:2-6, 15-18). The same is true for their invalidity theory involving the Park reference. RX-0380C at Q/A 573 (citing RX-0147 (comparing product name to BWC)). The correspondence between adsorbent model name and BWC value is unsurprising, given the 844 patent's note of BWC as "ha[ving] been established in the art as a good predictor of the canister working capacity" and commercially available products being classified by that metric. 844 patent at 2:1-25. This further supports finding the 35 g/L or more IAC limitation to be met in the Accused Products.

Accordingly, I find all Accused Products include the "initial adsorbent volume" limitation of claim 1. As there is no dispute as to the remaining portion of claim 1—"contacting [with] the fuel vapor"—the use of all Accused Products except MAHLE Part Nos. 7214330 and 72144283 infringes claim 1.

ii. Claim 13

Claim 13 of the 844 patent requires:

> 13. The method of claim 11 wherein the volumetric dilution is accomplished by forming the adsorbent into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons.

844 patent at cl. 13.

Ingevity claims "[a] simple visual inspection makes clear MPAC has a substantially cylindrical shape and the individual pieces have multiple voids that pass through it, making it hollow." CIB at 25-26 (citing CX-0909C at Q/A 210-202; JX-0054C at *2; RPX-0027). Ingevity

[redacted]

adds that Respondents' witness, Dr. Yamasaki, "admits that MPAC has a hollow shape." *Id.* at 26 (citing Hr'g Tr. at 421:18-23).

In response, Respondents argue "Ingevity has no proof" that MPAC is "substantially cylindrical" or "hollow." RIB at 28. Respondents contend Dr. Rockstraw "admit[s]" that MPAC is not hollow under the plain and ordinary meaning of the term. *Id.* (citing Hr'g Tr. at 247:24-248:8). More specifically, Respondents contend an empty cylinder that has an internal dividing wall is not hollow. RRB at 7.

There can be no genuine dispute that MPAC is a cylinder, or even a hollow cylinder. I observe from RPX-0027, a physical vial of MPAC in evidence, that it precisely matches the below illustration and photograph provided in Dr. Rockstraw's testimony:

CX-0909C at Q/A 201; JX-0054C; RPX-0027. Each MPAC piece has a regular outside curved surface with a circular cross-section, bounded by two planar faces. This makes it at least "substantially cylindrical." Further, as determined above, the construction for "hollow cylinder"

[redacted]

is a "cylinder with one or more voids or empty spaces that allow for fluid passage from one end of the cylinder to the other." MPAC's empty spaces plainly allow air passage from end-to-end.

Accordingly, I find the use of those Accused Products leading to infringement of claim 1, and intervening dependent claims, also infringes claim 13.

iii. Claim 18

Claim 18 of the 844 patent requires:

> 18. In a method of reducing fuel vapor emissions in an automotive evaporative emissions control system comprising removing at least one volatile organic compound from a volatile organic compound-containing fuel vapor by routing the fuel vapor through a vapor adsorbent, the improvement comprising sequentially routing the fuel vapor through an initial adsorbent material-containing volume wherein the initial adsorbent material is characterized by an incremental adsorption capacity at 25° C. of greater than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane before routing the fluid stream through at least one subsequent adsorbent-containing volume prior to venting to the atmosphere wherein the subsequent adsorbent-containing volume is characterized by an incremental adsorption capacity at 25° C. of less than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane.

844 patent at cl. 18.

The parties largely treat claim 18 the same as claim 1. Ingevity acknowledges claim 18 includes additional language reciting, generally, a step of removing a volatile organic compound from fuel vapor (CIB at 21-22), but claims this is nonetheless met as "the Accused Canisters have multiple volumes of activated carbon that adsorb hydrocarbons, a volatile organic compound, from fuel and air vapor mixtures emitted from fuel tanks of vehicles in which the canisters are installed" (*id.* (citing CX-0909C at Q/A 97-99)). Respondents do not dispute this. *See generally* RIB; RRB.

Although I have determined above that claim 18's use of "subsequent adsorbent material-containing volume" renders this claim indefinite, if that term is found not indefinite and construed to mean "subsequent adsorbent volume" (as in claim 1) or "subsequent adsorbent material" (by analogy to the "initial adsorbent material" term earlier in claim 18), then Ingevity has shown the

[redacted]

limitations of claim 18 are met. Accordingly, I find the use of those Accused Products leading to infringement of claim 1 also infringes claim 18.

iv. Claim 31

Claim 31 of the 844 patent requires:

> 31. In an evaporative emissions control system for a vehicle comprising, in combination, a fuel tank for storing a volatile fuel, an engine having an air induction system and adapted to consume the fuel, a canister containing an initial volume of fuel vapor adsorbent material for temporarily adsorbing and storing fuel vapor from the tank, a conduit for conducting fuel vapor from the tank to a canister vapor inlet, a fuel vapor purge conduit from a canister purge outlet to the induction system of the engine, and a vent/air opening for venting the canister and for admission of air to the canister during operation of the engine induction system, wherein the canister is defined by a fuel vapor flow path via the canister vapor inlet through the initial volume of vapor adsorbent within a first region of the canister toward the vent/air opening, and an air flow path through a subsequent volume of adsorbent within a second region of the canister at the vent/air opening and the first region at the purge outlet, such that fuel vapor formed in the tank flows through the vapor inlet into the initial volume of adsorbent where it is adsorbed and, during operation of the engine induction system, ambient air flows in a path to and through the vent/air opening and along the air flow path in the canister through the initial volume and the purge outlet to the induction system of the engine, the flow of air removing a portion of the adsorbed fuel vapor but leaving a residue of fuel in the initial volume,
>
> the improvement wherein at least one subsequent volume of vapor adsorbent material comprises a volume of 1 % to 100 % of the first volume and is located either inside of the canister within the second region thereof or outside of the canister, and wherein the initial volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25° C. of greater than 35 g n-butane/L-bed between vapor concentrations of 5 vol % and 50 vol % n-butane before routing the air flow through at least one subsequent volume of vapor adsorbent material wherein the subsequent volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25° C. of less than 35 g n-butane between vapor concentrations of 5 vol % and 50 vol % n-butane.

844 patent at cl. 31.

The parties largely treat claim 31 the same as claim 1. Ingevity acknowledges claim 31 includes additional language reciting, generally, that the subsequent adsorbent volume comprises

[redacted]

between 1 and 100% of the first (*i.e.*, initial) volume and is located in one of two positions relative to the canister (CIB at 22), but claims this is nonetheless met because in "each accused canister, all volumes of adsorbent material are located inside the same canister" (*id.* (citing CX-0909C at Q/A 177-178; CX-0510C; RX-0381C at Q/A 419-423, 431-435)). Respondents do not dispute this. *See generally* RIB; RRB.

Ingevity also acknowledges claim 31, distinct from claim 1, "include[s] various claim elements related to parts of an automobile as well as the flow of fuel vapor and purge air through the canister" (CIB at 22-23), but claims this is nonetheless met, primarily citing expert testimony (*id.* at 23 n.9 (citations omitted)). Respondents do not dispute this. *See generally* RIB; RRB.

As determined above, these additional preamble limitations are limiting, yet it is more likely than not that the placement of the Accused Products within the intended and identified models of automobile meets all of these additional limitations. Accordingly, infringement of claim 31 has been shown for those evaporative emissions control systems which include the Accused Products whose use would infringe claim 1.

v. Claim 38

Claim 38 of the 844 patent requires:

> 38. The system of claim 36 wherein the volumetric dilution is accomplished by forming the adsorbent material into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons.

844 patent at cl. 38.

The parties treat claim 38 the same as claim 13. Accordingly, infringement of claim 38 has been shown for those evaporative emissions control systems which infringe claim 31, and all intervening dependent claims.

[redacted]

vi. Claim 43

Claim 43 of the 844 patent requires:

> 43. A canister operative for use in automotive systems for emission control defined by a canister vapor inlet to permit a fuel vapor flow path through an initial volume of vapor adsorbent within a first region of the canister toward a canister vent/air opening to permit a continued air flow path through a subsequent volume of adsorbent within a second region of the canister at the vent/air opening and the first region at a canister purge outlet, such that fuel vapor formed in a tank for storing volatile fuel flows through the canister vapor inlet into the initial volume of adsorbent where it is adsorbed and, during operation of an engine induction system, ambient air is caused to flow in a path to and through the vent/air opening and along the air flow path in the canister through the initial volume and the purge outlet to the induction system of the engine, wherein the flow of air removing a portion of the adsorbed fuel vapor but leaving a residue of fuel in the initial volume, and wherein at least one subsequent volume of vapor adsorbent material comprises a volume of 1% to 100 % of the initial volume and is located either inside of the canister within the second region thereof or outside of the canister, and wherein the initial volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25° C. of greater than 35 g n-butane/L-bed between vapor concentrations of 5 vol % and 50 vol % n-butane before routing the air flow through at least one subsequent volume of vapor adsorbent material wherein the subsequent volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25° C. of less than 35 g n-butane between vapor concentrations of 5 vol % and 50 vol % n-butane.

844 patent at cl. 43.

The parties largely treat claim 43 the same as claim 1. Ingevity acknowledges claim 43 includes additional language reciting, generally, that the subsequent adsorbent volume comprises between 1 and 100% of the first (*i.e.*, initial) volume and is located in one of two positions relative to the canister (CIB at 22), but claims this is nonetheless met because in "each accused canister, all volumes of adsorbent material are located inside the same canister" (*id.* (citing CX-0909C at Q/A 177-178; CX-0510C; RX-0381C at Q/A 419-423, 431-435)). Respondents do not dispute this. *See generally* RIB; RRB.

[redacted]

Ingevity also acknowledges claim 43, distinct from claim 1, "include[s] various claim elements related to parts of an automobile as well as the flow of fuel vapor and purge air through the canister" (CIB at 22-23), but claims this is nonetheless met, primarily citing expert testimony (*id.* at 23 n.9 (citations omitted)). Respondents do not dispute this. *See generally* RIB; RRB.

As determined above, these additional preamble limitations are limiting, yet it is more likely than not that the placement of the Accused Products within the intended and identified models of automobile meets all of these additional limitations. Accordingly, infringement of claim 43 has been shown for those evaporative emissions control systems which include the Accused Products whose use would infringe claim 1.

vii. Claim 50

Claim 50 of the 844 patent requires:

> 50. The canister of claim 48 wherein the volumetric dilution is accomplished by forming the adsorbent material into high voidage shapes selected from the group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons.

844 patent at cl. 43.

The parties treat claim 50 the same as claim 13. Accordingly, infringement of claim 50 has been shown for those evaporative emissions control systems which infringe claim 43, and all intervening dependent claims.

2. Indirect Infringement

Ingevity has shown indirect infringement of the asserted claims by each of MAHLE, Kuraray, and Nagamine by a preponderance of the evidence.

a. MAHLE

Ingevity contends respondent MAHLE both induces and contributes to infringement of the 844 patent. CIB at 29-31.

[redacted]

Ingevity contends MAHLE induces infringement through the provision of the Accused Products to automobile OEMs, "and in doing so, actively encourages them to test the Accused Canisters . . . . thereby meeting the Method Claims." *Id.* at 29 (citing, *inter alia*, CX-0909C at Q/A 1994-1995). Ingevity also contends MAHLE sends the Accused Products to non-parties Sterling and Vexa for "DBL and SHED tests," with the implication that these non-parties also infringe method claims 1 and 18 through that testing. *See id.* (citing, *inter alia*, CX-0909C at Q/A 1952, 1999-2001; JX-0230C at 269:4-271:13, 396:6-398:9, 399:2-403:1). Ingevity further argues MAHLE had notice of the 844 patent through pre-suit correspondence from Ingevity, but also much earlier, in the "'around late 2005'" timeframe. *See id.* at 29-30 (citing, *inter alia*, Hr'g Tr. at 376:11-13, 421:3-6; RX-0373C at Q/A 29-31; CX-0638C at *46; CX-0909C at Q/A 1993-1994, 1998)). Ingevity alleges this knowledge was present when MAHLE was developing MPAC as a replacement for Ingevity's honeycomb product. *See id.* at 30 (citing CX-0638C at *46; CX-0909C at Q/A 1993-1994).

As determined above, the use of the Accused Products (with the exception of MAHLE Part Nos. 7214330 [redacted] and 72144283 [redacted] within an automobile fuel system which causes fuel vapor to enter the canister from a fuel tank directly infringes, at least, method claims 1 and 18 and system claim 31, and the canisters themselves infringe apparatus claim 43. Respondents do not dispute their provision of the Accused Products to OEMs or their prior knowledge of the 844 patent. *See* RIB at 24-25 (discussing development of MPAC with consideration of the 844 patent); RRB at 13-14. Respondents claim, however, that "Ingevity has no evidence of MAHLE's purported intent to infringe" apart from Dr. Rockstraw's opinion on such matters. *Id.* at 13-14.

But Respondents' response to Ingevity's Interrogatory No. 16 states:

[redacted]

[redacted]

CX-0637C at *46. This response notes MPAC [redacted] MAHLE's witness, Dr. Yamasaki, similarly testified the development of "MPAC-1" was [redacted] RX-0373C at Q/A 38-39. As discussed in more detail further below with respect to technical prong domestic industry, it is effectively undisputed that Ingevity's honeycomb, the product mentioned in Respondents' interrogatory response and implied in Dr. Yamasaki's testimony, has no substantial non-infringing uses outside of the 844 patent. CX-0911C at Q/A 101-102; CX-1144C at Q/A 97-99; RIB at 87 (citing CPB at 367), 104-105; *see* RRB at 58. Thus, there is at least *some* evidence of MAHLE's intent to replicate Ingevity's technique of practicing the patent, contrary to Respondents' contention.

Setting that overbroad contention aside, the more measured response from Respondents is that [redacted] and was found to have such high values after various rounds of in-house testing between 2013 and 2018. *See* RIB at 24-26; RRB at 13-14. Respondents contend this evidences a good faith belief of non-infringement, which precludes both induced and contributory infringement. RIB at 25; RRB at 14. Although not discussed in their briefing, Respondents' expert, Mr. Lyons, discusses a variety of other evidence in support of the same contention. *See* RX-0381 at Q/A 442-462 (citing RX-0936C; RX-0754C; RX-0337C; RX-0751C).

[redacted]

Little of this evidence supports a good faith belief in non-infringement on the part of MAHLE. First, the evidence discussed solely in the testimony of Mr. Lyons is of little probative value. RX-936C, cited by Mr. Lyons (RX-0381C at Q/A 450-451), is not in evidence although it appears JX-0243C may be the same. Regardless, the cited excerpts are either redacted as not in evidence or irrelevant to this issue. RX-0754C, also cited by Mr. Lyons (RX-0381C at Q/A 452-453), is also not in evidence although it may have become JX-0241C. Regardless, the cited excerpt is irrelevant. RX-0337C [redacted]—is standard for such contracts, regardless of the underlying factual circumstances. *See* RX-0381C at Q/A 452-453. Finally, RX-0751C is not in evidence although it may be JX-0230C. The cited excerpts (*see* RX-0381C at Q/A 457) do evidence a belief that MPAC is a "high-capacity carbon" such that "[w]hen used in combination with BAX, which is also high capacity, is outside the Ingevity patent claims," but this is based on MAHLE's 2013 testing (JX-0230C at 97:9-15; *see* JX-0230C at 204:3-206:10, 243:24-244:7), the adequacy of which Ingevity challenges.

Thus, the issue fairly turns on whether MAHLE's in-house testing between 2013 and 2018 establishes a good-faith basis to believe their provision of MPAC in the Accused Products would not lead to infringement of the 844 patent. While the parties spend the majority of their discussions on the adequacy of the methods behind each round of tests (*see, e.g.*, CIB at 26-30; CRB at 16-17; RIB at 25-26; RRB at 11-12, 14) and whether or not certain BWC values accurately reflect IAC (*see, e.g.*, CRB at 15-16; RIB at 24-25; RRB at 11), Respondents' overall contention is that their in-house development determined that an IAC of 35 g/L corresponds to a BWC of 8.0 g/dL, and so [redacted] (RIB at 25 (citing RX-0373C at Q/A 44-55; Hr'g Tr. at 398:17-399:18; JX-0029C)). In this way,

[redacted]

Respondents cannot dispute that they [redacted] RX-0373C at Q/A 49-55.

This does not resemble a good faith belief or effort to not infringe, as any slight variance from the [redacted] would result in infringement. To borrow the general engineering concept, MPAC's factor of safety to avoid infringement is effectively [redacted] This risk should have been apparent to Respondents, especially given their acknowledgement that a BWC of 8.0 only "correlates" to an IAC of 35. RX-0373C at Q/A 55. Respondents state:

> Ingevity argues that "[c]ontrary to Respondents' assertions, IAC is not the same as BWC." (CPOB at 7.) Respondents have not argued they are the same, only that they are closely correlated and an IAC of 35 g/L is closely correlated with a BWC of 8.0 g/dL, based on an "excellent" correlation first discovered and characterized by the alleged inventor of the '844 patent, Dr. Hiltzik. (*See* CPOB at 24.)

RRB at 11.

Further, the same MPAC specification states that the apparent density of MPAC should be [redacted] JX-0029C at *2. To the extent Respondents seek to rely on the individual IAC results from Dr. Yamasaki's rounds of in-house testing as the source of the non-infringement belief—separate and apart from their perceived BWC-IAC correlation—it is important that Dr. Yamasaki only used an apparent density value of [redacted] for those experiments. RX-0373C at Q/A 70, 74, 78, 79; CX-0909C at Q/A 157. [redacted] A more earnest investigation as to whether MPAC infringes would have also considered the [redacted] and it appears it would have made a difference. For those more recent 2018 tests, Dr. Yamasaki's butane isotherms showed incremental g/gAC adsorption values of 0.1092 g/gAC (0.1892 –

[redacted]

0.0800), 0.09983 g/gAC (.19520 – 0.09537), and 0.0964 g/gAC (0.2126 – 0.1162). RX-0373C at Q/A 70, 78, 79. These values multiplied by the [redacted] gives IAC values of [redacted] respectively—*i.e.*, infringement in at least two out of three runs.

Therefore, I do not find the evidence supports a good-faith belief that MPAC is such a "high-capacity" carbon (JX-0230C at 97:9-15, 204:3-206:10, 243:24-244:7) or that Respondents "carefully avoided releasing a potentially infringing product" (RRB at 14); and this determination is based solely on Respondents' own internal records and testimony. *See* RIB at 26 ("Dr. Rockstraw's evidence was created long after MPAC's design and development was complete . . . ."). With no other elements of inducement contested by Respondents (RRB at 14), Ingevity has shown MAHLE has induced infringement of the 844 patent through the sale of its Accused Products.

As for contributory infringement, Ingevity contends MAHLE NA sells the Domestic Accused Products to "auto OEMs in the United States" and "[v]ehicles including the Accused Canisters meet [claims 31 and 43], and operating vehicles that incorporate the Accused Canisters meets [claims 1 and 18]." CIB at 30-31 (citing CX-0909C at Q/A 1953-1974, 2024-2027). Ingevity further contends the Domestic Accused Products have no non-infringing uses and "MAHLE NA must know about downstream infringement by end users and the automobile OEMs." *Id.* at 31 (citing CX-0909C at Q/A 1973-1976).

Apart from their asserted belief in the high-capacity nature of MPAC, dismissed above, Respondents argue MPAC has substantial non-infringing uses due to Dr. Rockstraw's "admi[ssion] that certain units of MAHLE canisters do not infringe because the MPAC volumes he identified have an IAC greater than or equal to 35 g/L." *See* RRB at 13 (citing CIB at 15; CX-

[redacted]

0909C at Q/A 145 (Table 7)). Such MPAC volumes are few, however, and greatly outnumbered by MPAC volumes which do have an IAC of less than 35 g/L. *See* CX-0909C at Q/A 145 (Table 7). Thus, I do not find, and Respondents do not attempt to explain, why those few volumes represent "substantial" non-infringing applications.

Thus, Ingevity has shown that MAHLE has contributed to the infringement of the 844 patent by others with the Domestic Accused Products.

b. Kuraray

Ingevity contends respondent Kuraray both induces and contributes to infringement of the 844 patent. CIB at 31-33.

With respect to inducement, Ingevity contends Kuraray, like MAHLE, has known of the 844 patent for years, at least by 2009 when "Kuraray was considering the impact of the '844 Patent on its business plans." CIB at 32 (citing JX-0236C at 124:22-125:7, 125:13-17, 125:20; CX-0084C at *2; CX-0611C at *36). Ingevity contends this includes subsidiary and co-respondent Calgon Carbon Corporation. *Id.* at 33 (citing JX-0226C at 27:18-25; CX-0909C at Q/A 1978). Ingevity specifically argues that "by providing MPAC to MAHLE NA via CCC, Kuraray actively induces MAHLE NA to sell the Domestically Manufactured Canisters, thereby infringing at least the Canister Claims." CIB at 31 (citing CX-0909C at Q/A 2005; JX-0244C at 55:20-25; JX-0230C at 67:7-12). Ingevity adds "Kuraray's importation and sale of MPAC further constitutes an importation and sale after importation of an article that infringes" (*id.* at 32 (citing CX-0909C at Q/A 2023-2027)) and [redacted] Kuraray is encouraging MAHLE NA to manufacture, offer to sell, and sell infringing fuel vapor canisters" (*id.*). Ingevity further argues "Kuraray has hosted multiple automobile OEMs for tours of Kuraray's MPAC production site in Japan to aid MAHLE's marketing of MPAC canisters." *Id.* (citing JX-0244C at 49:19-50:17, 51:7-14; CX-0030C at *1-4).

[redacted]

In response, Respondents argue only that Kuraray held the same belief in non-infringement as respondent MAHLE. *See* RRB at 14 (citations omitted); RX-0381C at Q/A 472. As noted, that belief is not supported by the record. Respondents' expert opines that Kuraray "does not have all information related to how or where MAHLE uses the activated carbon" and "there is no sharing of information between CCC and MAHLE regarding the design of MPAC canisters, the performance of MPAC canisters, or certification of MPAC canisters." RX-0381C at Q/A 474. Even accepting this opinion, the evidence shows that Kuraray assists in marketing MAHLE's canisters and developing business strategy (CX-0030C; JX-0244C at 49:19-52:16), Kuraray and MAHLE collaborated during the development of MPAC (JX-0244C at 31:1-23 ("MPAC product is – designed to be used only by MAHLE, and how MAHLE use is not our concern"); JX-0242C at 55:2-57:13; JX-0230C at 66:13-67:1; JX-0242C at 36:16-38:1), and Kuraray's MPAC is sold only to MAHLE (JX-0244C at 31:18-23).

Accordingly, I find it is more likely than not that Kuraray induces MAHLE NA to directly infringe the 844 patent. To the extent Ingevity's reference to Kuraray's automobile OEM tours (CIB at 32) is intended to be a second inducement theory—*e.g.*, that Kuraray induces automobile OEMs to directly infringe—that theory is not clearly explained in the briefing, and is therefore rejected.

With respect to contributory infringement, the evidence shows a collaborative history between the Kuraray and MAHLE in the development and marketing of MPAC in full view of the 844 patent, as discussed above. There is no evidence that MPAC has a use outside of the Accused Products, and as determined above, those volumes of MPAC which were found not to have IAC below 35 g/L do not constitute a "substantial" non-infringing use, so it is more likely than not

[redacted]

Kuraray contributes to MAHLE NA's direct infringement through the provision of MPAC. *See* CIB at 33.

c. Nagamine

Ingevity contends respondent Nagamine induces infringement of the 844 patent. CIB at 33-34. As with MAHLE and Kuraray, Ingevity claims Nagamine has known of the 844 patent for some time, far before the filing of the present complaint. *Id.* at 34 (citing CX-0909C at Q/A 2020; JX-0242C at 36:16-37:2, 38:21-24, 40:4-10); *see* CX-0909C at Q/A 2014 (citing CX-0184C at 39:9-13). Ingevity argues Nagamine's development of MPAC with Kuraray and MAHLE, sale of MPAC to Kuraray "which it knows to resell to MAHLE," and hosting of factory tours for OEMs, means "Nagamine actively induces MAHLE NA's infringement by providing MPAC to MAHLE NA through Kuraray and its efforts to aid MAHLE's sales to OEMs." *Id.* (citations omitted).

In response, Respondents argue only that Nagamine held the same belief in non-infringement as respondent MAHLE. *See* RRB at 14 (citations omitted); RX-0381C at Q/A 493. As noted, that belief is not supported. Additionally, the evidence cited by Ingevity in its briefing, and summarized above with regard to Nagamine's sale of MPAC for importation, demonstrates that Nagamine was aware of the 844 patent, and collaborated with Kuraray and MAHLE to develop MPAC in an effort to avoid its infringement. *E.g.*, JX-0242C at 37:19-39:13.

Accordingly, given the collaborative history between the Respondents in the development of MPAC in view of the 844 patent, it is more likely than not that Nagamine induces MAHLE NA to directly infringe. To the extent Ingevity's reference to Nagamine's automobile OEM tours (CIB at 34) is intended to be a second inducement theory—*e.g.*, that Nagamine induces automobile OEMs to directly infringe—that theory is not clearly explained in the briefing, and is therefore rejected.

[redacted]

E. Domestic Industry – Technical Prong

According to Ingevity's post-hearing briefing, the construction or use of the following products is alleged to practice claims of the 844 patent:

Ingevity's "DI Canisters"	
Futaba	17300TLC A022M1; 17300TLA A022M1; 42035AL01C
Leehan	31400-F3500; 31400-S2500; 31400-D5500; 31400-D5600; 31400-S9000; 31400-H9500; 31400-H9600; 31400-M7600; 3QF201797A
Stant	ACO-8355; AAO-8355; ACO-8214; POR-AAO-8214; ACO-7452; AAO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO-4505-1; 0212025061; AAO-8156
Kayser	42698919; 42702737; 84493688; 84359221; 84316430; 84407925; 84413230; 84410850; 52029 779AB; 52029 779AD; 52029 780AD; 68350 418AA
MAHLE	[redacted]

CIB at xiv; *see* CIB at 35. It appears Ingevity contends the following claims of the 844 patent are practiced by these canisters:

Claims	DI Canisters Alleged to Practice
1, 18, 31, 43 (independent)	All
4, 5, 19 (dependent)	All
2 (dependent)	Futaba: 42035AL01C Leehan: 31400-D5600; 31400-S9000, 31400-M7600

[redacted]

	Stant: ACO-8355; AAO-8355; ACO-8214; POR-AA-8214; ACO-7452; AAO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO4505-1; 0212025061; AAO-8156 Kayser: 42702737; 84493688; 84359221; 84316430; 84407925; 84413230; 84410850; 52029779AB; 52029779AD; 52029780AD; 68350418AA MAHLE: [redacted]
3 (dependent)	Futaba: 17300TLC A022M1, 17300TLA A022M1 Leehan: 31400-F3500; 31400-S2500; 31400-D5500; 31400-H9500; 31400-H9600 Kayser: 42698919
8, 21, 33, 45 (dependent)	All
11, 24, 36, 48 (dependent)	All
12, 25, 37, 49 (dependent)	All
13, 26, 38, 50 (dependent)	MAHLE: 72142079
14, 27, 39, 51 (dependent)	All, except: Leehan: 31400-D5600, 31400-S9000, 31400-M7600
16, 29, 41, 53 (dependent)	All

See CIB at 34-43.

1. Articles "Protected" by the 844 Patent

19 U.S.C. § 1337(a)(3) explains that "an 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 . . . (A)

[redacted]

significant investment in plant and equipment; (B) significant employment of labor or capital; or substantial investment in its exploitation, including engineering, research and development, or licensing." 19 U.S.C. § 1337(a)(3). Particularly relevant to this investigation is the phrase "with respect to articles protected by the patent," because the activated carbon adsorbents which Ingevity manufactures and sells do not themselves meet the limitations of the claims of the 844 patent. Rather, as discussed above in the context of infringement, the independent claims identified for domestic industry are only met when, *inter alia*: a method is performed wherein the adsorbents are placed in series with respect to one another and contacted with a flowing fuel vapor (*see* 844 patent at cls. 1, 18); the adsorbents are contained within a canister in a similar arrangement (*see id.* at cl. 43); or the adsorbents are contained within a canister, again, in the same arrangement and where the canister is further connected to an automobile's fuel system (*see id.* at cl. 31). Ingevity describes this as "[t]he independent claims include method (1, 18), system (31), and canister/product (43) claims that are directly [practiced] by each [] canister, the use of such canister when connected to a fuel vapor source, or when included as part of a vehicle." CIB at 12; *see* CIB at 22-23, 38-39.

Thus, Ingevity's activated carbon adsorbents do not practice the 844 patent—a conclusion that is undisputed. RIB at 3; *see* RIB at 29, 106 (citing RX-1297C at 120). In other words, those adsorbents, which Ingevity nonetheless characterizes as the "DI Products" (CIB at xiv), are not "articles protected by the patent" under the statute. Rather, the "articles" are fuel vapor canisters containing those adsorbents which: when used, practice the steps of method claims 1 and 18; when made or sold, meet apparatus claim 43; and when placed within an automobile's fuel system, meet system claim 31. Indeed, Ingevity characterizes these canisters as the "DI Canisters." CIB at xiv, 35.

[redacted]

Accordingly, Ingevity seeks to satisfy the technical prong of domestic industry in two ways. First, Ingevity claims "Fuel Vapor Canisters Manufactured by Ingevity's Implied Licensees Satisfy The Technical Prong of the Domestic Industry Requirement." *See* CIB at 34-48. As noted in its title, this theory depends on the existence of an implied license between Ingevity and those third-parties whose canisters it relies on to meet the limitations of the claims. *See id.* at 45-47 (discussing why the third-parties are so licensed). For various reasons, Respondents dispute that such licenses exist. *See* RIB at 103-106.

Second, Ingevity claims its "DI Products Satisfy the Technical Prong of the Domestic Industry Requirement." *Id.* at 48-52. This theory depends on either of two legal premises—that the technical prong may be satisfied "based on investments in components of products that practice a patent" (CIB at 48) or "[w]hen the technical prong is satisfied by complainant's sale of component parts configured by customers to practice an asserted patent, ALJs have not required that the customers have a license" (*id.* at 52). To support these two concepts, Ingevity cites to a trio of final IDs which were not reviewed by the Commission: *Certain Optoelectronic Devices, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-669, 2010 WL 1249683, at *60-61 ("*Optoelectronic Devices*"); *Certain Integrated Repeaters, Switches, Transceivers, and Products Containing Same*, Inv. No. 337-TA-435, 2001 WL 1769747, at *94-95 ("*Integrated Repeaters*"); and *Certain Foam Masking Tape*, Inv. No. 337-TA-528, 2005 WL 1597282, at *9 ("*Foam Tape*"). *Id.* at 48, 52. These three final IDs all stand for the proposition that the technical prong is satisfied "if it [is] established that [the patent owner] or its customers configure the allegedly covered products in a manner that practices the claims within the United States." *Optoelectronic Devices*, 2010 WL 1249683, at *58.

[redacted]

Ingevity's technical prong assertions are addressed below. As a threshold issue, however, Respondents challenge the starting point for Ingevity's claims of implied license—whether Ingevity Corp. has any rights to the 844 patent to grant given ownership of the patent by Ingevity South Carolina, LLC.

Respondents present the relevant test as "[i]mplied licenses arise based on 'language used by the owner of the patent or any conduct on [its] part' from which another 'may properly infer that the owner consents to his use of the patent in making or using [the impliedly licensed product], or selling it, upon which the other acts.'" RIB at 103 (citing *McCoy v. Mitsuboshi Cutlery*, 67 F.3d 917, 920 (Fed. Cir. 1995); *De Forest Radio Tel. Co. v. United States*, 273 U.S. 236, 241 (1927)). Respondents thus argue, "Mr. Woodcock testified at deposition, as the corporate representative, that he is not aware of any indication from Ingevity SC to Ingevity Corp. that implies a license" (*id.* (citing JX-0252C at 273:20-25)), and any activities now discussed by Ingevity "do not evince an implied exclusive license (*id.*). Respondents hold up *CryoLife, Inc. v. C.R. Bard, Inc.*, 2015 U.S. Dist. LEXIS 28911 (D. Del., Mar. 10, 2015), as an example of no implied license being found between parties situated similarly to Ingevity Corp. and Ingevity South Carolina LLC. *See id.* at 103-104.

In fact, Mr. Woodcock, Ingevity Corporation's executive vice president, testified unequivocally that Ingevity Corporation [redacted] JX-0252C at 272:12-18. Admittedly, he also testified [redacted] JX-0252C at 20-25. But this question and answer have little probative value, both because it is not clear what was meant by "indication," or what Mr. Woodcock understood the word to mean, and because Ingevity South Carolina, LLC, is a wholly

[redacted]

owned subsidiary of Ingevity Corp., and the corporation is the LLC's sole member. CX-0911C at Q/A 13. And the other evidence, in combination with the corporate relationship, clearly proves the existence of an [redacted] (CX-0911C at Q/A 17, 19-20, 29, 141-143; JX-0150C ([redacted]); Ingevity Corp. [redacted] (CX-0911C at Q/A 18); and [redacted] (JX-0252C at 273:13-18). As to *CryoLife*, the facts surrounding the patent-subsidiary relationship in that case were far less developed than what Ingevity has demonstrated. *See CryoLife*, 2015 WL 1069397, at *3 n.3 (discussing change in building signage and website content as insufficient to show standing of the parent corporation).

Accordingly, Ingevity has shown that Ingevity Corp. is [redacted] with a right to sub-license.

Turning back to whether the DI Canisters from Ingevity's customers are impliedly licensed, Ingevity correctly argues:

> There are two requirements for an implied license based on "the sale of nonpatented equipment used to practice the patented invention": (1) "the equipment involved must have no noninfringing uses," and (2) "the circumstances of the sale must 'plainly indicate that the grant of a license should be inferred.'" *Carborundum Co. v. Molten Metal Equip. Innovations, Inc.*, 72 F.3d 872, 878 (Fed. Cir. 1995).

CIB at 45. Under this rule, Ingevity claims its "customers that purchase and use automotive honeycomb products in canisters as the only subsequent adsorbent volume satisfy the requirement for an implied license." *Id.* at 46. Ingevity states that its automotive honeycombs "have no noninfringing uses." *Id.* (citing CX-0911C at Q/A 101-102; CX-1144C at Q/A 97-99). Importantly, Respondents do not dispute this *see* RIB at 87 (citing CPB at 367), 104-105; *see* RRB

[redacted]

at 58), nor is there evidence to the contrary in the record. Therefore, the first element of an implied license is met for those DI Canisters which incorporate an Ingevity honeycomb (*i.e.*, HCA or HCA-LBE).

Ingevity does not explicitly mention BAX-LBE as another, non-honeycomb adsorbent product through which the purchase by customers grants an implied license. *See* CIB at 45-47. But Ingevity argues that it, too, has no non-infringing uses. *Id.* at 45 ("When Ingevity sells its BAX-LBE, HCA, and HCA LBE products to its customers, those products are only used in canisters that practice the '844 Patent—there is no other reasonable or intended use for these low-IAC carbon adsorbents."); CX-0911C at Q/A 17. As with the HCA and HCA-LBE honeycombs, there appears to be no dispute from Respondents on this point, nor is there record evidence contradicting it. *See generally* RIB; RRB. Thus, Ingevity has met its burden to show BAX-LBE, HCA, and HCA-LBE have no non-infringing uses; and the first element of an implied license is met for all three products.

The second element is more vigorously disputed. Ingevity [redacted] but at some point [redacted] in order to obtain an implied license." CIB at 46 (citing CX-0911C at Q/A 140-143; CX-1144C at Q/A 173-176). Ingevity contends its customers, Futaba (or FIC), Leehan, Stant, and Kayser, do so purchase their subsequent absorbent volumes and "therefore have an implied license." *Id.* As for MAHLE, Ingevity cites to corporate deposition testimony to show that MAHLE understood this was the arrangement. *Id.* (citing JX-0230C at 297:18-298:13). And Ingevity has [redacted] (*id.* at 47) and only [redacted]

[redacted] (*id.* (citing CX-1144C at Q/A 160-161, 164-165, 168-169)).

To be sure, Ingevity has [redacted] Futaba, Leehan, Stant, or Kayser, and Mr. Woodcock, [redacted] RIB at 104-105 (citing Hr'g Tr. at 59:6-63:17). And corporate deposition testimony shows that each of Futaba, Leehan, Stant, and Kayser [redacted] *See id.* at 105 (citing JX-0225C at 76:21-77:1, 122:23-16:7; JX-0233C at 80:22-87:1; JX-0227C at 65:7-24, 71:5-77:12; JX-0229C at 116, 120; RX-0750C at 120-121).

These facts are beside the point, however. The Federal Circuit has instructed that when nonpatented equipment is sold to an alleged implied licensee, only the circumstances at the time of the sale are relevant to the license inquiry, and not, for example, those after the sale. *Met-Coil Sys. Corp. v. Korners Unlimited, Inc.*, 803 F.2d 684, 687 (Fed. Cir. 1986); *see Elkay Mfg. Co. v. Ebco Mfg. Co.*, 99 F.3d 1160 (Fed. Cir. 1996). When no non-infringing uses exist for the sold item, "unless the circumstances of the sale indicate that a grant of a license should not be inferred . . . the patentee will be barred from asserting its patent rights against a downstream purchaser of the article," that is, a license is implied. *Jacobs v. Nintendo of America, Inc.*, 370 F.3d 1097, 1100 (Fed. Cir. 2004); *see Carborundum*, 72 F.3d at 878-879 ("the circumstance of such a sale plainly indicate that a license should be implied under the apparatus patent. . . . once Metaullics sold the pump without restriction, the parties to the sale were presumed to have intended that the purchaser was free to repair it with parts obtained from any source."); *Anton/Bauer, Inc. v. PAG, Ltd.*, 329 F.3d 1343, 1351-52 (Fed. Cir. 2003) (relying on "no evidence that Anton/Bauer

[redacted]

places express restrictions on the use of the female plates it sells or that it requires that manufactures to whom it sells female plates expressly restrict the grant of a license upon sale of the finished camera that incorporates the plate" to hold that an implied license existed); *Met-Coil*, 803 F.2d at 687 ("A patent owner's unrestricted sales of a machine useful only in performing the claimed process and producing the claimed product 'plainly indicate that the grant of a license should be inferred.' . . . Absent any circumstances tending to show the contrary, we see now error in the district court's holding that Met-Coil's customers enjoyed an implied license under the patent.").

Here, the facts are similar to those in *Anton/Bauer*, *Met-Coil*, and *Carborundum*, in which an implied license was found. There is no evidence to indicate that Ingevity's sale of honeycombs (by themselves or in combination with additional adsorbents) to any of Futaba, Leehan, Stant, or Kayser, and especially to MAHLE (who was aware of Ingevity's position on implied license), [redacted] Respondents' cited evidence primarily concerns whether customers understood they practiced the 844 patent or had discussed the patent with Ingevity. This is not relevant, however, to the two-factor test promulgated by the Federal Circuit for implied licenses through the sale of unpatented items.

Thus, given the undisputed claim that the sold HCA, HCA-LBE, and BAX-LBE have no uses other than to practice the claims of the 844 patent, and the absence of any evidence in connection with those sales restricting the use of HCA, HCA-LBE, and BAX-LBE in any way, I find each of Futaba, Leehan, Stant, Kayser, and MAHLE received implied licenses through their respective purchases.[3] Since all of the DI Canisters include at least one of HCA, HCA-LBE, and

[3] The precise terms or scope of the implied license are discussed further below in connection with patent exhaustion.

[redacted]

BAX-LBE (CX-0909C at Q/A 2030, 2051, 2076-2079, 2110), their practice of a low-IAC adsorbent in series with a high-IAC adsorbents is "authorized" and thus "protected" by the 844 patent in satisfaction of 19 U.S.C. § 1337(a)(2) and (3).

The authorized canisters also include a select subset of MAHLE models referenced in the testimony of Dr. Rockstraw. Dr. Rockstraw testifies, based on an interrogatory response from MAHLE, that five current canisters and ten "service" canisters utilize Ingevity honeycomb without any MPAC (CX-0909C at Q/A 2077), and thus practice the 844 patent (*id.* at Q/A 2078). Ingevity's brief does not identify all fifteen of these canisters as DI canisters, however; it instead refers to [redacted] CIB at 35; *see* CIB at 35 n.18 (citing CX-0909C at Q/A 2072-2077).[4] Although it is not perfectly clear, this statement seemingly refers to the five current canister models listed in CX-0909C at Q/A 2077, plus that additional canister (Model 72142079 for the [redacted] (*see* RIB at 92 (citing JX-0136C)).

Accordingly, all the DI canisters are "protected" articles eligible for technical prong domestic industry purposes, subject to determinations on whether they meet every limitation of at least one valid claim of the 844 patent. Ingevity's other theories, however, focused only on its own DI Products (*i.e.*, the carbon adsorbents themselves) (*see* CIB at 48-52), and on acts which would constitute inducement and/or contributory infringement even if those customers were not licensed (*see id.* at 44-45), are rejected. Absence of a license means there is no article "protected" by the patent as required by the statute. And each of the three investigations Ingevity cites for support of its "significant component" theory made clear the technical prong determination was

[4] I treat Ingevity's reference to [redacted] as a typo, given the model is shown as [redacted] and was discussed in this way at the deposition of John Jackson without correction. CX-0909C at Q/A 2077; JX-0230C.

[redacted]

ultimately based on the customers' end device. *See Optoelectronic Devices*, 337-TA-669, Initial Determination at 101-102 (discussing *Integrated Repeaters* and *Foam Tape*); *see also Certain Windshield Wipers and Components Thereof*, Inv. No. 337-TA-928/937, Initial Determination at 25 (Nov. 13, 2015) (citing *Optoelectronic Devices* and determining purchasers of complainant's components create larger assemblies as required by the patent for technical prong).

2. Claim Analysis

For the reasons discussed below, I find Ingevity has shown by a preponderance of the evidence that the DI Canisters practice the following claims[5]:

Claims	DI Canisters Determined to Practice
1, 18, 31 (independent)	All, except: Kayser: 42698919; 42702737; 84493688; 84359221; 84316430; 84413230 Leehan: 31400-D5600; 31400-M7600
43 (independent)	All, except: Kayser: 42698919; 42702737
2 (dependent)	Futaba: 42035AL01C; Leehan: ~~31400-D5600~~; 31400-S9000, ~~31400-M7600;~~ Stant: ACO-8355; ~~AAO-8355~~; ~~ACO-8214~~; ~~POR-AA-8214~~; ~~ACO-7452~~; ~~AAO-6974~~; ~~AAO-7412~~; ~~AAO-8378~~; ~~ASO-4937-1~~; ~~ASO4505-1~~; ~~0212025061~~; ~~AAO-8156~~

[5] In this table, a strikethrough indicates a canister alleged to practice, but determined not to practice.

[redacted]

	Kayser: ~~42702737~~; 84493688; 84359221; 84316430; 84407925; 84413230; 84410850; 52029779AB; 52029779AD; 52029780AD; 68350418AA MAHLE: [redacted]
3 (dependent)	Futaba: ~~17300TLC A022M1~~, 17300TLA A022M1 Leehan: 31400-F3500; 31400-S2500; 31400-D5500; 31400-H9500; ~~31400 H9600~~ ~~Kayser: 42698919~~
4 (dependent)	All that practice the preceding independent and dependent claims, except: Kayser: (all) Leehan: 31400-D5600; 31400-M7600; 31400-H9600; 3QF201797A Futaba: 17300TLC A022M1 Stant: AAO-8355; ACO-8214; POR-AAO-8214; ACO-7452; ACO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO-4505-1; 0212025067; AAO-8156
5, 19 (dependent)	All that practice the preceding independent and dependent claims, except: Kayser: (all) Leehan: 31400-H9600; 3QF201797A Futaba: 17300TLC A022M1

[redacted]

	Stant: AAO-8355; ACO-8214; POR-AAO-8214; ACO-7452; ACO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO-4505-1; 0212025067; AAO-8156
8, 21, 33, 45 (dependent)	All that practice the preceding independent and dependent claims, except: Kayser: 42698919; 42702737 Futaba: 17300TLC A022M1 Leehan: 31400-H9600; 3QF201797A Stant: AAO-8355; ACO-8214; POR-AAO-8214; ACO-7452; ACO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO-4505-1; 0212025067; AAO-8156
11, 24, 36, 48 (dependent)	All that practice the preceding independent and dependent claims, except: Kayser: 42698919; 42702737 Futaba: 17300TLC A022M1 Leehan: 31400-H9600; 3QF201797A Stant: AAO-8355; ACO-8214; POR-AAO-8214; ACO-7452; ACO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO-4505-1; 0212025067; AAO-8156
12, 25, 37, 49 (dependent)	All that practice the preceding independent and dependent claims, except: Kayser: 42698919; 42702737 Futaba: 17300TLC A022M1

[redacted]

	Leehan: 31400-H9600; 3QF201797A Stant: AAO-8355; ACO-8214; POR-AAO-8214; ACO-7452; ACO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO-4505-1; 0212025067; AAO-8156
13, 26, 38, 50 (dependent)	MAHLE: 72142079
14, 27, 39, 51 (dependent)	All that practice the preceding independent and dependent claims, except: Leehan: 31400-D5600, 31400-S9000, 31400-M7600; 31400-H9600; 3QF201797A Kayser: 42698919; 42702737 Futaba: 17300TLC A022M1 Stant: AAO-8355; ACO-8214; POR-AAO-8214; ACO-7452; ACO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO-4505-1; 0212025067; AAO-8156
16, 29, 41, 53 (dependent)	All that practice the preceding independent and dependent claims, except: Kayser: 42698919; 42702737 Futaba: 17300TLC A022M1 Leehan: 31400-H9600; 3QF201797A Stant: AAO-8355; ACO-8214; POR-AAO-8214; ACO-7452; ACO-6974; AAO-7412; AAO-8378; ASO-4937-1; ASO-4505-1; 0212025067; AAO-8156

[redacted]

a. Preliminary Issues

In addition to a dispute over the technical characteristics of the DI Canisters as compared to the limitations of the 844 patent claims, Respondents raise several other "failures of proof." RIB at 36-37. Respondents argue several DI Canisters are marked to show intended use outside of the United States and Ingevity otherwise has not proven technical prong for the asserted method claims. *Id.* (citing RX-0381C at Q/A 522-531). This is discussed below in reference to those method claims—claims 1 and 18. Respondents also argue Ingevity has not proven practice of system claims 31 or 43, should the preambles of those claims be limiting. *Id.* at 37 (citing RX-0381C at Q/A 574-599). This too is discussed below in reference to those claims.

Respondents allege Dr. Rockstraw's table summarizing which DI Canisters practice which claims of the 844 patent does not match his claim by claim analysis. RIB at 37 (citing CX-0909C at Q/A 2055 (Table 9); CX-0909C at Q/A 2131-3205). Respondents identify seven such instances (*id.*), with an additional argument that each instance reflects a more basic failure to map these canisters to the claims (*see id.*). In response, Ingevity states:

> Dr. Rockstraw did not chart several Futaba, Leehan, and Stant canisters (ROB at 37) but explained that his charting of exemplary canisters represented how the uncharted ones practiced the claims based on the manufacturers' disclosures of the canisters' adsorbents and his inspection of the exemplary canisters.

CRB at 21 (citing CX-0909C at Q/A 2056, 2071, 2078, 2123-2128). Ingevity acknowledges, however, that two of the identified Leehan models, 31400-D5600 and 31400-M7600, indeed do not practice claims 2 or 4. CRB at 21 n.18. I thus find these products do not practice claims 2 and 4 as reflected in the summary table above.

For reasons explained below, the table Respondents complain of, Table 9 in Q/A 2055, is inaccurate to the point of unreliability, and is disregarded in favor of the actual questions and answers presented in Dr. Rockstraw's witness statement. Any complaint from Respondents over

[redacted]

its inaccuracy is therefore moot. Regarding Dr. Rockstraw's alleged failure to map certain DI Canisters to any of the claims of the 844 patent in those questions and answers, he explains two canisters provided him bear both Leehan 31400-S9000 and 31400-S2500 model numbers, and the 31400-S2500 was sufficiently mapped. CX-0909C at Q/A 2056. Respondents apparently do not dispute the dual-identity nature of S2500 and S9000 canisters, and I accept it.[6] For the remaining canisters, Dr. Rockstraw explained:

> In addition to the inspected and charted domestic industry canisters, Futaba, Leehan, and Stant identified a number of domestic industry canisters identified in CDX- 0001.32 (Table 8), but which I have not personally inspected. Nevertheless, it is my opinion that each of the foregoing canisters practices the '844 Patent. In particular, as I discussed, each of these canisters has one or more high IAC adsorbent volumes (*i.e.*, BAX 1500, 1100, or 1100LD) and one or more low IAC adsorbent volumes (*i.e.*, BAX LBE, HCA, or HCA LBE). This configuration satisfies the IAC limitations of the independent claims of the '844 Patent. The other limitations are satisfied for the same reasons as set forth above and in the exemplary claims charts for the domestic industry canisters.

CX-0909C at Q/A 2071; *see* CX-0909C at Q/A 2078. The merits of this analysis are addressed below.

b. Undisputed Claims

Respondents do not contest Ingevity's claims of direct practice of the following claims, apart from their dependency on other, disputed claims: 2-5, 8, 11-14, 16, 19, 21, 24-27, 29, 33, 36, 37, 38, 39, 41, 45, 48, 49, 50, 51, and 53. *See* RIB at 29-37; RRB at 15-16; RX-0381C at Q/A 540-599. In view of the testimony of Dr. Rockstraw that the DI Canisters include the limitations recited in these claims, and there being no clear disagreement from Respondents as to that fact, I find

[6] In view of this lack of dispute, Ingevity's representation is accepted. However, the 31400-S2500 allegedly contains BAX-LBE and HCA, whereas the 31400-S9000 contains only BAX-LBE. CX-0909C at Q/A 2051 (Table 8).

[redacted]

that use of the DI Canisters meets the limitations of these dependent claims as alleged by Ingevity. *See* CX-0909C at Q/A 2131-3205; CIB at 40-43.

The above determination is subject to some exceptions, however. Respondents claim "Dr. Rockstraw admitted that several DI Products do not practice [dependent] claims 2, 3, 4, and/or 5." RIB at 37 (citing CX-0909C at Q/A 2055, 2110, 2129). As noted above, Ingevity acknowledges that two Leehan models, 31400-D5600 and 31400-M7600 do not practice claims 2 or 4, and so these products have been removed from the summary table above.

Regarding all other models, more explanation from Respondents would have been helpful, as the testimony they cite consists of collections of tables, not easily comparable to determine which products Ingevity may have incorrectly claimed practice claims 2, 3, 4, "and/or" 5. It would also have been helpful if Ingevity had been more forthright in its reply post-hearing brief concerning where its expert's testimony was inconsistent with its own contentions. For instance, Respondents cite Q/A 2055 of Dr. Rockstraw's testimony (CX-0909C). This question and answer consists entirely of a summary table outlining which products from Futaba, Leehan, and Stant practice which claims of the 844 patent. It clearly contains assertions inconsistent with Ingevity's post-hearing briefing. To note just one example, Ingevity contends all DI Canisters practice claim 4 of the 844 patent (CIB at 40-41), yet Dr. Rockstraw's testimony leaves out many models, including: Futaba 17300TLC A022M1, Futaba 17300TLA A022M1, Leehan 31400-F3500, Leehan 31400-S2500, Leehan 31400-D5500, Leehan 31400-H9500, and Leehan 31400-H9600 (CX-0909C at Q/A 2055).

There are also discrepancies, however, between the table and the approximately 900 questions and answers which follow and discuss, on a claim by claim basis, the evidence in support of each practiced claim. For example, Dr. Rockstraw's summary table lists claims 3 and 5 as *not*

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practiced by the Leehan 31400-D5600 canister. CX-0909C at Q/A 2055. Yet, he claims in questions and answers that there is such practice. *Id.* at Q/A 2656-2659.

Considering this conflict between Dr. Rockstraw's summary table and his own questions and answers, it is more appropriate to consider the latter as what Dr. Rockstraw contends or "admits" to, as the former is simply a summary (in this case, an incorrect one). I therefore disregard that summary table entirely as unreliable.

Respondents also cite to Q/A 2110 and 2129 of Dr. Rockstraw's witness statement. RIB at 37. This testimony concerns products from Kayser. Q/A 2129 states clearly in table form "what claims are [practiced] by these Kayser canisters," and this table fails to list two Kayser GSV models (42698919 and 42702737) which Ingevity contends in its brief practice the 844 patent. *See* CIB at 34-43; CX-0909C at Q/A 2129 (mentioning only E2XX, JL, and JT models). Unlike the summary table of Q/A 2055 discussed above, however, there is no additional, claim-by-claim testimony from Dr. Rockstraw to show whether this Kayser summary table is inaccurate or not. I am therefore left to conclude that the 42698919 and 42702737 models have not been shown to practice any claim of the 844 patent. This too is reflected in the summary table above. For what it is worth, eliminating these models makes no appreciable difference, because it appears from production records provided by Kayser that these models only arrived in 2019. *See* CX-0668C (year 2016); CX-0669C (year 2017); CX-0670C (year 2018); CX-0671C (year 2019). As explained in the economic prong discussion below, 2019 investments are not counted, because they occurred after the filing of the complaint in this investigation.

Ingevity contends the remaining Kayser models—belonging to E2XX, JL, and JT groupings—practice claim 5 (CIB at 40-41), but Dr. Rockstraw's testimony at Q/A 2110, 2129 shows these canisters have just one subsequent adsorbent volume in contravention of claim 5,

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(requiring multiple subsequent volumes). *See* 844 patent at cl. 5. Similarly, Ingevity contends all Kayser models practice claim 4 (CIB at 40-41). Yet, again, Dr. Rockstraw leaves out claim 4 for these products. CX-0909C at Q/A 2129. Thus, these models have not been shown to practice this claim, as reflected in the summary table above.

Lastly, various models from Futaba, Leehan, and Stant have admittedly not been mapped by Dr. Rockstraw to any claims of the 844 patent, but generalized to nonetheless practice the independent claims by virtue of their known adsorbent content. *See* CX-0909C at Q/A 2071. For reasons explained below in the context of claim 1, these models have been determined not to practice any dependent claims of the 844 patent.

c. Disputed Claims

Respondents do contest Ingevity's claims of direct practice for the following independent claims: 1, 18, 31, and 43. *See* RIB at 29-37; RRB at 15-16. Ingevity has shown direct practice of each.

i. Claim 1

The full text of method claim 1 of the 844 patent is reproduced above in the discussion of infringement. Ingevity contends each DI Canister houses an "initial adsorbent volume" of BAX 1100, 1100LD, 1500, or 1700, which have IACs greater than 35 g/L. CIB at 37 (citing, *inter alia*, CX-0909C at Q/A 85-97, 2032-2046). Ingevity also contends each DI Canister houses a "subsequent adsorbent volume" of BAX LBE, H[CA], or HCA LBE, which have IACs less than 35 g/L. *Id.* at 38 (citing, *inter alia*, CX-0909C at Q/A 2046).

The methods by which Ingevity's expert, Dr. Rockstraw, determined IAC for BAX 1100, 1100LD, and 1500 volumes are discussed above in the infringement context for the same "initial adsorbent volume" claim limitation. In sum, Dr. Rockstraw combined PTA adsorption capacity testing data with apparent density values taken from commercial product specification sheets. *See*

[redacted]

generally CX-0909C at Q/A 91-98, 2032. Dr. Rockstraw explains the same process was used for BAX 1700 and BAX LBE, where the former is an "initial adsorbent volume" used in some DI Canisters but not in the Accused Products, and the latter is a "subsequent adsorbent volume" used in some DI Canisters but not in the Accused Products. *See id.* at Q/A 2032-2039.

HCA and HCA LBE (*i.e.*, Ingevity's honeycombs) were also sent to third-party PTA for adsorption capacity testing. CX-0909C at Q/A 2033-2037. Dr. Rockstraw correctly explains, however, that these products do not have specification sheet apparent density values and are otherwise not appropriate for ASTM D2854 due to their structure. Ingevity provides a sample of a "29x100 HCA" honeycomb as CPX-0001, which is a single carbon cylinder piece, approximately four inches in length and one inch in diameter, hollow, with an internal lattice creating over 100 channels through which air can pass end-to-end. Clearly, it is not a "granular" activated carbon as contemplated by ASTM D2854. JX-0222 at *1.

In place of ASTM D2854, Dr. Rockstraw explains he "simply measured the relevant dimensions (length and diameter) and mass and computed the density. CX-0909C at Q/A 2040. He reasons this calculated amount is the same as what would be found in-canister because "HCA and HCA LBE, as solid monoliths, will not change size or shape when they are loaded into the canisters. Thus, their out-of-canister and in-canister apparent densities are the same for the purposes of the '844 Patent." *Id.* at Q/A 2041. This is reasonable and is adopted.

Dr. Rockstraw opines that the IACs of the BAX 1500, 1100, and 1100LD "initial adsorbent volume[s]" in the DI Canisters are the same as they are for the Accused Products (CX-0909C at Q/A 2032); namely, 80.33 g/L, 51.40 g/L, and 44.74 g/L, respectively (*id.* at Q/A 97). For BAX 1700, BAX LBE, HCA, and HCA LBE, Dr. Rockstraw's multiplying of the PTA adsorption

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capacity values (expressed in g/g) with apparent density values (expressed in g/L) yields IACs of 87.32 g/L, 25.05 g/L, 19.05 g/L, and 6.85 g/L, respectively. CX-0909C at Q/A 2044.

Accordingly, Ingevity has shown the DI Canisters include an "initial adsorbent volume" with an IAC of greater than 35 g/L, and a "subsequent adsorbent volume" with an IAC less than 35 g/L, such that the limitations of claim 1 are met in the DI Canisters.

While Respondents contest the reliability of all these IAC values, their opposition to Dr. Rockstraw's analysis of BAX 1500, 1100, and 1100LD has already been addressed in the context of infringement, and determined not to be persuasive. *See* RIB at 27 ("Respondents' non-infringement positions for BAX as an alleged initial adsorbent volume are fully described below in Section III.C.1. For the reasons described therein, the Accused (and DI) Products do not infringe any Asserted Claim, because BAX does not meet the initial adsorbent volume limitations."), 30 (discussing Accused Products in technical prong section). Respondents dispute Dr. Rockstraw's findings on BAX 1700 and BAX LBE on the same grounds. *See generally* RIB at 30-36; RRB at 15-16. But for the same reasons discussed above, Dr. Rockstraw has reliably shown the IAC for BAX 1700 in the DI Canisters is above 35 g/L, and the IAC for BAX LBE is below 35 g/L.

As to the HCA and HCA LBE-containing volumes in the DI Canisters, Respondents do not assert, in contrast to the BAX-containing volumes, that Dr. Rockstraw failed to account for volumetric dilution. *See* RIB at 31-35 (discussing possible, unaccounted for dilution only in the identified BAX volumes); RRB at 15-16 (discussing same). Further, with respect to Respondents' universal criticism that two samples (used by PTA for adsorption capacity) have not been shown to be "sufficient to establish that any DI Carbon will, in all instances, meet the IAC values specified in the claims, or why any of these samples are representative of any non-tested sample of DI Carbon" (RIB at 35), although this would apply to HCA and HCA LBE, there is no contradicting

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evidence. Similarly, Respondents' complaint that the IAC values reported in the 844 patent cannot be trusted to reflect the IAC of either HCA or HCA LBE as it exists today (RIB at 35-36 (citing RX-0381C at Q/A 504-505)) is again of little import because Dr. Rockstraw does not rely solely on these values; he also relies (if not primarily) on the testing data obtained from PTA. CX-0909C at Q/A 2036-2037.

Accordingly, Dr. Rockstraw has reliably shown the IACs for HCA and HCA LBE volumes in the DI Canisters are below 35 g/L.

As to Respondents' "Other Failures of Proof," Respondents first argue:

> In order to practice the method claims (*i.e.*, claims 1, 18, and their dependent claims), all method steps must be performed in the U.S. *NTP, Inc. v. Research In Motion, Ltd.*, 418 F.3d 1282, 1318 (Fed. Cir. 2005). However, several DI Canisters have markings and documentation associated with foreign design, manufacturing, and/or sale. (RX-0381C, Q/A 522, 527.) Similarly, multiple DI Canisters appear to contain BAX made by Ingevity in China. (*Id.*, Q/A 527.) Ingevity does not perform the steps of the claimed methods, they are left to Ingevity's end customers, if they are performed at all. (*Id.*, Q/A 528.) But Ingevity and Dr. Rockstraw have no evidence where or how the DI Canisters are used, or that Ingevity even induces or contributes to its end customers' direct infringement. (*Id.*, Q/A 529-531; JX-0252C at 378:15-379:1, 388:2-6, 464:20-465:3.) Thus, Ingevity did not prove technical prong for any of the method claims.

RIB at 36-37.

From the cited expert testimony, it appears that the complaint over foreign "markings and documentation" applies only to certain canisters from Leehan and Kayser. *See* RX-0381C at Q/A 52-527. Ingevity does not dispute that these canisters would not practice claim 1 (or claim 18, as discussed below) or those dependent therefrom, because they would only be practiced outside the United States, but argues this only affects claims 1 and 18. *See* CRB at 19-20. These claims are contrasted with apparatus claim 43, which would not be affected because, as alleged by Ingevity and not contested by Respondents, "Leehan's and Kayser's subpoena responses specify that all these canisters are *manufactured* in the U.S. . . . ." CRB at 20 (citing CX-0676C at *12; CX-

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0326C). Nevertheless, Respondents are correct that Leehan model numbers 31400-D5600 and 31400-M7600 (RX-0381C at Q/A 522) have not been shown to have been used with the method of claim 1 within the United States—*i.e.*, they are not "protected" by claim 1 under 19 U.S.C. § 1337. "A method claim is directly infringed when someone practices every step of the patented method." *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1219 (Fed. Cir. 2014) (citing *DSU Med. Corp. v. JMS Co.*, 471 F.3d 1293, 1306 (Fed. Cir. 2006)). This is reflected in the summary table above.

The Kayser models are more difficult to evaluate because Mr. Lyons does not identify them by model number. *See* RX-0381C at Q/A 527. But he references Dr. Rockstraw's testimony at Q/A 2116 (*see* RX-0381C at Q/A 526), and that testimony includes images of lists of Kayser models with the "POAI-Korea" "GMCCA" and "GM Korea" descriptors. CX-0909C at Q/A 2116. Thus, with no opposition from Ingevity on this issue, models corresponding to these three descriptors (Kayser Model Nos. 42698919, 42702737, 84493688, 84359221, 84316430, and 84413230) have not been shown to be "protected" by claim 1. If other Kayser models are unprotected, Respondents have not adequately specified them.

As to Respondents' mention of BAX made by Ingevity in China, Ingevity explains this refers to BAX 1100LD. CRB at 20. This foreign source is immaterial to the technical prong because canisters containing this adsorbent are still manufactured within the United States. Further, and as explored below, Ingevity rightly does not count this foreign investment in BAX 1100LD in its economic prong calculus.

Lastly, as mentioned above, Respondents complain that "Dr. Rockstraw's table correlating DI Products with the claims they allegedly practice (CX-0909C, Table 9) does not match his claim-by-claim analysis (CX-0909C, Q/A 2131-3205)" for a handful of DI Canisters. RIB at 37 (listing

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bulleted examples). Three of Respondents' examples have been addressed above (Leehan 31400-S9000; Leehan 31400-D5600; Leehan 31400-M7600). Additionally, the Table 9 Respondents speak of has been disregarded in its entirety for the reasons discussed above. What remains is an observed lack of claim-by-claim analysis for: the Futaba 17300TLC A022M1, the Leehan 31400-H9600; the Leehan VW Atlas 3QF201797A; and eleven of twelve canister models from Stant. In response, and as excerpted above, Dr. Rockstraw contends these uninspected models nonetheless practice the 844 patent independent claims because each "has one or more high IAC adsorbent volumes (*i.e.*, BAX 1500, 1100, or 1100LD) and one or more low IAC adsorbent volumes (*i.e.*, BAX LBE, HCA, or HCA LBE)." CX-0909C at Q/A 2071.

The evidence shows that if a canister includes an initial adsorbent of BAX 1500, 1100, or 1100LD, and a subsequent adsorbent of BAX LBE, HCA, or HCA LBE, it will satisfy the independent claims' IAC limitations. As the evidence provided by Futaba, Leehan, and Stant identifying the content of the adsorbent volumes of their canisters (CX-0909C at Q/A 2050-2054) stands uncontroverted (*see* RIB at 37), these canisters meet the limitations of claim 1. This is limited, however, to the independent claims, as suggested by Dr. Rockstraw (CX-0909C at Q/A 2071), such that these models are not determined to practice any dependent claims. This is reflected in the summary table above.

ii. Claim 18

The full text of method claim 18 of the 844 patent is reproduced above in the discussion of infringement. The parties largely treat claim 18 the same as claim 1. Ingevity acknowledges claim 18 includes additional language reciting, generally, a step of removing a volatile organic compound from fuel vapor (CIB at 39), but claims this is nonetheless met as "the DI Canisters have multiple volumes of activated carbon that function to adsorb hydrocarbons, volatile organic compounds, from fuel and air vapor mixtures emitted from fuel tanks of vehicles in which the

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canisters are installed" (*id.* (citing CX-0909C at Q/A 27, 245, 349; RX-0380C at Q/A 97-99)). Respondents do not dispute this. *See generally* RIB; RRB.

Although claim 18's use of "subsequent adsorbent material-containing volume" renders this claim indefinite, if that term is not found indefinite and given the same scope as similar language in claim 1, then Ingevity has shown 18 is met. Accordingly, I find the use of those DI Canisters leading to practice of claim 1 also results in the practice of claim 18.

iii. Claim 31

The full text of system claim 31 of the 844 patent is reproduced above in the discussion of infringement. The parties largely treat claim 31 the same as claim 1. Ingevity acknowledges claim 31 includes additional language reciting, generally, that the subsequent adsorbent volume comprises between 1 and 100% of the first (*i.e.*, initial) volume and is located in one of two positions relative to the canister (CIB at 39), but claims this is nonetheless met as in "each DI Canister, all volumes of adsorbent material are located inside the same canister" with reference to its discussion of claims 4, 5, and 19 (*see id.*). Respondents do not dispute this. *See generally* RIB; RRB.

Ingevity also acknowledges claim 31, distinct from claim 1, "include[s] claim elements related to parts of an automobile as well as the flow of fuel vapor and purge air through the canister" (CIB at 39) but claims this is nonetheless met, primarily citing expert testimony (*id.* at 39 n.27 (citations omitted)). Respondents do not dispute this. *See generally* RIB; RRB.

As determined above, these additional preamble limitations are limiting, but it is more likely than not that the placement of the DI Canisters within a fuel-consuming automobile meets all of these additional limitations. Accordingly, practice of claim 31 has been shown for those evaporative emissions control systems which include the DI Canisters whose use would practice claim 1. This excludes (as excluded for claim 1) those Leehan and Kayser models Respondents

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have identified as intended for foreign automobile markets. While Ingevity argues the domestic manufacture of these canisters constitutes a practice of system claim 31 (CRB at 20), this position can only be rooted in a non-limiting treatment of claim 31's preamble—which, for reasons explained above, is not the case.[7]

iv. Claim 43

The full text of apparatus claim 43 of the 844 patent is reproduced above in the discussion of infringement. The parties largely treat claim 43 the same as claim 1. Ingevity acknowledges claim 43 includes additional language reciting, generally, that the subsequent adsorbent volume comprises between 1 and 100% of the first (*i.e.*, initial) volume and is located in one of two positions relative to the canister (CIB at 39), but claims this is nonetheless met as in "each DI Canister, all volumes of adsorbent material are located inside the same canister" with reference to its discussion of claims 4, 5, and 19 (*see id.*). Respondents do not dispute this. *See generally* RIB; RRB.

Ingevity also acknowledges claim 43, distinct from claim 1, "include[s] claim elements related to parts of an automobile as well as the flow of fuel vapor and purge air through the canister" (CIB at 39), but claims this is nonetheless met, primarily citing expert testimony (*id.* at 39 n.27 (citations omitted)). Respondents do not dispute this. *See generally* RIB; RRB.

As determined above, these additional preamble limitations are limiting, but it is more likely than not that the placement of the DI Canisters within a fuel-consuming automobile meets all of these additional limitations. Accordingly, practice of claim 43 has been shown for those evaporative emissions control systems which include the DI Canisters whose use would practice

[7] Specifically, if the fuel vapor canister is shipped out of the United States after manufacture, then it is likely combined into the automobile's evaporative emissions control system, as required for claim 31, outside of the United States.

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claim 1—additionally including those Leehan and Kayser models excluded from practice of claim 1 due to their foreign automobile market destination. As discussed above, this foreign distribution does not impact their domestic origin, which satisfies apparatus claim 43.

F. Validity and Enforceability

Respondents' post-hearing briefings identify the following invalidity and unenforceability theories against the following claims of the 844 patent:

Claims	Theory
1-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 37, 38, 39, 41, 43, 45, 48-51 and 53	Anticipated under 35 U.S.C. § 102(g)(2) by the Delphi Prior Invention or rendered obvious under 35 U.S.C. § 103 by the Delphi Prior Invention in view of Meiller (RX-0004) and/or Tennison (RX-0208)
1-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 37, 38, 39, 41, 43, 45, 48-51 and 53	Anticipated under 35 U.S.C. § 102(a) by the Williams Publication (RX-0067) or rendered obvious under 35 U.S.C. § 103 by the Williams Publication (RX-0067) in view of Park (RX-0209) and/or Tennison (RX-0208) and/or McCue (RX-088) and/or Meiller (RX-0004)
1-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 37, 38, 39, 41, 43, 45, 48-51 and 53	Rendered obvious under 35 U.S.C. § 103 by Meiller (RX-0004) and/or Park (RX-0209) and/or Tennison (RX-0208)
1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 31, 33, 36, 37, 38, 39, 40, 41, 43, 45, 48, 49, 50, 51, 52, 53	Indefinite under 35 U.S.C. § 112, ¶ 2
1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 24, 25, 26, 27, 28,	Lack of enablement under 35 U.S.C. § 112, ¶ 1

[redacted]

29, 31, 33, 36, 37, 38, 39, 40, 41, 43, 45, 48, 49, 50, 51, 52, 53	
1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 31, 33, 36, 37, 38, 39, 40, 41, 43, 45, 48, 49, 50, 51, 52, 53	Lack of written description 35 U.S.C. § 112, ¶ 1
1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 31, 33, 36, 37, 38, 39, 40, 41, 43, 45, 48, 49, 50, 51, 52, 53	Invalid and/or unenforceable based upon improper inventorship
All claims	Unenforceable due to patent misuse
All claims	Infringement barred due to patent exhaustion

See generally RIB at 38-98.

Before reaching the specifics of Respondents' challenges, a few preliminary points should be made. First, it is acknowledged that patent exhaustion is not technically a ground of invalidity or unenforceability, but it is discussed in this larger section out of convenience. Further, as is evident, Respondents' indefiniteness theory has already been discussed in the context of claim construction, above. I also observe Respondents describing the invalidity theory surrounding the Meiller reference as based in obviousness (RIB at 59) but also anticipation and/or obviousness (*id.* at 60). I do not see an anticipation theory in their expert's testimony, however. RX-0380C at Q/A 544-632. Lastly, to the extent Respondents challenge the validity of claims 15, 28, 40, and 52 of the 844 patent, I decline to make that determination as these claims are not asserted under

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infringement nor technical prong domestic industry. To do otherwise would amount to an improper advisory opinion.

1. Delphi Prior Invention

Respondents' first prior art-based invalidity theory surrounds a device referred to as the "Delphi Epsilon Canister System" (hereafter, "DECS") created by engineers at non-party Delphi, [redacted] RIB at 59-60. Respondents set the dates for reduction to practice of this device as between [redacted] and [redacted] (*id.* at 61), where [redacted] and [redacted] (*see id.* at 61-63 (citing, *inter alia*, RX-0896C; RX-0902C; Hr'g Tr. at 116:22-118:8, 153:13-154:21, 155:2-9, 155:24-156:12, 736:17-21; JX-0239C at 60:9-13, 67:14-68:4, 74:20-76:5, 258:2-18; RX-0034C)).

The auxiliary canister of the DECS is shown below, produced at the deposition of a Delphi witness, Dr. LaBine, along with the honeycombs removed therefrom:

[redacted]

RX-0389 at *1; RX-0903 at *3, 5; *see* JX-0239C at 86:5-97:24. Respondents describe the DECS as [redacted] RIB at 61 (citing JX-0239C at 75:6-76:5, 258:2-18). Importantly, the auxiliary canister shown has a tag which indicates the honeycombs inside are sample number 445-S-99. Respondents observe this sample number [redacted] RIB at 61; RX-0902C at *1. Additionally, [redacted]

RX-0902C at *1. Respondents argue the [redacted] referred to here were [redacted] RIB at 61 (citing RX-0896C at *1). Those [redacted]

[redacted]

RX-0896C at *1-2. As shown, one of the listed properties is a [redacted] It is a reasonable inference that the BWC of the honeycombs contained in the DECS would also have been 3.7 g/dL. Respondents then argue that a BWC of 3.7 g/dL necessarily correlates to an IAC of under 35 g/L. RIB at 66-67 (citing Hr'g Tr. at 116:22-117:21, 673:3-13; JX-0239C at 187:17-188:6; RX-0380C at Q/A 447-477). For the reasons explained below, the evidence supports this determination.

Taken altogether, Respondents contend the DECS qualifies as prior art to the 844 patent under 35 U.S.C. § 102(g)(2), and anticipates at least claim 1, because "the Delphi Inventors built the canister described above and shown in the Record of Invention and attached it to a conventional carbon canister with an initial volume of 11 or 15 BWC base carbon (BAX 1100 or 1500)" and

[redacted]

tested it for bleed emissions. *See* RIB at 65. Respondents add that the Delphi inventors determined (*i.e.*, appreciated) that they had constructed a canister system that [redacted] and "did not abandon, suppress, or conceal their invention; in fact, they filed a patent application (issuing as Meiller) and worked with [redacted] to commercialize the invention." *Id.* at 65-66 (referring, *inter alia*, to RX-0034C). Assuming these assertions as true, Respondents have clearly and convincingly shown anticipation of claim 1.

Ingevity resists this determination on a number of grounds, none of which are persuasive. First, Ingevity argues the DECS is not prior art under section 102(g)(2) because it was not "made." CIB at 75. Specifically, Ingevity argues "a purported prior inventor can neither conceive of nor reduce to practice a claimed invention for the purposes of Section 102(g)(2) unless he or she appreciated the subject matter recited in the claims." *Id.* (citing, *inter alia*, *Invitrogen Corp. v. Clontech Labs, Inc.*, 429 F.3d 1052, 1063-64 (Fed. Cir. 2005)). Ingevity argues, through the characterization of Respondents' expert, that the invention of the 844 patent is "'flat isotherms and IAC.'" *Id.* at 76 (citing Hr'g Tr. at 535:16-18). Yet, according to Ingevity, the [redacted] (*id.* at 76 (citing Hr'g Tr. at 513:6-9, 513:11-12, 513:23-514:1), 77 (citing RX-0034C at *3)), and there is "no evidence that the Delphi Employees were aware that the material they were allegedly using had a flat isotherm" (*id.* (citing Hr'g Tr. at 514:11-20)). Ingevity further argues that any alleged appreciation of the BWC of the honeycombs in the DECS cannot constitute the requisite appreciation because "Delphi did not even understand IAC, let alone its alleged relationship to BWC" (*id.* (citing Hr'g Tr. at 513:10-514:1); *see id.* at 77-78 (citing, *inter alia*, JX-0239C at 95:13-21, 113:18-25, 116:4-6); CRB at 39-40)) and "BWC and IAC are

[redacted]

not synonymous" (CIB at 76-77 (citing CX-0909C at Q/A 58-65); *see* CRB at 39 ("BWC and IAC measure different physical properties"), 45).

The record shows that the individuals associated with the DECS sufficiently appreciated their invention under 102(g)(2). Ingevity analogizes between the DECS, the Delphi Inventors' knowledge of BWC in the DECS, and the prior art at issue in *Invitrogen* (*see* CIB at 75-76; CRB at 39-40), but the circumstances here more closely align with those in *Teva Pharm. Indus., Ltd. v. AstraZeneca Pharms. LP*, 661 F.3d 1378 (Fed. Cir. 2011), cited by Respondents (RIB at 75; RRB at 38 n.7). In that case, the asserted claim required a compound with, *inter alia*, "a stabilizing effective amount of at least one amido-group containing polymeric compound or at least one amino-group containing polymeric compound." *Teva*, 661 F.3d at 1380. AstraZeneca's prior art product included such an "amido-group containing polymeric compound" even though AstraZeneca "did not understand [it] to have a stabilizing effect" as required by the claim. *Id.* at 1381. In its analysis, the court discussed *Invitrogen*, alongside other cases also cited by the present parties, and held:

> *Dow, Mycogen Plant Science*, and *Invitrogen* are consistent applications of the same rule. To establish prior invention, the party asserting it must prove that it appreciated what it had made. The prior inventor does not need to know everything about how or why its invention worked. Nor must it conceive of its invention using the same words as the patentee would later use to claim it. In this light, it is apparent that the district court correctly entered summary judgment.
>
> Teva's entire argument turns on the phrase "stabilizing effective amount." As stated in *Invitrogen,* this court must resolve questions of priority "using a properly defined invention." 429 F.3d at 1062. There is no question that AstraZeneca appreciated that AstraZeneca's drug contained an "amount" of crospovidone. And because of AstraZeneca's limited concession of infringement, there is no question that the amount of crospovidone AstraZeneca's drug contained falls within the scope of the asserted claims as defined by the limitation "stabilizing effective amount."
>
> AstraZeneca had to appreciate that the compound it asserted as its invention was stable and what the components of this formulation were. There is no

[redacted]

> question that AstraZeneca had this appreciation. However, AstraZeneca did not need to appreciate which component was responsible for the stabilization. Teva effectively asks this court to fault AstraZeneca for not first conceiving of its drug in the same words in which Teva later chose to claim it. This case therefore falls squarely within the holdings of *Dow* and *Silvestri*. Because "[t]he invention is not the language of the [claim] but the subject matter thereby defined," Teva's argument must fail. *Dow,* 267 F.3d at 1341 (quoting *Silvestri,* 496 F.2d at 599).

Teva, 661 F.3d at 1384-85. Directly applicable here is the holding "AstraZeneca had to appreciate that the compound it asserted as its invention was stable and what the components of this formulation were. There is no question that AstraZeneca had this appreciation. However, AstraZeneca did not need to appreciate which component was responsible for the stabilization."

In the case of the DECS, Ingevity relies heavily on the idea that the Delphi Inventors "were unaware of, and indeed agnostic to, the BWC of the honeycombs" as demonstrated by their [redacted] and the deposition of Dr. LaBine (JX-0239C). *See* CIB at 77; CRB at 39-40. Yet *Teva* shows that the Delphi Inventors need not be aware of the property of the honeycombs if they appreciate the benefit the honeycombs contributed to the DECS. The evidence shows they did. Specifically, in an answer to a question on competitive benefits, their [redacted] states:

[redacted]

RX-0034C at *4. Dr. LaBine was asked at deposition about the meaning of this answer. JX-0239C at 71:6-22. She testified:

[redacted]

[redacted]

Id. At another point in the deposition, she repeated her team's [redacted] *Id.* at 192:25-193:14.

This appreciation of [redacted] in the DECS is very similar to the benefit the 844 patent discloses is contributed by a subsequent adsorbent with a flat isotherm. The 844 patent states:

> One common feature for all of these approaches is to have a vent-side adsorbent with a relatively flat-shaped isotherm. This isotherm shape is important for reasons related to purge efficiency across the adsorbent bed depth. For an adsorbent with a flat adsorption isotherm, the concentration of hydrocarbon vapor in equilibrium with adsorbed hydrocarbon, by definition, decreases further as the adsorbed hydrocarbon is removed compared with an adsorbent with a more steeply sloped isotherm. Thus, when such a material is employed as an adsorbent volume on the vent-side region of a canister, *purge is able to reduce the vapor concentration in the area of the purge inlet to a very low level. Since it is the vapor near the purge inlet that eventually emerges as bleed, decreasing this concentration reduces the bleed emission level.* The degree of removal of adsorbed hydrocarbon during purge is determined by the difference between the concentration of hydrocarbon picked up in the purge gas and the concentration in equilibrium with the adsorbent at any point in the bed. *Thus, adsorbent in the immediate vicinity of the purge inlet will be most thoroughly regenerated.* At points deeper in the adsorbent bed, less hydrocarbon will be removed because the purge gas will already contain hydrocarbon removed from previous points in the bed. An adsorbent with a flatter adsorption isotherm will give up less vapor into the purge stream and this purge will then be more efficient in reducing vapor concentrations deeper into the bed. Therefore, for a given quantity of purge gas, it will be possible to reduce the vapor concentration in a volume of adsorbent with a

[redacted]

> flat adsorption isotherm to a lower level than the concentration in the same volume of an adsorbent with a steep adsorption isotherm. Bleed emission from such a volume will therefore be lower when the adsorbent has a flatter adsorption isotherm.

844 patent at 4:31-63 (emphasis added). 844 patent inventor Dr. Hiltzik testified similarly to the benefit of eliminating hydrocarbons in the adsorbent closest to the vent port:

> Q64. Why are flat isotherms, on a volumetric basis, critical to bleed emissions controls?
>
> A64. As we explain in the '844 Patent, a*dsorbents with flat or flattened isotherms on a volumetric basis can be more thoroughly purged* than isotherms with a steep isotherm, especially to a lower equilibrium vapor pressure *towards the atmosphere vent port of the canister system*. This is because pairing a flat isotherm adsorbent volume and a steep isotherm adsorbent volume as the bulk adsorbent can reduce the bulk phase diffusion between the two adsorbent volumes following a purge cycle.

CX-1147C at Q/A 64 (emphasis added). The benefit is also shown in Dr. Hiltzik's laboratory notebook, [redacted]

[redacted]

. . . .

[redacted]

JX-0005C at *130; *see* JX-0005C at *132 [redacted] CX-0604C at *110 [redacted]

Thus, there is clear, convincing, and consistent evidence that the Delphi Inventors not only appreciated the benefit from introduction of an auxiliary honeycomb to a fuel vapor canister, but appreciated the same benefit as the 844 patent inventors. This fits squarely with AstraZeneca in *Teva*, who appreciated its prior art drug was stable and contained some amount of the claimed "amido-group containing polymeric compound," even though it did not appreciate that it was that compound which led to the stability in satisfaction of the patented claims. 661 F.3d at 1385. Here, the Delphi Inventors certainly appreciated the bleed emissions benefit a honeycomb in a subsequent, auxiliary position gave the DECS, even if they did not appreciate which property of the honeycomb to credit. In contrast, the prior art inventor in *Invitrogen* was unable to show appreciation of the beneficial effect its mutated enzyme possessed, as required by that patent's claims (a lack of RNase H activity). 429 F.3d at 1058-59. Thus, the requisite appreciation is met under section 102(g)(2).

[redacted]

Ingevity also contends the DECS was not "by another inventor" in accordance with 35 U.S.C. § 102(g)(2). CIB at 78. Ingevity views the [redacted] as deficient corroborating evidence "because it [redacted] *Id.* (citing JX-0239C at 6:2-12). Ingevity continues, [redacted] and suggests that this is because [redacted] *See id.* at 79-80 (citing, *inter alia*, Hr'g Tr. at 511:11-13; RX-0034C; CX-1148C at Q/A 66; JX-0239C at 35:6-13, 55:12-57:10, 67:24-68:4); CRB at 40-41.

This argument requires Westvaco personnel to have conceived the invention first, before [redacted] and then to have communicated it to the Delphi Inventors. But Ingevity concedes that [redacted] *See* CX-0604C at *69; CRB at 49. Nevertheless, it is possible, given the above determination that recognition of IACs of the adsorbents is not necessary to appreciate when the invention had been accomplished, that "conception" by Ingevity occurred prior to [redacted] Ingevity has not, however, provided any evidence that it appreciated the benefit that an auxiliary honeycomb would provide beyond mere supposition. Indeed, Ingevity [redacted] suggesting that Ingevity had not appreciated the benefit of an auxiliary honeycomb. *See* CIB at 73 (citing CX-1148C at Q/A 29; CX-1146C at Q/A 29); RIB at 64 [redacted] (citing Hr'g Tr. at 153:3-20; 727:14-24; 740:4-25, 734:28-20 [sic], 739:9-14). According to Ingevity's account, [redacted]

[redacted] *Id.* at 74 (citing JX-0180C at *12 [redacted] But there is no evidence that [redacted] had any more of the requisite appreciation under section 102(g)(2) than Ingevity.

To the extent Ingevity contends its position on deficient corroboration stands on its own from its theory that Westvaco had earlier conceived of an auxiliary honeycomb (*see* CRB at 43-44), that is not persuasive. Delphi's [redacted] (RX-0034) was written and signed by the [redacted] thus, it serves as contemporaneous corroboration for the otherwise oral testimony from Dr. LaBine that [redacted] This document is no different, or at least no less reliable, than the notebook of Dr. Hiltzik (JX-0005C), on which Ingevity relies to show an [redacted] (*see* CX-0604C at *109).

Accordingly, clear and convincing evidence supports conception of the 844 patent invention, "by another inventor," under 35 U.S.C. § 102(g)(2).

Ingevity further challenges whether the honeycombs present in the DECS had an IAC below 35 g/L, on two grounds. First, Ingevity argues the language, "as the previous parts you tested," in [redacted] was *not* in reference to the [redacted] based on the testimony of Mr. Miller. CIB at 78 (citing, *inter alia*, CX-1146C at Q/A 52-54); CRB at 39-40 (citing, *inter alia*, CX-1146C at 41-54). Mr. Miller testified:

> Q52. [redacted]
>
> A52. No. I don't think that would be a correct conclusion.

[redacted]

Q53. Why is that?

[redacted]

Q54. So, in your estimation, to what [redacted]

A54. [redacted]

CX-1146C at Q/A 52-54; CX-1146C at Q/A 2 ("Q2. Who is your current employer? A2. Ingevity."). But the [redacted] does not claim that the [redacted] *See* RX-0902C. It simply says that the two honeycomb sets have the same "carbon, formulation, and cell density." *Id.* And at that time Westvaco was [redacted] its low-BWC honeycombs, at least to [redacted] *E.g.*, JX-0180C at *12. So even assuming that the [redacted] were a different product, there is good reason to think that, like every other Ingevity/Westvaco honeycomb described in the record, they had an IAC below 35 g/L and a BWC below 8 g/dL. Certainly their operation resulted in [redacted] as Dr. LaBine testified, which demonstrates that they were low capacity. JX-0239C at 71:21-22.

Next, Ingevity views Respondents' section 102(g)(2) theory as dependent on treating IAC and BWC as "different measures for the same thing" (CRB at 45 (citing RIB at 67)), and thus meritless because "BWC and IAC measure different physical properties" (*id.* (citing CX-0909C at Q/A 58-65); *see* CIB at 80 (citing CX-1143C at Q/A 303-316)). Respondents' use of a *rough* correlation between a BWC of 8 g/dL and IAC of 35 g/L is thoroughly supported by the record, however.

[redacted]

First, at a basic engineering level, the units for the two measures are the same. BWC is expressed as grams of adsorbate per deciliter of adsorbent volume, which is explained in both the 844 patent (844 patent at 2:1-12) and the ASTM D5228-92 standard (JX-0009 at *3). As shown, for example, by Ingevity's presentation of infringement, IAC is also expressed as grams of adsorbate per liter of adsorbent volume. CIB at 16; CX-0909C at Q/A 99; *see* 844 patent at cl. 1.

And the calculations to arrive at the two measures are nearly the same. BWC is the multiplicative product of three values: (1) apparent density; (2) activity level (grams of adsorbate per grams of adsorbent); and (3) butane ratio. 844 patent at 2:1-12; JX-0009 at *3. IAC comes from the same multiplication of (1) apparent density and (2) activity level (grams of adsorbate per grams of adsorbent), but without BWC's unit-less "butane ratio" of ASTM D5228-92. *See* CIB at 19; CX-0909C at Q/A 145 (Table 7). Indeed, Dr. Rockstraw admits that BWC measurement begins with the same isotherm as IAC—the only difference being it is taken at 100% vapor concentration instead of 5% and 50%. CX-0909C at Q/A 60; *see* CX-0909C at Q/A 58-65.

That "BWC and IAC measure different physical properties" is both hypertechnical and beside the point. CRB at 45. It is the same property measured—adsorption capacity expressed as grams of adsorbate per grams of adsorbent, at a given temperature and vapor concentration (*i.e.*, pressure). IAC takes two such measurements and subtracts them. BWC takes one level and multiplies it by a unit-less (and always some fraction of one) "butane ratio." These are the only real differences between the two metrics. CX-0909C at Q/A 60 ("IAC is not dependent on purgeability"). If IAC is "non-standard," it is a non-standard mathematical operation on an otherwise standard measurement.

This correlation between BWC and IAC finds further support throughout the record, including in Ingevity's representations on the 844 patent invention. Dr. Hiltzik's laboratory

notebook, which Ingevity relies on for conception (CX-0604C at *108-110) describes a successful embodiment of the invention as a "'6 BWC' on the vent side," "provid[ing] better purge inside the bed and lowers equilibrium vapor pressures across the bed depth" (JX-0005C at *132; *see* CX-0604C at *110). In the prosecution of U.S. Patent No. 6,540,815 (which reissued as the 844 patent), the applicants described the invention in comparison to prior art at times as simply having "high adsorption capacity" material as the initial volume and the same carbon "but distributed in space" as the subsequent:

The Tennex application teaches that the working capacity of automotive fuel treatment canisters can be improved by incorporation of heat accumulating materials into the canister or directly into an adsorbent form such as a honeycomb. This is quite different from the object of the invention claimed in the instant application, which is directed more specifically toward control of diurnal bleed emissions from automotive canisters, and on a volume basis, use of the invention actually tends to decrease the working capacity of the canister system. The applicants' disclosure teaches that the canister system should consist of a volume of fuel adsorbing material with high adsorption capacity, and a separate volume of bleed control adsorbent. The bleed control adsorbent preferably has a high adsorption capacity on a mass basis, but is distributed in space so that its volumetric capacity is relatively low according to a claimed range. The distribution in space of the adsorbent can be attained by different means, one of which is dispersion by the addition of diluents and/or binders. However, such dispersing materials are not required to have a heat capacity even as high as the adsorbent itself. The applicants' experiments showed, for example, that when activated carbon was dispersed in a pellet by dilution with glass microbeads, the performance in control of bleed emissions was the same whether the beads were solid, with a relatively high heat capacity, or hollow, with a relatively low heat capacity. Coincidentally, honeycomb forms of activated carbon made by extrusion of a mixture of carbon and clays under our commonly-assigned patent contain components which could contribute to heat absorption, but good performance of honeycomb elements in bleed control is not related to this. A honeycomb element contains so little carbon (in relation to the clay-based material) that heat exchange with purge gas easily offsets the cooling due to desorption during purge, which would be appreciated by one skilled in the art. Furthermore, little heat is generated during the adsorption of bleed emissions because both the vapor concentration and flow rate influent to the honeycomb is very small.

It is respectfully submitted, therefore, that the teaching of published application EP 11 13163 would not suggest, to one skilled in the art, the claimed invention of the instant application.

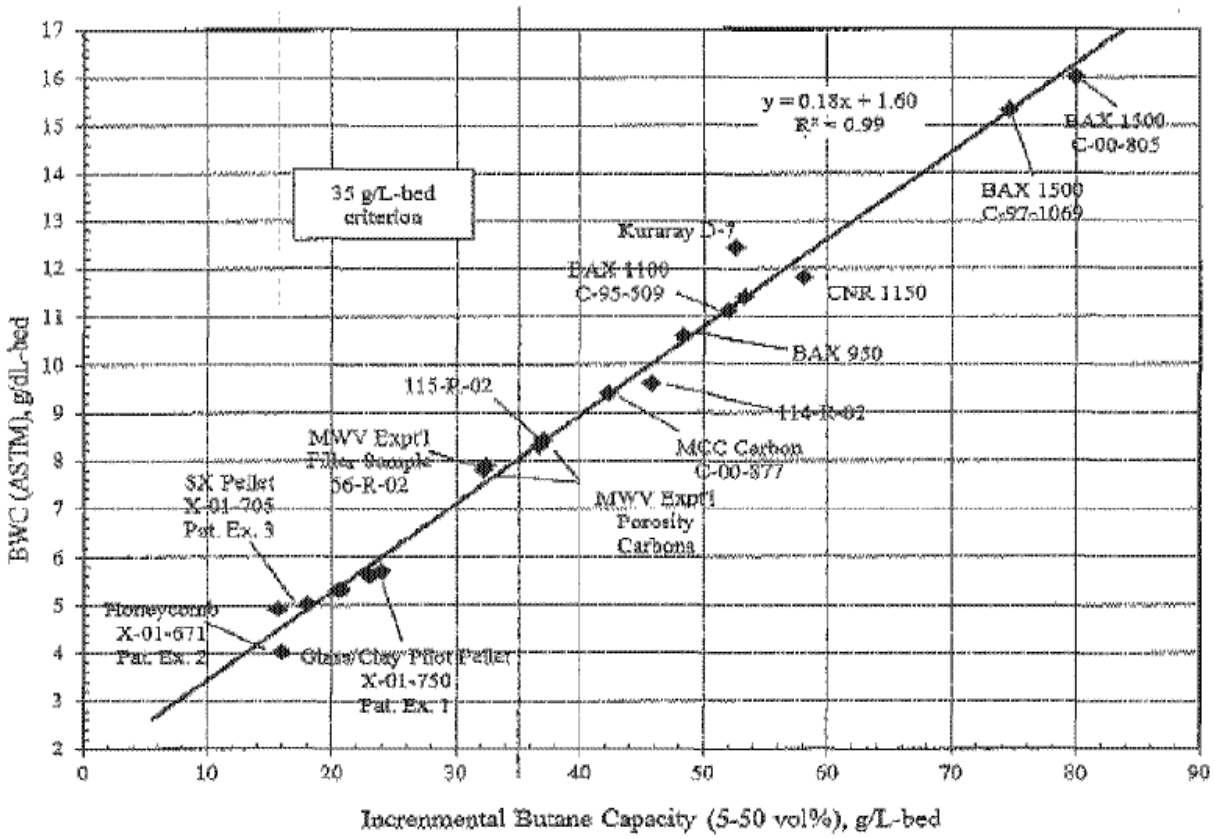
[redacted]

CX-1061 at *104-105. Notably, BWC, like IAC, is expressed on a volumetric basis (g/dL) (*see, e.g.*, 844 patent at 2:1-12), and there is no mention of incremental capacity, capacity difference, or flat isotherm.

Consistent with these representations, when Ingevity later sought reissue, it explained to the USPTO: (1) that the present invention differed from the prior art because it included "a lower activity carbon adsorbent in the canister in an after-position (in relation to vapor flow through the canister) to the higher activity carbon adsorbent therein" (CX-1060 at *88); (2) the problem is "diurnal breathing emissions," which are solved with a "combination of high working capacity carbons on the fuel-source side and preferred lower working capacity adsorbent on the vent-side" (*id.* at *94); and (3) prior art from co-inventor Dr. Tolles was distinguishable because it did "not even suggest [high BWC carbons] in an auto canister in conjunction with an activated carbon of reduced activation" (*id.* at *97). Again, in none of these descriptions is a mention of incremental capacity, capacity difference, or flat isotherm—just higher or lower working capacity or "reduced activation."

The strongest evidence supporting a rough correlation between 8 g/dL BWC and 35 g/L IAC is, of course, the actual *correlation table* created by co-inventor Dr. Hiltzik and presented to the EPO. *See* RX-0380C at Q/A 448-452 (citing RDX-0001C.29); RX-0314. As shown below, with the exception of one outlier, nearly every carbon tested fell along a linear fit, with an intersection between ~8 g/dL BWC and 35 g/L IAC:

[redacted]



RX-0314 at *1; RX-0084 at *1; RX-0133C at *20. Dr. Rockstraw's opinion that the one outlier makes all the difference (CX-0909C at Q/A 63-65) to discount the entire table is not persuasive in light of this R^2=0.99 linear fit. Moreover, Respondents provide a bevy of additional evidence regarding Ingevity's own reliance on the correlation (*see* RIB at 24 (citing, *inter alia*, RX-0133C at *3 [redacted] RX-0156C at *1 [redacted] RX-0164C at *3), to which Ingevity has effectively no response (*see* CIB at 80-81 (citing CX-1143C at Q/A 303-316); CRB at 15-16, 45-46; *see, e.g.*, CX-0913C at Q/A 149 ("I have seen an analysis performed by Ingevity that attempts to shows [sic] a correlation, but in my mind . . . .")).

With that rough correlation between 8 g/dL BWC and 35 g/L IAC in place, it is clear a honeycomb with a BWC of 3.7 g/dL would have an IAC of above 35 g/L. This is not nearly as

[redacted]

close a question as, for example, the IAC of MPAC and its "8.20 +0.40/-0.20" target BWC (JX-0029C at *2).

Mr. Lyons testifies as to why the remaining limitation of claim 1 ("[a] method . . . comprising the steps of contacting the fuel vapor with . . . . ") is met by the DECS. RX-0380C at Q/A 362-365. Dr. Rockstraw's opposition here is limited to uncertainty as to whether such "rig" testing occurred (CX-1143C at Q/A 258-260), but [redacted] and Dr. LaBine's deposition testimony provide convincing evidence [redacted] (RX-0034C at *4 (referencing [redacted] and [redacted] *see* JX-0239C at 71:6-77:1). Accordingly, Respondents have established anticipation of claim 1 of the 844 patent by the DECS under section 102(g)(2).

As to claims 2-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 37, 38, 39, 41, 43, 45, 48-51, and 53, Ingevity does not dispute the substance of Mr. Lyons's obviousness rationales (*see* CIB at 73-81; CRB at 36-46; CX-1143C at Q/A 219-326), but only argues that Order No. 35 precludes the DECS from invalidating claims 7, 13, 38, and 50 (*see* CIB at 73 n. 45; CRB at 45). The point is well taken, inasmuch as Order No. 35 did preclude Mr. Lyons from offering an opinion on the DECS invalidating claim 13. Order No. 35 at 2. Considering that Mr. Lyons's discussions of claims 38 and 50 depend directly on the stricken testimony of claim 13 (RX-0380C at Q/A 532, 540), those opinions are unsupported. Nonetheless, Respondents are correct that there is no requirement for expert testimony when the evidence speaks for itself. *See, e.g.*, *Meyer Intellectual Props. Ltd. v. Bodum, Inc.*, 690 F.3d 1354, 1374 (Fed. Cir. 2012) (citations omitted). Claims 13, 38, and 50 are all directed to volumetric dilution accomplished by forming the adsorbent into, for example, a "hollow cylinder." 844 patent at cls. 13, 38, 50. Based on the photographs presented

[redacted]

above, it is clear that the honeycombs contained inside the DECS are hollow cylinders, thus meeting the limitations of these claims.

Accordingly, given the lack of dispute from Ingevity or its expert, I find Respondents have established anticipation under section 102(g)(2) and prima facie obviousness under section 103, as credibly testified to by Mr. Lyons (RX-0380C at Q/A 485-543) and argued in their briefing (RIB at 67-68) for claims 2-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 37, 38, 39, 41, 43, 45, 48-51, and 53.

2. Williams

Respondents contend "claims 1-5, 8, 11-14, 16, 18-19, 21, 24-27, 29, 31, 33, 36-39, 41, 43, 45, 48-51 and 53 [of the 844 patent] are anticipated or rendered obvious for the reasons in Mr. Lyons' unrebutted claim-by-claim analysis" with respect to an article published in March 2001, "months before Ingevity's alleged August 2001 conception date." *See* RIB at 80-81 (citing RX-0380C at Q/A 633-688). Respondents claim the article, RX-0067, "is prior art to the '844 patent since it is a printed publication in the U.S. before Ingevity's alleged August 2001 conception." *Id.* at 80. The authors of the article are Mr. Williams, co-inventor on the 844 patent, and non-inventor C. Reid Clontz. RX-0067 (hereinafter "Williams Publication"). Respondents incorporate their expert's testimony to explain how the Williams Publication discloses or renders obvious the limitations of the claims.

Ingevity argues "Respondents failed to meet their burden to establish that the Williams Publication is prior art." CIB at 81. Specifically, Ingevity argues the reference does not qualify under pre-AIA section 102(b) because it was published less than one year to the '844 patent's priority date, and not under sections 102(a) or 102(g) because it is not "by others" or "by another inventor." *Id.* Respondents do not dispute the first point, and I agree with the second.

[redacted]

Respondents bear the burden of showing the Williams Publication is prior art (*Allergan, Inc. v. Apotex, Inc.*, 754 F.3d 952, 967 (Fed. Cir. 2014)) but they have not met that burden. Ingevity provided notice in its pre-hearing brief that if Respondents pursued section 102(a) for the Williams Publication, it would be challenged as not "by others" under the statute. CPB at 299. Respondents did not present any argument on this in their pre-hearing brief. RPB at 40, 247-283. Respondents have thus waived any argument that the Williams Publication is "by others" under section 102(a) per Ground Rule 9.2, and they cannot meet their clear and convincing burden. Order No. 2 at G.R. 9.2; *Certain Robotic Vacuum Cleaning Devices and Components Thereof Such as Spare Parts*, Inv. No. 337-TA-1057, Comm'n Op. at 51-52 (Feb. 1, 2019). Even if not waived, their burden is not met. Respondents present no evidence to contradict Mr. Williams' testimony that he was the author of the innovative aspects of the Williams Publication as opposed to Mr. Clontz. CX-1145C at Q/A 69-99. Indeed Respondents do not offer to contradict any fact asserted by Mr. Williams in the discussion of the issue. *See* RRB at 43-44. Rather, they attempt to cast doubt on his credibility. *See id.* This is not persuasive and it, alone, would not otherwise meet their clear and convincing burden. Accordingly, Respondents have not shown the Williams Publication to be prior art to the 844 patent, and it cannot therefore invalidate under 35 U.S.C. § 102 or 103.

3. Meiller

Respondents contend "claims 1-5, 8, 11-14, 16, 18-19, 21, 24-27, 29, 31, 33, 36-39, 41, 43, 45, 48-51 and 53 [of the 844 patent] are anticipated or rendered obvious" "in view of the Meiller and/or Park References." RIB at 82, 81. Respondents' overall theory is that "a PHOSITA would combine the fuel vapor canister described in Meiller with the method of making honeycombs described in Park; select any Formulations A-D (most likely B or D), use any of the five commercially available automotive grade carbons sold by Ingevity at the time, and invariably obtain a honeycomb with IAC below 35 g/L." RRB at 47; *see* RIB at 82 (citing RX-0380C at Q/A

544-632). Respondents characterize the combination of Meiller and Park as an "obvious to try" theory and involving the premise that "activated carbon honeycombs inherently have IAC below 35 g/L." RRB at 47. As to this inherency, Respondents observe "[t]hough there are many tunable features of a honeycomb, Ingevity failed to present any evidence that its experimentation ever resulted in a honeycomb with a BWC above 8 g/dL or an IAC above 35 g/L." *Id.* at 50. As noted above, only obviousness is at issue because anticipation was not supported in Respondents' expert testimony.

Nevertheless, clear and convincing evidence supports Respondents' combination of Meiller, Park, and an additional reference describing adsorbents commercially available at the time. Meiller, as a primary reference, discloses most of the 844 patent's invention. Respondents' expert, Mr. Lyons, shows that Meiller discloses a fuel vapor canister system consisting of initial and subsequent adsorbent volumes of adsorbent—where the subsequent volume is a monolith honeycomb. RX-0380C at Q/A 548-552, 554; *see* RX-0004 at Figs. 4, 10, 1:61-2:5, 4:36-5:47. This is shown below:

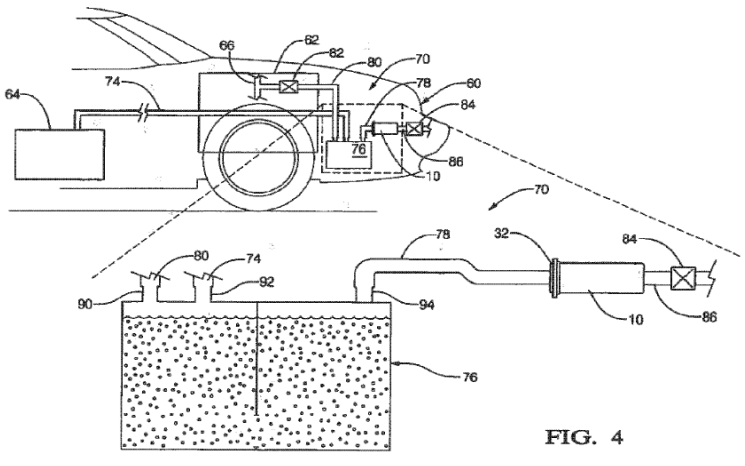


FIG. 4

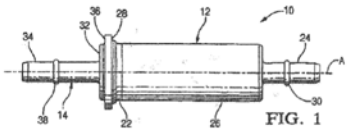


FIG. 1

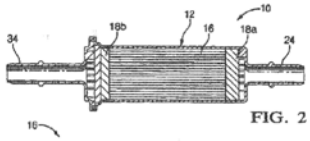


FIG. 2

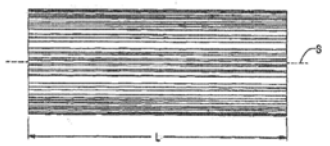


FIG. 3A

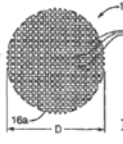


FIG. 3B

RX-0004 at Figs. 1-4.

[redacted]

Although Meiller does not disclose the IAC or BWC of its adsorbents, Mr. Lyons persuasively argues the initial volume obviously would have had a high IAC, over 35 g/L, as Meiller describes this volume as "granular or pelletized carbon" and the 844 patent describes such adsorbents as ordinary at the time. RX-0380C at Q/A 553 (citing 844 patent at 2:[1]-27, 5:[46-55], 8:10, 8:[61-67]). Dr. Rockstraw does not dispute Mr. Lyons's reasoning on the initial adsorbent volume, focusing only on the subsequent volume IAC (CX-1143C at Q/A 327-398), and it is therefore accepted.

And clear and convincing evidence shows the combined device would have a subsequent adsorbent volume with an IAC of less than 35 g/L. First, Mr. Lyons persuasively explained why a POSITA seeking to construct the device in Meiller, specifically, the honeycomb-containing auxiliary canister, would have looked to the honeycombs disclosed in Park (RX-0209). While Park is directed to monolith honeycombs used to adsorb "volatile organic compounds from automobile engine air intake systems" (RX-0209 at Abstract), Mr. Lyons presents prior art reference Scardino (RX-0087), which explicitly discloses to use a monolith activated carbon element "such as that described in U.S. patent No. 5,914,294 to Park et al" (RX-0087 at 2:46-49; RX-0380C at Q/A 317, 545) with a "base canister for evaporative emissions from the fuel tank" (RX-0087 at 6:16-18; RX-0380C at Q/A 318). Further contributing to a motivation to combine Meiller and Park is the fact that both Meiller and Scardino are assigned to Delphi on their faces (RX-0004 at *1; RX-0087 at *1), and Meiller actually lists Park in its list of references cited (RX-0004 at *1). Thus, clear and convincing evidence supports the prima facie obviousness of using the honeycombs disclosed in Park with the fuel vapor canister system of Meiller.

As to Ingevity's argument that a POSITA would not have looked to Park because of its application in engine intake systems as opposed to evaporative emissions systems (*see, e.g.*, CIB

[redacted]

at 86), the purge cycle in an evaporative emissions system is effectively an engine intake air flow path—the purged air is fed to the engine for combustion (*see, e.g.*, CX-0909C at Q/A 279 ("[T]he purpose of the adsorbents in these canisters is to adsorb fuel vapors that emit from the fuel tank that can later be purged for use in the engine. Thus, the storage of fuel vapors in the adsorbent volume is temporary as it will later be removed and ingested in the engine."), 288-295.

Second, Mr. Lyons persuasively explains why a honeycomb made pursuant to Park would have low enough BWC values to be clearly below the 35 g/L IAC threshold of claim 1 of the 844 patent. Admittedly, Park does not disclose the types of carbon used in each of its honeycomb Formulations A-D, or, by extension, the BWCs of those honeycombs. Rather, Park discloses the amount of activated carbon by weight and apparent density for each formulation. RX-0209 at 9:30-40, Fig. 4; *see* RX-0380C at Q/A 569-571. Despite this omission, it cannot be disputed that the honeycombs have BWC values, and to determine what those values would have been, Mr. Lyons consults a prior art textbook (RX-0147) which lists "Properties of Westvaco automotive grade activated carbons" including BAX 1100, BAX 1500, and BAX 950. RX-0380C at Q/A 572-574 (citing RX-0147 at *31). Among the properties listed are BWC (g/dL) and apparent density (g/mL). RX-0147 at *31. These two tables and figure from Park and RX-0147 relied upon by Mr. Lyons are shown below:

TABLE 1

Ingredient	Formulation in parts by weight A	B	C	D
activated carbon[1]	50	50	30	30
ball clay[2]	42	36	58	50
calcined kaolin[3]	8	7	12	10
nepheline syenite[4]	—	7	—	10
sodium silicate[5] (solids from aqueous solution)	—	4.5	—	2.8
methyl cellulose[6]	3	3	2.5	2.5
water	83	102	66	75

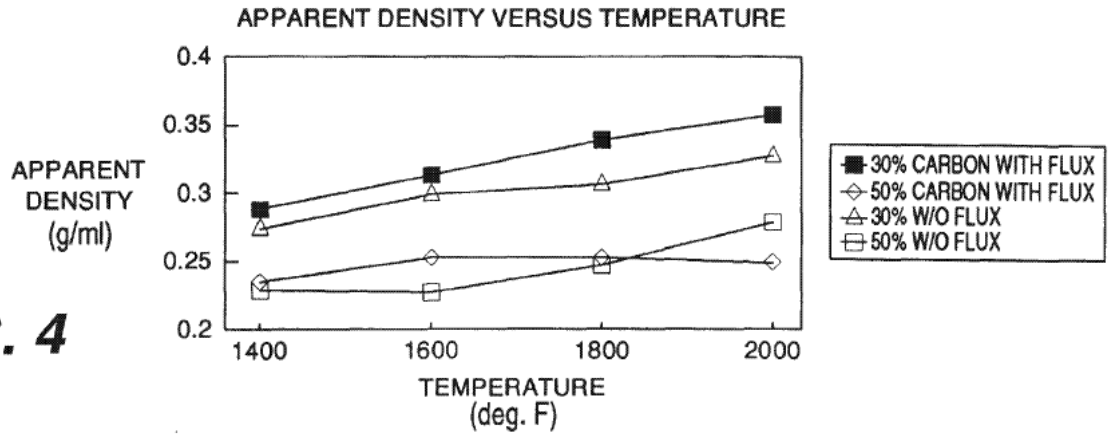


FIG. 4

RX-0209 at 9:30-40, Fig. 4;

Table 5. Properties of Westvaco automotive grade activated carbons [19]

Grade	WV-A 900	BAX 950	WV-A 1100	BAX 1100	BAX 1500
Shape	Granular	Pelleted	Granular	Pelleted	Pelleted
Mesh Size	10x25	2mm	10x25	2mm	2mm
BET Surface Area (m^2/g)	1400-1600	1300-1500	1600-1900	1400-1600	1800-2000
Butane Working Capacity (g/100ml)	9.0 min	9.5 min	11.0 min	11.0 min	15.0 min
Apparent Density (g/cm^3)	0.2-0.32	0.3-0.4	0.2-0.32	0.3-0.4	0.27-0.35
Moisture, as Packed (%)	10 max	5 max	10 max	5 max	5 max
Particle Size (U.S.Sieve Series)					
Oversize (%)	8 max	2 max	8 max	2 max	2 max
Undersize (%)	5 max	5 max	5 max	5 max	5 max

[redacted]

RX-0147 at *31.

Mr. Lyons uses the weight percent of activated carbon and apparent density of honeycombs provided by Park, and the BWC and apparent density values of known Westvaco carbons provided by RX-0147, in a calculation he designed to show what the BWC would have been of a honeycomb made out of, for example, BAX 1100, 1500, or 950. RX-0380C at Q/A 578. That equation is:

$$BWC_M = (BWC_C/AD_C)*(g_C/g_M)*AD_M$$

RX-0380C at Q/A 578. Consistent with Mr. Lyons's description, I understand this equation to simply swap out the apparent density of the pellet adsorbent (AD_C) with the apparent density of a honeycomb (AD_M), with the latter being modified by the weight percent of carbon reported in Park (g_C/g_M). In this way, Mr. Lyons does not disturb the other two elements of the standard BWC formula: butane activity (grams of adsorbate per grams of adsorbent) and butane ratio (unitless ratio of adsorbate released during purge to adsorbate gained during saturation). Mr. Lyons presents a table reflecting his calculated BWC values under this equation for Park's Formulations B and D (which Mr. Lyons explains would be tried first due to their improved strength). RX-0380C at Q/A 574, 578. The highest BWC reported is 5.8 g/dL (Formulation B, BAX 1500) and the lowest is 2.6 g/dL (Formulation D, BAX 950). *Id.* at Q/A 578. Considering the now-established rough correlation between 8 g/dL BWC and 35 g/L IAC, each of these honeycombs would meet the "subsequent adsorbent volume" limitation of claim 1.

As to this invalidity theory, Ingevity describes it as a "backup" to a similar Meiller/Park theory unsuccessfully attempted before the PTAB in two *inter partes* reviews by non-party BASF and respondent MAHLE. *See* CIB at 84-87 (citing, *inter alia*, JX-0207; CX-1150; CX-1149). Ingevity and its expert, Dr. Rockstraw, thus dedicate much of their discussions on the perceived strength of those PTAB decisions. *See* CIB at 84-87; CX-1143C at Q/A 327-358. But

[redacted]

Respondents' explain why the Meiller/Park theory presented in this investigation differs from what was used in those IPR proceedings (RRB at 46-47), and upon review of Ingevity's summaries of the IPR decisions as compared to Mr. Lyons's present testimony, I agree.

Ingevity argues four points in opposition. First, there is no "motivation to use air intake honeycombs in fuel vapor canisters." CIB at 86 (citing CX-1143C at Q/A 361-369). As discussed above, this is not persuasive, because the fuel vapor canister effectively becomes an air intake path during purge. Second, Ingevity argues there is no "motivation to choose Formulations B and D" from Park under an "obvious to try" approach to invalidity. *Id.* at 86-87 (citing, *inter alia*, CX-1143C at Q/A 370-386; Hr'g Tr. at 524:3-526:8). I disagree. Dr. LaBine, an acknowledged canister designer in the relevant time frame, testified that development of honeycombs involved "ISO static strength [because] if these are very brittle, it becomes an assembly problem because they shatter." JX-0239C at 26:12-25. She also testified that in a certain monolith-containing canister, the monolith is bounded by a foam insert "so it doesn't shake itself to death." JX-0239C at 149:2-21. These design needs support Mr. Lyons's conclusion that Formulations B and D from Park would be obvious to try, as they are stronger than Formulations A and C. *See* RX-0380C at Q/A 559, 569-571. Obviously, resistance to vibration is important in automotive applications.

Third, Ingevity disputes that a POSITA would have selected a Westvaco-supplied carbon to create the honeycombs of Park. CIB at 87 (citing CX-1143C at Q/A 387-393). Setting aside the apparently undisputed contention that Westvaco was, at the time and in its own words, the "world's leading supplier of activated carbons for automotive emissions controls" (*see* CX-1143C at Q/A 393; RX-0380C at Q/A 576; RX-0050C at *6), Park is assigned to Westvaco on its face (RX-0209 at *1). It surely would have been obvious for a POSITA to try a Westvaco-supplied carbon if they sought to create the honeycombs disclosed in Westvaco's patent (Park).

[redacted]

Fourth and finally, Ingevity and Dr. Rockstraw challenge the reliability of Mr. Lyons BWC conversion equation. CIB at 87 (citing CX-1143C at Q/A 395-398). Dr. Rockstraw testified in relevant part as follows:

> Q396. Do you agree with Mr. Lyons's opinion?
>
> A396. No. Mr. Lyons has provided no support for his assertion that a POSITA would have estimated the expected BWC using the equation that he sets forth in his testimony. See RX-0380C at Q/A 578. For example, Mr. Lyons does not identify the source of the formula he cites, nor does he opine that a POSITA would have known of the formula. Nor does Mr. Lyons describe what level of accuracy a POSITA would have expected from the formula he provides. In addition, Mr. Lyons states that "I have used the minimum BWCC and midpoint ADC values from Table 5 along with weight percentages of carbon given in Table 4 and the midpoint of the ADM from Figure 4 of Park for Formulations B and D." RX-0380C at Q/A 578. But Mr. Lyons has not explained why these values he used are appropriate or pertinent to his evaluation. Accordingly, in my opinion, Mr. Lyons has not established that the formula that he relies on would accurately calculate BWC.
>
> Q397. Any other reasons why you disagree with Mr. Lyons?
>
> A387. Yes. As I explained earlier, Formulations B and D are incomplete relating to inputs needed for creating a honeycomb. For example, they do not identify the cell density, cell wall thickness, open frontal area, or skin thickness. These inputs will affect adsorptive characteristics, including IAC and BWC. Mr. Lyons's formula does not take these factors into account. Moreover, Mr. Lyons's formula likewise does not account for other factors such as the drying process and firing temperatures, which also affect adsorptive characteristics including IAC and BWC. Thus, in my opinion, Mr. Lyons's "formula" is necessarily incomplete and cannot accurately determine BWC as he asserts.

CX-1143C at Q/A 396-397. These arguments are not persuasive.

The record is clear that three elements and three elements alone contribute to a BWC calculation: apparent density (g/dL), butane activity (grams of adsorbate per grams of adsorbent), and butane ratio (unitless ratio of grams of adsorbate purged to grams of adsorbate taken up in saturation). JX-0009 at *3; 844 patent at 2:1-12; *see* RX-0047C (calculating row "BWC, g/100ml" from rows "Butane Activity, wt%," "Butane Ratio," and "Piece Density, g/ml"). It is logical,

[redacted]

therefore, that any manufacturing process (drying and firing temperature) or resulting structure (cell density, cell wall thickness, open frontal area, skin thickness) which does not affect any one of these elements, does not affect BWC. Dr. Rockstraw's failure to identify how any of his "inputs" or "factors" affect an element of BWC, apart from generalizing that they would, greatly diminishes the weight of his opinion.

Moreover, Mr. Lyons's calculated BWC values are consistent with honeycomb BWC values determined by Ingevity in is normal course of business. In his testimony, Ingevity witness Dr. Miller described RX-0047C as "a spreadsheet that shows a variety of different sample activated carbon honeycombs that were created and tested during our development of the honeycomb for an evaporative emissions canister." CX-1146C at Q/A 82-83. The document shows that two honeycombs produced with 30% by-weight BAX 1500 had BWC values of 3.8 and 3.6 g/dL, and one honeycomb produced with 50% by-weight of WV-A 1100 had a BWC value of 4.6 g/dL. RX-0047C; *see* CX-1146C at Q/A 82-83 (identifying specific carbons BAX 1500 and WV-A 1100 in RX-0047C).

Mr. Lyons, on the other hand, calculated that a honeycomb made with BAX 1500 and Park's Formulation D (30% carbon by-weight), would have a BWC of 4.6 g/dL; and a honeycomb made with WV-A 1100 and Formulation B (50% carbon by-weight) would have a BWC of 5.1. Not only are these calculated amounts consistent with Ingevity's own data using the same carbon-types and concentrations, they are in fact higher, and yet still far below the approximate 8 g/dL threshold determined above as correlating to 35 g/L IAC. Thus, for Dr. Rockstraw's criticism to have any merit, there must exist options for cell density, cell wall thickness, open frontal area, skin thickness, drying process, and firing temperatures which, when used, can increase BWC by 50% *more* than whichever parameters would have already been used to cause Mr. Lyons's BWC values

[redacted]

to be higher than Ingevity's.[8] Without explanation from Dr. Rockstraw (*see* CX-1143C at Q/A 301-325, 395-398) or any Ingevity witness (*see generally* CX-1146C at Q/A 79-89; CX-1147C at Q/A 122-135; CX-1148C at Q/A 112-122 (stating effectively same points as CX-1146C)), such testimony is simple speculation. Indeed, Respondents note:

> In fact, Dr. Rockstraw testified that despite reviewing Ingevity's documentation showing the IAC or BWC values of honeycombs made by Westvaco during the time of its development work with Delphi, he does not recall seeing any document showing honeycomb with an IAC of 35 g/L or higher or BWC of 8 g/dL or higher, or any experimental data showing that Ingevity produced such a honeycomb. (HT 673:20-675:2.) Instead, the average BWC of all the honeycombs that Dr. Rockstraw has seen data for is around 4 g/dL. (HT 675:6-15.)

RIB at 70.

Accordingly, clear and convincing evidence shows that a honeycomb with a BWC of significantly less than 8 g/dL and, by extension, significantly less than 35 g/L IAC, would have been obvious to use in the fuel vapor canister system of Meiller in view of Park and RX-0174. Therefore, Respondents have established the obviousness of claim 1 of the 844 patent under section 103.

As to claims 2-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 37, 38, 39, 41, 43, 45, 48-51, and 53, Ingevity does not dispute these are invalid as alleged by Mr. Lyons. *See* CIB at 84-87; CRB at 48-49; CX-1143C at Q/A 327-398. Given this lack of dispute, and the credible testimony from Mr. Lyons (RX-0380C at Q/A 580-632), Respondents have established prima facie obviousness under section 103 for these claims as well.

4. Secondary Considerations

Ingevity's discussion of secondary considerations of non-obviousness do not move me from the above determination that the claims of the 844 patent are obvious. Essentially, Ingevity's

[8] Here, "50% more" assumes a BWC of 5.1 as in the WV-A 1100, Formulation B example.

[redacted]

considerations are not particularly relevant to the specific obviousness issue presented by the prior art—as opposed to features and benefits already disclosed. Meiller explicitly discloses the use of a subsequent honeycomb in combination with an initial conventional canister. *See, e.g.*, RX-0004 at Figs. 1-4. What Meiller leaves out from its teachings are the BWC or IAC properties of its adsorbents. Given that any adsorbent must have an IAC value (it is an unavoidable property), and the 844 patent's use of a single IAC value to divide the entire spectrum of adsorbents, the obviousness question for Meiller is a narrow one—whether it would have been obvious to use a low-IAC honeycomb as opposed to a high-IAC honeycomb. Ingevity's secondary considerations, on the other hand, are directed to the basic auxiliary honeycomb concept Meiller already discloses, and are not therefore probative of the actual issue. "Where the offered secondary consideration actually results from something other than what is both claimed *and novel* in the claim, there is no nexus to the merits of the claimed invention." *In re Kao*, 639 F.3d at 1068 (emphasis added).

For example, Ingevity presents the commercial success and copying by others of its honeycombs. CIB at 88, 89-90. Again, given that Meiller already discloses the use of a subsequent honeycomb, the only value these considerations can offer is if they show the non-obviousness of using a low-IAC honeycomb over a high-IAC honeycomb. Outstanding commercial success of low-IAC honeycombs could do this, but the record in this investigation lacks any evidence that high-IAC honeycombs were in existence, so as seriously to give a POSITA this choice. *See, e.g.*, CX-1143C at Q/A 316 ("Q316. Are you aware of any carbon honeycomb products that have an IAC about 35 g/L? A316. Yes. I understand that Mr. John Jackson testified during his deposition [redacted]"); CX-1148C at Q/A 120 (finding one example in RX-0047 that could potentially be made to have over

[redacted]

8 g/dL BWC); CX-1146C at Q/A 87 (describing same example in almost same words). Thus, these considerations are worth little weight to the analysis.

Ingevity's unexpected results and satisfaction of a long-felt need fall into a similar predicament. The inventors of Meiller already combined a subsequent auxiliary volume of honeycomb with an initial conventional canister, and appreciated the resulting improvement in diurnal breathing emissions. RX-0004 at Figs. 1-4, 2:58-60. Thus, evidence that the 844 patent also supplied this benefit (CIB at 87, 88) is not noteworthy. As to the unexpectedness of using a low-IAC honeycomb, this too is tempered by the absence of any high-IAC honeycombs at the time of the invention in the record.

As to praise from others and industry respect (CIB at 88-89), these have even less connection to the narrow obviousness question presented by Meiller, as Ingevity largely describes respect and praise for the 844 patent as a whole based on its ability to provide the aforementioned improvement in diurnal breathing emissions (*id.* at 88 (citing CX-1143C at Q/A 465-480; CX-1144C at Q/A 39-83; CX-1145C at Q/A 137-160; JX-0172; JX-0007; JX-0174; CX-1076C at *1-2; CX-0976C at *15; JX-0188C), 89 (citing CX-1143C at Q/A 481-493; CX-1046 at 2:15-19; CX-1047 at 2:4-7; CX-1048 at 7:44-47; CX-1049 at 1:44-57; JX-0175 [sic] at 0076)). As Meiller also provides the same improvement with effectively the same apparatus, this praise does little to distinguish the 844 patent, especially, again, with regard to the selection of a low-IAC honeycomb over a high-IAC honeycomb. Although not in any way dispositive, one cited memorandum actually evinces a frustrated customer's challenge to the novelty of the 844 patent and its value to industry. JX-0188C at *1 [redacted]

[redacted]

Accordingly, secondary considerations do not sufficiently support a finding of non-obviousness of the 844 patent.

5. 35 U.S.C. § 112, ¶ 1 (Enablement)

In addition to indefiniteness, Respondents contend all asserted claims of the 844 patent are invalid for lack of enablement. Specifically, Respondents argue the claims recite "a high IAC with no upper bound and a low IAC with no lower bound," yet the 844 patent fails to teach how to obtain values higher than 80 g/L or lower than 16 g/L. RIB at 57 (citing RX-0380C at Q/A 238, 249). Respondents view this discrepancy between the claims and the specification as in conflict with the rule that "[t]o 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.'" *Id.* (citing, *inter alia*, *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997)); RRB at 31-32. Respondents hold up *MagSil Corp. v. Hitachi Glob. Storage Techs., Inc.*, 687 F.3d 1377, 1380-1384 (Fed. Cir. 2012) as an on-point example of an unbounded claimed range (*i.e.* "up to infinity" (RIB at 58)) resulting in lack of enablement (*see* RIB at 58-59). Respondents note that when Ingevity achieved an IAC of 100 g/L, it was a viewed as a considerable feat—only achieved years after the 844 patent's 2001 filing date. *Id.* at 58 (citing Hr'g Tr. at 99:3-100:19; Rx-0380C at Q/A/ 246).

Respondents refer to a second ground for lack of enablement as well. Respondents contend it would take undue experimentation "for a PHOSITA to determine the proper method for measuring IAC (assuming that it is even possible to do so)" in light of the indefiniteness problems mentioned above. RIB at 59.

[redacted]

In response, Ingevity argues two points of law: first, "[a] patent claim written to cover more than one embodiment can be enabled based on a single embodiment" (CIB at 72 (citing *Invitrogen Corp. v. Clontech Labs., Inc.*, 429 F.3d 1052, 1070-71 (Fed. Cir. 2005))); and second, "it is the novel aspect of an invention that must be enabled" as opposed to "hypothetical variant[s] of limitations that are tangential to the inventive concept" (*id.* (citing Memo. Opinion, *Delaware Display Group LLC v. Vizio, Inc.*, Case No. 13-2112, at 8-10 (D. Del. Mar. 1, 2007; *Auto. Techs. Int'l v. BMW of North America, Inc*., 501 F.3d 1274, 1283 (Fed. Cir. 2007)). Ingevity argues the point of novelty of the 844 patent is the configuration of adsorbents in a canister and "not adsorbent volumes with adsorption capacity of infinity or absolute zero." *Id.*

Respondents have not shown lack of enablement with clear and convincing evidence. With respect to the low-IAC range of less than 35 g/L, this would not be beyond the ability of those of ordinary skill in the art, because the 844 patent teaches that incremental adsorption capacity can be reduced through the use of diluents such as non-adsorbing fillers. *See, e.g.*, 844 patent at 3:55-57 ("One approach is to use a filler and/or bed voidages as a volumetric diluent for flattening an isotherm."). It is not hard to imagine a near zero IAC achieved through the use of, perhaps, one pellet of adsorbing carbon buried within non-adsorbing filler. Thus, the low end of the range is enabled.

Nor does the high-IAC range of greater than 35 g/L suffer from lack of enablement. In both *MagSil* and the case it compares itself to, *Fisher*, 427 F.2d 883, the claimed range which was found to lack enablement was the heart of the invention. In *MagSil*, the invention was rooted in the achievement of a resistive change between electrodes in a magnetic read head of 10% wherein only lower percentages had been achieved before. *See* 687 F.3d at 1379-80. The claims attempted to capture this innovation with the limitation "an electrical insulator between the first and second

[redacted]

electrodes, wherein applying a small magnitude of electromagnetic energy to the junction reverses at least one of the magnetization directions and causes a change in the resistance by at least 10% at room temperature." *Id.* at 1379. Similarly, in *Fisher* the invention concerned a treatment for arthritis and was rooted in the achievement of a substance with high potency as to the beneficial effects while maintaining low harmful effects. *See* 427 F.2d at 830. The claims in that case used the limitation "containing at least 1 International Unit of ACTH per milligram and containing no more than 0.08 units of vasopressin and no more than 0.05 units of oxytocin per International Unit of ACTH" to capture this innovation. *Id.* at 835. In both cases, the courts invalidated the claims due to a lack of enablement for the unbounded upper ranges in these limitations. *See MagSil*, 687 F.3d at 1383; Fisher, 427 F.2d at 839-840. In relevant part, the *Fisher* court explained:

> The issue thus presented is whether an inventor who is the first to achieve a potency of greater than 1.0 for certain types of compositions, which potency was long desired because of its beneficial effect on humans, should be allowed to dominate all such compositions having potencies greater than 1.0, including future compositions having potencies far in excess of those obtainable from his teachings plus ordinary skill.
>
> It is apparent that such an inventor should be allowed to dominate the future patentable inventions of others where those inventions were based in some way on his teachings. Such improvements, while unobvious from his teachings, are still within his contribution, since the improvement was made possible by his work. It is equally apparent, however, that he must not be permitted to achieve this dominance by claims which are insufficiently supported and hence not in compliance with the first paragraph of 35 U.S.C. § 112. That paragraph requires that the scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification to persons of ordinary skill in the art. In cases involving predictable factors, such as mechanical or electrical elements, a single embodiment provides broad enablement in the sense that, once imagined, other embodiments can be made without difficulty and their performance characteristics predicted by resort to known scientific laws. In cases involving unpredictable factors, such as most chemical reactions and physiological activity, the scope of enablement obviously varies inversely with the degree of unpredictability of the factors involved.

427 F.2d at 839.

[redacted]

Unlike *MagSil* and *Fisher*, the 35 g/L metric in the 844 patent is central to the invention in that it delineates between what would be considered low-IAC and high-IAC adsorbents, yet no party argues achievement of an adsorbent with an IAC greater than 35 g/L was the contribution to the art. Rather, the contribution is as Ingevity has written it (*see* CRB at 35)—the use of otherwise known adsorbents, one with an IAC greater than 35 g/L and one with an IAC less than 35 g/L, arranged in a certain sequence with respect to the flow of fuel vapor. *See, e.g.*, 844 patent at cls. 1, 18, 31, 43. Respondents do not contend that this arrangement is not disclosed in the 844 patent specification, nor do they contend it would take undue experimentation to achieve it. A person of ordinary skill's inability to create adsorbent volumes with an IAC greater than 80 g/L, 100 g/L, or even 1000 g/L without undue experimentation is simply irrelevant.

With respect to Respondents' additional contention that the claims are not enabled "because, as discussed with respect to indefiniteness, a PHOSITA would not know how to measure IAC given the '844 patent's deficient disclosure, including regarding which 'volume' to measure" (RIB at 59; RRB at 33 ("Ingevity also failed to enable the full scope of its claims based on the indefiniteness arguments made above.")), Respondents have not adequately explained how this indefiniteness theory somehow translates into a lack of enablement. *Crown Oper. Int'l v. Solutia Inc.*, 289 F.3d 1367, 1378 n.5 (Fed. Cir. 2002) ("[D]efiniteness and enablement are analytically distinct requirements.") (citation omitted).

Accordingly, Respondents have not shown by clear and convincing evidence that the asserted claims of the 844 patent are not enabled.

6. 35 U.S.C. § 112, ¶ 1 (Written Description)

In addition to enablement and indefiniteness, Respondents contend the 844 patent is invalid by way of lack of written description in that "[t]he claims of the '844 patent are impermissibly broader than the supporting disclosure with respect to IAC ranges." RIB at 56. Specifically,

[redacted]

Respondents identify the 844 patent specification as disclosing a highest IAC of 80 g/L and a lowest of 16 g/L, yet the claims would cover values that exceed both this maximum and minimum. *See id.* at 56-57. Respondents again cite the example of an absorbent with an IAC of 100 g/L as a considerable feat achieved by Ingevity but only years after the 844 patent's 2001 filing date. *Id.* at 57 (citing Hr'g Tr. at 99:3-100:19; RX-0380C at Q/A/ 246). As with enablement, Respondents add in that the indefiniteness surrounding "which 'volume' to measure" for the recited adsorbent volumes is another ground of invalidity for lack of written description. *See id.*

Respondents have not adequately explained a written description theory of invalidity as opposed to enablement (regarding bounds of claimed IAC ranges (*see* RIB at 56-57; RRB at 31-32)) or indefiniteness (regarding identification of volumes for IAC evaluation (*see* RIB at 57; RRB at 31)). Accordingly, Respondents have not shown the 844 patent claims are invalid for lack of written description.

7. Improper Inventorship

Another of Respondents' affirmative defenses is improper inventorship: "[t]he '844 patent does not name the correct inventors, and is thus invalid and unenforceable" under 35 U.S.C. § 102(f) and 35 U.S.C. § 116. RIB at 96. Specifically, Respondents contend the novel aspect of the 844 patent was the placement of a low-IAC adsorbent subsequent to a high-IAC adsorbent in the flow path of vapors from a fuel tank, and this idea belonged to Dr. Hiltzik alone and apart from any other named inventor. *Id.* at 96-97. Respondents then discuss particular activities of named inventor Roger Williams, and argue none rise to an inventive contribution. *Id.* at 97-98 (citing CX-1145C at Q/A 10, 17, 20-30; JX-0251C at 24:16-25, 43:9-21; JX-0250C at 107:7-110:7, 114:2-9, 118:25-119:24; CX-1143C at Q/A 508; Hr'g Tr. at 691:14-694:14; RX-0325; RX-0034C; RX-0067).

[redacted]

In response, Ingevity criticizes Respondents for a "dissect-and-evaluate-novelty approach" in which each alleged contribution from, in relevant part, Mr. Williams, is tested "to see if it is novel alone" with a credibility evaluation from Respondents' technical expert. *See* CIB at 91-92. Ingevity contends "[a]n inventor can contribute to only one claim and collaboration with other inventors is sufficient so long as it is not insignificant and does not involve merely explaining well-known concepts." *Id.* at 90 (citing *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1351 (Fed. Cir. 1998); *Ethicon v. U.S. Surgical Corp.*, 135 F.3d 1456, 1460 (Fed. Cir. 1998)). Ingevity points to testimony from Dr. Hiltzik and Mr. Williams on how the inventions of the 844 patent "resulted from all four inventors that enabled his discovery of the importance of a flat isotherm." *Id.* (citing CX-1147C at Q/A 66, 77-79, 84, 88-91; CX-1145C at Q/A 3-21). Specifically, Ingevity argues Mr. Williams "identif[ied] adsorption capacity as the key carbon property for bleed emissions" which then "enabled the team, including Dr. Hiltzik, to discover the need for flat isotherms." *Id.* at 90-91. Ingevity also provides additional examples of collaboration efforts from Mr. Williams, in addition to the two inventors other than Dr. Hiltzik. *See id.* at 91 (citations omitted).

Respondents have failed to show by clear and convincing evidence that Mr. Williams, although engaged in a collaborative effort with Dr. Hiltzik, only provided Dr. Hiltzik with well-known principles or statements on the state of the art. *See* RIB at 98 (citing *Ethicon*, 135 F.3d at 1460; *Caterpillar*, 387 F.3d at 1377); RRB at 60. For example, Respondents do not dispute Ingevity's evidence that Mr. Williams made contributions relating to materials, material shapes, and material locations that would meet both the claimed IAC limits and practical emissions requirements. *See* RRB at 60; CIB at 91; JX-0250C at 110:9-25, 114:2-22; CX-1145C at Q/A 17-30; CX-1147C at Q/A 66, 78-79, 81. These efforts have a link to, at least, dependent claim 17, which recites "[t]he method of claim 12 wherein the non-adsorbing filler is volatized or combusted

[redacted]

to form voidages larger than 50 Å width within the shaped particle or monolith" (844 patent at cl. 17; CIB at 91), or claims 32 and 44, which place the second (*i.e.*, subsequent) adsorbent volume in a separate canister (844 patent at cls. 32, 44; CIB at 91). The fact that voidages larger than 50 angstroms or auxiliary canisters may have been known or even well-known in a standalone manner does not clearly show Mr. Williams only supplied Dr. Hiltzik with statements on the state of the art. The evidence suggests that Mr. Williams' contributions were provided in furtherance of a "total inventive concept." CX-1147C at Q/A 66, 74-79; *Pannu*, 155 F.3d at 1351 ("During the meeting with Link, Pannu was doing more than simply providing Link with well-known principles or explaining the state of the art; he was contributing his ideas concerning the snag-resistant elements to a total inventive concept."). And Mr. Williams' choice of testing procedure design contributed to the inventors' alleged discovery "that isotherm shape was related to performance." *See* CX-1147C at Q/A 81, 70. This, of course, is the core of the 844 patent's independent claims.

As to inventors Jagiello and Tolles, they receive effectively no discussion in Respondents' briefs. *See* RIB at 96-98; RRB at 60. Accordingly, Respondents' affirmative defense of improper inventorship is rejected.

8. Patent Misuse

Another of Respondents' affirmative defenses is patent misuse, manifested in either of two ways: Ingevity "illegally [tying] the sales of its unpatented carbon products to allowing its customers to practice the '844 patent"; and Ingevity [redacted] RIB at 90, 92. I discuss each in turn, below.[9]

[9] Respondents make reference in a footnote to Ingevity committing "further" patent misuse [redacted] (RIB at 96 n. 25), but this is not adequately presented and is therefore rejected.

[redacted]

a. Tying Arrangements

Respondents contend Ingevity has committed patent misuse through its requirement that [redacted] RIB at 90-91 (citing *Princo Corp. v. Int'l Trade Comm'n*, 616 F.3d 1318, 1327 (Fed. Cir. 2010)), 96; RRB at 52-54, 56. Respondents argue that Ingevity's reliance on *Dawson Chem. Co. v. Rohm & Haas Co.*, 448 U.S. 176, 179 (1980) ("*Rohm & Haas*") to justify its conduct of [redacted] is inapposite, as that case was limited to customers who engage in contributory infringement, while Ingevity's customers "would be engaged in direct infringement by manufacturing and selling fuel vapor canisters covered by the '844 patent." RRB at 54. Respondents add that "[i]t is undisputed that Ingevity has market power in the carbon adsorbent market for fuel vapor canisters" and cite to evidence indicating "Ingevity is the largest supplier in the U.S. of carbon adsorbents used in fuel vapor canisters" including the "pelletized carbon market" and honeycombs. *See* RIB at 96 (citing CX-0295C at ¶ 4; Hr'g Tr. at 67:24-68:2, 68:3-6, 476:6-477:11). In response to certain of Ingevity's arguments, Respondents dispute that the relevant market for a determination on market power is fuel vapor canisters, as opposed to the constiuent carbon adsorbents. RRB at 56.

In opposition, Ingevity argues primarily that its conduct is no different from the patentee in *Rohm & Haas* who was not held to engage in patent misuse (CIB at 92-93; CRB at 53), and Respondents have not shown the requisite "market power" under 35 U.S.C. § 271(d)(5). On the latter point, specifically, Ingevity contends Respondents "do not explain why market power in the alleged *tied* product is relevant when Congress and the Supreme Court have stated that a defendant must show market power in the tying product, which Respondents never show." CRB at 53 (citing *Ill. Tool Works, Inc. v. Indep. Ink, Inc.*, 547 U.S. 28, 42-46 (2006)). Ingevity adds that even if it "had conditioned a license on the purchase of a staple product during a time in which it had market

power in a relevant market—which Respondents have not shown—[it] purged any alleged misuse by abandoning the conduct and allowing any consequences to dissipate." CIB at 94 (citing *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1372 (Fed. Cir. 1998); *Va. Panel Corp. v. MAC Panel Co.* ("*Va. Panel II*"), 133 F.3d 860, 871 (Fed. Cir. 1997)). Ingevity further adds, "[i]f it somehow had market power, it would have developed that market power only recently because the widespread use of LEV-III standards did not occur until recently, so any alleged tying by Ingevity in previous years would not constitute patent misuse under 35 U.S.C. § 271(d)(5)." *Id.* (citing CX-0062C).

Ingevity's sale of honeycombs does not constitute patent misuse via tying. The Supreme Court has held, in its *Rohm & Haas* decision, that subsections (1) through (3) of 35 U.S.C. § 271(d) reflect a "grant[] to patent holders of a statutory right to control nonstaple goods that are capable only of infringing use in a patented invention, and that are essential to that invention's advance over prior art." 448 U.S. 176 at 213.[10] In Rohm & Haas, the patentee sold a herbicide known as propanil, itself not patented and not patentable, and with those sales granted a license to its patented method of applying propanil to crops. *Id.* at 176. The Court acknowledged that subsections (1) through (3) did not expressly cover the patentee's "linkage" of the sale with the license as a protected activity, but nonetheless held the tying fell within these subsections. *Id.* at 213 ("We find nothing in this legislative history to support the assertion that [patentee's] behavior falls outside the scope of § 271(d).").

Similar to propanil in *Rohm & Haas*, there is no dispute that Ingevity's honeycombs have no non-infringing uses, making them nonstaple goods. It is clear, therefore, that any tying between

[10] At the time of the *Rohm & Haas* decision, 35 U.S.C. § 271(d) did not include subsections (4) and (5), as they were added in a 1988 amendment to the statute. *Ill. Tool Works Inc. v. Indep. Ink, Inc.*, 547 U.S. 28, 41–42 (2006); *Princo*, 616 F.3d at 1329.

[redacted]

a sale of honeycombs and a license to the 844 patent is protected by 35 U.S.C. § 271(d), subsections (1) through (3), and does not constitute patent misuse. Respondents' attempt to distinguish *Rohm & Haas* on the basis of the nature of the conduct by Ingevity's customers (RRB at 54 (distinguishing contributory infringement from direct infringement)) is not persuasive; method patent claims and allegations of contributory infringement are at issue in both cases. *Rohm & Haas*, 448 U.S. at 182; 844 patent at cls. 1, 18.

Ingevity's tying of BAX sales to a license of the 844 patent is a different matter, however, because Ingevity acknowledges that BAX has non-infringing use and does not substantially embody the 844 patent. CIB ta 97 (citations omitted). It therefore falls outside of the protection afforded by 35 U.S.C. § 271(d)(1)-(3). The issue then becomes whether it is otherwise protected by 35 U.S.C. § 271(d)(5):

> (d) No patent owner otherwise entitled to relief for infringement or contributory infringement of a patent shall be denied relief or deemed guilty of misuse or illegal extension of the patent right by reason of his having done one or more of the following: ... (5) conditioned the license of any rights to the patent or the sale of the patented product on the acquisition of a license to rights in another patent or purchase of a separate product, unless, in view of the circumstances, the patent owner has market power in the relevant market for the patent or patented product on which the license or sale is conditioned.

35 U.S.C. § 271(d)(5). Pursuant to this subsection, and given that BAX is not itself patented, the determination on Ingevity's tying of BAX sales to a license under the 844 patent turns on whether Ingevity "has market power in the relevant market for the patent or patented product on which the license or sale is conditioned." The Federal Circuit has made clear that this market power must exist at the time the tying conduct occurred. *U.S. Philips Corp. v. Int'l Trade Comm'n*, 424 F.3d 1179, 1186 (Fed. Cir. 2005) ("According to the administrative law judge, the patent package arrangements were instituted in the early 1990s. Yet Princo did not enter into its agreement until June of 1997, and GigaStorage did not enter into its licensing agreement until October of 1999.

[redacted]

Thus, any lack of market power that Philips and its colicensors may have had in the early 1990s is irrelevant to the situation in the late 1990s, when the parties entered into the agreements at issue in this case.").

Respondents have not met their burden to show the requisite market power. *See Princo*, 616 F.3d at 1326; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003). It is crucial to clearly explain or define the market in which the patentee allegedly has power (*Hodosh v. Block Drug Co.*, 833 F.2d 1575, 1577 (Fed. Cir. 1987)), and, as mentioned above, the timeframe of this power in comparison to the allegedly improper tying activity (*Philips*, 424 F.3d at 1186). Respondents have defined the market with a general descriptor of "carbon adsorbent market for fuel vapor canisters." RIB at 96; *see* RRB at 526 ("market power in the carbon adsorbent market"). Even accepting this description, as opposed to Ingevity's defined market as the canisters themselves (CIB at 93-94), Respondents have not associated the market power with those points in time when the tying behavior occurred. For example, Respondents describe [redacted] (RIB at 92-93), and [redacted] (*id.* at 93-95), but Respondents do not sufficiently identify what Ingevity's market power was at each of those times (*see generally id.* at 92-96).

Accordingly, I do not find Respondents have shown patent misuse through tying.

b. Supply Agreements

Respondents contend Ingevity has also committed patent misuse through [redacted] which "maintain the price charged to customers at levels close to the pre-patent expiration rates." RIB at 91; *see* RIB at 92-95; RRB at 52, 54-56. However, "Respondents do not cite a single case or otherwise provide a legal basis for their theory." CRB at 54; *see* RIB at 91-95. Respondent do not cite any law demonstrating a basis for their patent misuse claim in their

[redacted]

initial post-hearing brief (RIB at 91-95) and only discuss *Brulotte v. Thys Co.*, 379 U.S. 29 (1964) in their reply brief (RRB at 54) to dispute the idea that a supply agreement is not a license if it does not use the word "license" (*see id.* at 54-56). This discussion, however, does not carry their burden to show that [redacted] is misuse. *See* RRB at 55. It is also unclear exactly which agreements Respondents contend constitute the misuse. Respondents' reply brief mentions no agreement in particular (*see* RRB at 54-55) and in the direct discussion of the issue in their initial brief, Respondents cite JX-0002C, an agreement with [redacted] and JX-0003, an agreement with [redacted] (RIB at 91). Yet Ingevity explains the [redacted] and [redacted] agreements are [redacted] "not [redacted] and do not [redacted] CRB at 54 n. 31.

The only other agreements mentioned by Respondents, albeit in a separate section entitled "Evidence of Illegal Anticompetitive Conduct by Ingevity" (RIB at 92), that could be pertinent to this misuse theory as extending past the 844 patent's expiration date, are with [redacted] and [redacted] (*see* RIB at 93-94 (discussing JX-0004C with [redacted], 95 (discussing RX-0063C with [redacted] Respondents do not even attempt to discuss the content of the [redacted] agreement, however (*see* RIB at 95), which is understandable because it [redacted] RX-0063C at *1-2. Respondents have therefore not shown this agreement constitutes patent misuse. As to the [redacted] agreement, it too contains a [redacted] (JX-0004C at *1), and again, Respondents otherwise fail to discuss why the remaining terms of the agreement constitute misuse other than their base allegation that the agreement's term extends past the 844 patent's expiration. Given the flexibility in contract negotiation afforded to patentees and customers, as explained in, for example, *Kimble v. Marvel*

[redacted]

Entm't, LLC, 135 S. Ct. 2401, 2408 (2015), Respondents have not met their burden to show either of these agreements constitute misuse.

Accordingly, Respondents have not shown patent misuse through [redacted]

[redacted]

9. Patent Exhaustion

Respondents present patent exhaustion as an affirmative defense. Respondents first observe that every Accused Product "includes at least one Ingevity BAX base carbon (*i.e.,* BAX 1500, BAX 1100, or BAX 1100LD), and multiple Accused Products include Ingevity's HCA honeycomb (CX-0909C.40-41, Table 3). RIB at 86. Respondents then argue that Ingevity's sale of these carbons to MAHLE exhausted Ingevity's rights in the 844 patent over those canisters that include BAX and HCA carbons (*id.* at 87-88) as well as those canisters that only include BAX with no HCA (*id.* at 88-90). To show this exhaustion, Respondents principally apply the tests from *Quanta Comp., Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 625 (2008) and *LifeScan Scotland, Ltd. v. Shasta Techs.*, LLC, 734 F.3d 1361, 1368 (Fed. Cir. 2013) ("The critical issue, whether a method or product patent is involved, is whether the product 'substantially embodies the patent'—*i.e.*, whether the additional steps needed to complete the invention from the product are themselves 'inventive' or 'noninventive.'"). *See id.* at 85-86.

As to HCA, Respondents highlight that an Ingevity witness, Mr. Ed Woodcock, has effectively admitted that HCA substantially embodies the 844 patent. RIB at 87 (citing JX-0252C at 377:4-378:3; Hr'g Tr. at 68:13-25; CX-0911C at Q/A 17). As to BAX, Respondents principally argue that Ingevity's characterization of BAX as a "DI Product," and reliance thereon for domestic industry economic prong, must mean it is a "specifically tailored, significant aspect" of an article that practices the patent under *Motorola Mobility, LLC v. Int'l Trade Comm'n*, 737 F.3d 1345 (Fed, Cir. 2013). *Id.* at 88. Respondents reason, "if Ingevity's BAX carbons are a specifically

[redacted]

tailored, significant aspect of a canister protected by the Asserted Patent under *Motorola*, they likewise satisfy the similar exhaustion standard under *Quanta*." *Id.* Alternatively, Respondents contend BAX adsorbents "embody an essential feature of the '844 patent and their only reasonable and intended use is to practice the patent," and that any non-infringing uses "are not intended by Ingevity or its business model." *Id.* at 89.

Ingevity acknowledges that the HCA it sells substantially embodies the invention of the 844 patent, but argues that that sale only results in exhaustion with respect to the HCA sold—where such HCA is not part of any infringement theory. *See generally* CIB at 98-99 (citing *Quanta*, 553 U.S. at 625; *Lexmark Int'l, Inc. v. Impression Prods.*, Inc., 816 F.3d 721, 742 (Fed. Cir. 2016) (en banc); *United States v. Univis Lens Co.*, 316 U.S. 241, 251 (1942)). With respect to BAX, Ingevity argues these adsorbents have non-infringing uses and thus do not substantially embody the 844 patent. *Id.* at 97-98 (citing Hr'g Tr. at 69:18-22; CX-0911C at Q/A 86; CX-1144C at Q/A 96; CX-1143C at Q/A 537; RX-0382C at Q/A 193; CX-1052C at *42-43). Even though a product with a non-infringing use may still substantially embody a patent, Ingevity argues BAX still does not do this because it does not constitute an inventive feature of the 844 patent. *See id.* at 98 (citing, *inter alia*, 844 patent at 5:46-49).

Patent exhaustion has not been demonstrated against any of the Accused Products. As a product which substantially embodies the 844 patent, exhaustion only applies to HCA and not any larger product HCA might end up in. The Supreme Court in *Quanta* was quite clear. "The authorized sale of *an article* that substantially embodies a patent exhausts the patent holder's rights and prevents the patent holder from invoking patent law to control postsale use of *the article*." 553 U.S. at 638. Ingevity's theory of infringement does not implicate HCA, so it is in no way an effort

[redacted]

to control postsale use of HCA. Thus, that theory of infringement is not affected by any HCA-triggered exhaustion.

Contrary to Respondents' assertion, the facts of this case are markedly different from those in *Quanta*. There, the infringement theory pursued by the patentee, LGE, was based on the use of the very same Intel processor alleged to trigger exhaustion. *Quanta*, 553 U.S. at 624 ("LGE filed a complaint against Quanta, asserting that the combination of the Intel Products with non-Intel memory and buses infringed the LGE Patents."), 637 ("LGE points out that the License Agreement specifically disclaimed any license to third parties to practice the patents by combining licensed products with other components."). Ingevity's infringement theory is not based on HCA—it is based on MPAC—so exhaustion does not apply. *See Drager Med. GMBH v. Allied Healthcare Prod., Inc.*, 2015 WL 1457954, at *2-3 (D. Del. Mar. 27, 2015) (finding exhaustion against an infringement claim that involved the patent-embodying adapter sold by the patentee).

As for BAX, it is implicated by Ingevity's theories of infringement. Respondents have not shown it substantially embodies the inventions of the 844 patent, however. Respondents' evidence on Ingevity's business model (RIB at 89; RRB at 57) has little nexus to this test, as opposed to Ingevity's presentation of the 844 patent itself, which describes how high-BWC adsorbents, like BAX, were common in the prior art fuel vapor canisters, which the 844 patent seeks to improve upon. *See, e.g.*, 844 patent at 1:27-2:33, 2:56-3:3, 3:45-47, 3:60-64, 4:64-5:2. Moreover, Respondents' use of *Motorola* is misplaced. In that case, the Federal Circuit did not hold that any component whose investments are sought to be relied upon for economic prong must be a "significant aspect of the [patented] article." *See* RIB at 88. Rather, the court held only that "[t]he investments or employment must only be 'with respect to the articles protected by the patent.' 19 U.S.C. § 1337(a)(3). An investment directed to a specifically tailored, significant aspect of the

article is still directed to the article," in resolution of a dispute over whether economic prong investments needed to be in support of that same portion of the article used to satisfy technical prong. *See Motorola*, 737 F.3d at 1348, 1351. Thus, Ingevity's decision to rely on its investments in BAX to satisfy economic prong does not automatically translate to an admission that BAX substantially embodies the 844 patent.

Respondents' patent exhaustion affirmative defense therefore fails.

V. DOMESTIC INDUSTRY - ECONOMIC PRONG

In a patent-based complaint, a violation of Section 337 can be found "only if an industry in the United States, relating to the articles protected by the patent ... concerned, exists or is in the process of being established." 19 U.S.C. § 1337(a)(2). Under Commission precedent, this "domestic industry requirement" of Section 337 consists of an economic prong and a technical prong. *Stringed Instruments*, Inv. No. 337-TA-586, Comm'n Op. at 12-14. The complainant bears the burden of establishing that the domestic industry requirement is satisfied. *See Certain Set-Top Boxes and Components Thereof*, Inv. No. 337-TA-454, Initial Determination at 294 (June 21, 2002) (not reviewed in relevant part).

The economic prong of the domestic industry requirement is defined in subsection (a)(3) of Section 337 as follows:

> (3) For purposes of paragraph (2), an 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 or mask work concerned --
>
> (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.

[redacted]

19 U.S.C. § 1337(a)(3). The economic prong of the domestic industry requirement is satisfied by meeting the criteria of any one of the three factors listed above. Importantly, the Commission has clarified that investments in plant and equipment, labor, and capital that may fairly be considered investments in research and development are eligible for consideration under subsections (A) and (B), in addition to subsection (C). *See Solid State Storage Drives,* Comm'n Op. at 14.

As alluded to above, and in consideration of subsections (A) and (B), Ingevity presents several sources of investment towards its satisfaction of the economic prong of domestic industry; specifically: investments it has made within the United States in plant, equipment, labor, and capital; investments made by third parties Futaba, Leehan, Stant, and Kayser in plant, equipment, labor, and capital; and investments made by respondent MAHLE in plant, equipment, labor, and capital. Ingevity also relies on its own investments in research and development under subsection (C). As determined below, Ingevity has not shown "significant" expenditures under subsections (A) and (B), but has shown "substantial" investment under subsection (C), such that economic prong domestic industry is satisfied.

A. Qualifying Expenditures

1. Subsection (A), Plant and Equipment

a. Ingevity Investments

As to subsection (A), the evidence shows Ingevity manufactures the honeycomb, low-IAC, adsorbents used in the DI Canisters at a plant located in [redacted] CX-0910C at Q/A 68; CX-0911C at Q/A 70. Ingevity's expert calculated that Ingevity invested the following amounts at this location reflecting what he calls the "change in gross PP&E [(*i.e.*, plant, property, and equipment)]" which would be relevant to subsection (A): [redacted] in 2015; [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. CX-0910C at Q/A 70; CDX-0002C.5; JX-0018C. The expert, Dr. Vander Veen, notes that the [redacted] is [redacted]

[redacted]

[redacted] of the honeycombs used in the DI Canisters, however. CX-0910C at Q/A 71. To accommodate this, the expert applied the following allocation percentages to these investments based on the amount of "honeycomb products" produced at the location: [redacted] in 2015, [redacted] in 2016, [redacted] in 2017, and [redacted] in 2018. *Id.*; *see* CIB at 104 (citing Hr'g Tr. at 332:6-333:4, 303:22-[3]04:14; CX-0911C at Q/A 74-75; CX-0914C at Q/A 81-83; CX-0063C). The resulting investments become:

	2015	2016	2017	2018
[redacted]				

See CX-0910C at Q/A 72. In its initial post-hearing brief, Ingevity then applies further allocations to these amounts to "remove investments made in the U.S. to manufacture honeycombs incorporated into vehicles for the Canadian market" for years 2015-2018, and "to remove honeycombs incorporated into vehicles for the Chinese and European markets" for 2018. CIB at 105 (citing CX-0910C at Q/A 117-118; JX-0013C; JX-0026C). Ingevity applies another allocation to remove the honeycomb which is incorporated into MAHLE's Domestic Accused Products for 2015-2018. *Id.* (citing CX-0190C at Q/A 126; Hr'g Tr. at 341:4-345:16; JX-0044C; JX-0046C). Finally, to the extent necessary, Ingevity applies an allocation to investments in 2018 to remove those that would have been after the complaint was filed in this investigation. *Id.* at 108 (referring to a 10/12 allocation to remove November 2018 and December 2018 investments). In total, the alleged investment in PP&E for the Waynesboro, GA plant becomes:

Ingevity	2015	2016	2017	2018

[redacted]

Subsection (A) – Plant and Equipment				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				

Ingevity refers to similar analyses done by Dr. Vander Veen for its [redacted] and [redacted] which [redacted] (or precursors thereto). *See* CIB at 104, 109-111 (citing, *inter alia*, CX-0910C at 56-67). Again, the analyses start with an identification of the "year-over-year change in gross PP&E," and then apply various allocation percentages to arrive at the investment amount for the "DI Products used in canisters practicing the Patent." CIB at 109, 110. These allocation percentages for [redacted] and [redacted] differ from those applied to the [redacted] and from each other, because of the nature of the respective activities and product manufactured.

For [redacted] a first allocation was applied to the "year-over-year gross change in gross PP&E" to capture the production of "DI Products" compared to other carbons; and a second

[redacted]

allocation was applied to represent how much of the DI Product investment went into "Tier 3 canisters practicing the patent with an Ingevity honeycomb." CIB at 109-110 (citing CX-0190C at Q/A 61-62; CX-0065C; JX-0018C; CX-0062C; CX-0911C at Q/A 86-100). To be consistent with the calculations for [redacted] above, I further add the same Canada, China, Europe, MAHLE Domestic Accused Product, and post-complaint allocation percentages, as suggested by Ingevity. *See* CIB at 108 (discussing 10/12 allocation for 2018), 111 n.48 ("All of these investments can be allocated to address Canada, China, Europe, and MAHLE's Accused Canisters"). The result is shown in the following table:

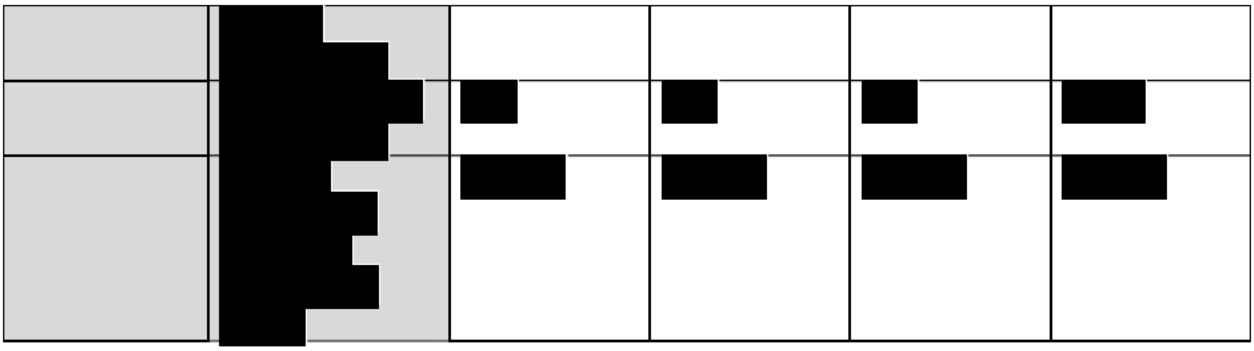
Ingevity Subsection (A) – Plant and Equipment	2015	2016	2017	2018
[redacted]				

For [redacted] a first allocation was applied to the "year-over-year change in gross PP&E" to capture the percentage of overall production attributable to BAX precursors; and a second allocation was applied to that amount to represent the proportion of precursor products which went

into "Tier 3 canisters practicing the Patent with a honeycomb purchased from Ingevity." Additionally, a third allocation was applied to the original "year-over-year change in gross PP&E" to capture the percentage of overall production attributable to honeycomb precursors. These BAX-precursor and honeycomb-precursor amounts are then added together, resulting in the following table:

Ingevity Subsection (A) – Plant and Equipment		2015	2016	2017	2018
[redacted]					
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	=======	======	======	======	=======
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]



Thus, the alleged investment by Ingevity under subsection (A), plant and equipment, is as follows:

Ingevity Subsection (A) – Plant and Equipment	2015	2016	2017	2018
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				

An evidentiary deficiency exists, however, that precludes consideration of the above plant and equipment expenses. As is explicit in the statute, otherwise qualifying economic investments must be "with respect to the articles protected by the patent." 19 U.S.C. § 1337(a)(3). In this

[redacted]

investigation, the "articles protected by the patent" are Ingevity's DI Canisters—and not simply any canister in existence that includes an Ingevity honeycomb. Yet Ingevity's allocations stop at this latter category of products. This is not sufficient because the record shows that there are many additional customers of Ingevity's honeycombs beyond the entities producing the DI Canisters—the only products established as "protected by the patent."

To begin, Respondents fault Ingevity's expert, Dr. Vander Veen, for not "allocat[ing] investments to the individual DI Products" as opposed to "on a plant-level." RIB at 112-113 (citing RX-0382C at Q/A 177-198). Respondents give examples of "[t]he expenses at [redacted] were allocated, in the aggregate to multiple BAX and HCA precursors," "[t]he expenses at [redacted] were allocated, in the aggregate, to multiple types of BAX," and "[t]he expenses at [redacted] were allocated, in the aggregate, to both types of HCA." *Id.* at 113. These *specific* criticisms are not especially relevant. The ultimate purpose of any allocation is to isolate those investments that are related to articles that practice the patent under the statute (19 U.S.C. § 1337(a)(2), (3)) from those that are not so related. Assuming the "aggregate" BAX and "aggregate" HCA produced at each location are shown to be put in articles which practice the 844 patent (*i.e.*, the DI Canisters), then it does not matter that investment amounts have been broken out "product-by-product" (RIB at 112) for each BAX and each HCA model, individually.

Based on review of Ingevity's briefing, witness testimony, and documentary evidence, however, that assumption is not supported. To repeat, the only articles which Ingevity has attempted to show practice the 844 patent are those models of fuel vapor canisters which are the DI Canisters from Leehan, Stant, Futaba, Kayser, and MAHLE. *See* CIB at 35-36 (third-party canisters); CIB at 35 (citing CX-0909C at Q/A 2072-2079 (MAHLE canisters)). Thus, any

[redacted]

investment, whether it be from Ingevity or licensee, must "relat[e] to" *these specific articles* to be cognizable for the economic prong calculus. 19 U.S.C. § 1337(a)(2), (3).

Ingevity's allocations do not reach this required level of specificity. For the honeycomb products produced at [redacted] and as shown above, Ingevity's allocations remove investments related to: non-HCA produced at the facility; honeycomb destined for the Canada, China, and Europe markets; honeycomb used in MAHLE accused products; and activities following the filing of the complaint. *See generally* CIB at 104-105, 108. What is left over are investments directed to honeycombs (*i.e.*, HCA or HCA-LBE) as a whole *to any customer*. This is not the same as honeycombs attributable to those specific canister models which are the DI Canisters from Leehan, Stant, Kayser, Futaba, and MAHLE.

As shown above, it is the same situation for the honeycomb precursors manufactured at the [redacted] facility; after all allocations, the investments reflect HCA to any customer. It is the same situation for the BAX precursors produced at [redacted] and the BAX pellets produced at [redacted] the products are not limited to the DI Canisters. While Ingevity's BAX allocations differ from its honeycomb allocations through the use of "Tier 3" canister percentage—an approximate allocation meant to remove non-844 patent practicing canisters—this still fails to remove any BAX not ending up in the specific list of DI Canisters from Leehan, Stant, Kayser, Futaba, and MAHLE.

But Ingevity's sales records show that not-insignificant amounts of DI Products (honeycombs and BAX) are sold to entities other than Leehan, Stant, Kayser, Futaba, and MAHLE. Ingevity witness William Hamilton testified that JX-0021C is a "sales and business planning document" which "provides a sales performance summary for the Performance Materials business." CX-0914C at *page* 16. The "data" tab of this spreadsheet contains all of the "source

[redacted]

data" for the summaries listed in other tabs. *Id.* at 17. The entries in this data tab can be filtered to show sales of DI Products made in the USA. JX-0021C at tab "data," columns O, AG. When this is done, there are many customers listed ("Sold-to name," column M) who are not Leehan, Stant, Kayser, Futaba, or MAHLE—[redacted] and these are just a few examples. Additional sales spreadsheets, JX-0022C, JX-0024C, JX-0026C, confirm the existence of many other customers of the DI Products.

[redacted] in particular, appears to be a major customer. *See, e.g.*, JX-0021C at "data" tab; JX-0026C at "data" tab. Indeed, [redacted] purchase of honeycombs is discussed at length in the rebuttal witness statement of Mr. Woodcock (CX-1144C at Q/A 113-159), and Ingevity's initial brief describes [redacted] as [redacted] CIB at 73 (citations omitted). But Ingevity's allocations do not remove honeycomb sales to [redacted] even though none of the DI Canisters are from [redacted]

[redacted] is just one example. Further supporting the existence of honeycomb customers other than Leehan, Stant, Kayser, Futaba, or MAHLE is the following testimony from Ingevity witness Ed Woodcock:

> Q. Which OEMs and Tier 1 manufacturers practice the claims of the '844 Patent without a license agreement?
>
> A. [redacted]

[redacted]

CX-1144C at Q/A 173 (emphasis added).

The evidence also suggests that Leehan, Stant, Kayser, Futaba, or MAHLE may themselves be using Ingevity carbons for products that are not protected by the 844 patent. At the deposition of Kayser's witness, Mr. Clark, for example, he testified both that [redacted] (JX-0229C at 33:17-19), and that [redacted] (*id.* at 31:15-22). Thus, it [redacted] Again, this is just one example.

Overall, no statements or arguments in Ingevity's briefs, witness testimony, or evidence refute this observation that Ingevity's claimed investments capture more than can be attributed to the DI Canisters. Indeed, several of Ingevity's contentions on this topic leave the door open for this possibility. One contention in its opening brief reads "Dr. Vander Veen's product-based allocations on a plant-by-pant basis for the DI Products used to practice the Patent is consistent with the flexible approach used by the Commission and is reasonable because it narrowed the investments to capture *only those directed to the DI Products used in canisters practicing the '844 Patent.*" CIB at 106 (emphasis added). Notably, the emphasized language does not read "only those directed to the DI Canisters" which it must to satisfy Ingevity's burden. This hedging as to which products Ingevity's investments relate to appears in Ingevity's reply brief as well. CRB at 64 ("The Federal Circuit directly rebuts Respondents' position because automotive honeycombs are significant components specifically tailored for use in canisters practicing the Patent."), 65 ("Dr. Vander Veen allocated the [redacted] investments to address only investments relating to

[redacted]

automotive honeycombs, which are specialty products manufactured only for use in practicing the Patent."), 70 (with respect to licensee data, "Dr. Vander Veen also found the investments significant based on the percentage of investments made in the U.S. for canisters that practice the Patent as opposed to those that do not practice the Patent.").

Due to these over-inclusive allocations, the amount of Ingevity's own investment that "relat[es] to" the DI Canisters under the statute—*i.e.*, the articles protected by the patent—are insufficiently reliable. Undoubtedly, this investment is non-zero; it is undisputed that the DI Canisters contain adsorbents from Ingevity, and that these adsorbents are manufactured in the United States. And it is likely this investment is [redacted] given the volumes of adsorbent and canisters at issue. *See, e.g.*, CX-0910C at Q/A 102 [redacted] of canisters incorporating the DI Products from Leehan), 105 [redacted] of canisters incorporating the DI Products from Stant), 108-109 (likely [redacted] of canisters incorporating the DI Products from Futaba), 113 [redacted] of canisters incorporating the DI Products from Kayser). Without a grasp on what the number is, however, it is not proper to consider Ingevity's own investments in the economic prong "significance" analysis.

In their initial and post-hearing briefs, Respondents raise a number of other criticisms towards Ingevity's plant and equipment calculus. Although some of these have merit, they do not undermine Ingevity's analysis to the same degree as Ingevity's failure to allocate to the DI Canisters. I nonetheless discuss each below to aid the Commission's analysis.

Respondents argue that the subsidiaries Ingevity Virginia Corp. and Ingevity Georgia LLC are neither complainants nor licensees of the 844 patent, such that the investments made in conjunction with their facilities cannot be counted for economic prong purposes. RIB at 106. This would include all three of the [redacted] locations.

[redacted]

This is hypertechnical and otherwise unpersuasive. While Respondents argue that "neither Complainant owns or operates the three domestic manufacturing facilities" (RIB at 106), Ingevity Corp. own these entities and their facilities. CX-0911C at Q/A 30-41. It is permissible to allow Ingevity Corp. to treat the investments at the subsidiaries' locations as its own under Commission precedent. *Certain Products Containing Interactive Program Guide and Parental Control Tech.*, Inv. No. 337-TA-845, Initial Determination at 277-278 (June 7, 2013) (affirmed in relevant part) (citing *Certain Liquid Crystal Display Devices and Products Containing the Same*, Inv. No. 337-TA-631, Order No. 18 at 7 (Sept. 23, 2008) (unreviewed); *Certain Electronic Imaging Devices*, Inv. No. 337-TA-726, Order No. 18 at 8-19 (Feb. 7, 2011)).

Respondents argue Dr. Vander Veen's calculations improperly include investments related to BAX 1700 because "no DI Canisters include BAX 1700." RIB at 109 (citing, *inter alia*, Hr'g Tr. at 189:10-190:8; RX-0381C at Q/A 536; RX-0382C at Q/A 212). Relatedly, Respondents challenge the reliability of a certain exhibit, CX-0062 (RX-0144C), used by Dr. Vander Veen to approximate the portion of Ingevity's carbons that are used in non-Tier 3 canisters, and thus practice the 844 patent. RIB at 113-114 (citing, *inter alia*, RX-0382C at Q/A 191-192; JX-0252C at 420:23-24). Neither position is persuasive. Given that a precise accounting is not necessary (*Stringed Instruments*, Inv. No. 337-TA-586, Comm'n Op. at 26 ("[a] precise accounting is not necessary; as most people do not document their daily affairs in contemplation of possible litigation.")), and the data contained within CX-0062C (RX-0144C) is collected and maintained for Ingevity's business purposes (CX-0911C at Q/A 89-98), it is sufficiently reliable to estimate how many BAX-containing canisters are not Tier 3 (or Tier 3 but not otherwise patent practicing, as in the case of Toyota's sealed tank technology), even though the data for 2018 may be based on predictions. Thus, Ingevity's use of this document to remove BAX 1700 containing canisters (used

[redacted]

only in Toyota's non patent-practicing sealed tanks) is acceptable, and has been incorporated in the tables above for the [redacted] and [redacted] locations.

Respondents argue that Dr. Vander Veen "relied upon untested estimates or assumptions when applying allocations," such as an assumption that 10-20% of U.S.-manufactured BAX base carbons are used in non-Tier 3 canisters. RIB at 114 (citing RX-0382C at Q/A 193-194; JX-0252C at 368:11-370:6). Again, like CX-0062C, the assumption is not problematic, given it is a research figure likely developed in the course of Ingevity's business. *See* JX-0252C at 367:14-373:12 (discussing applications and markets for various adsorbents). Indeed, Respondents' expert criticizes the assumption merely for being an assumption but does not otherwise refute it in any way. RX-0382C at Q/A 193. Moreover, Respondents rely on the figure under their patent exhaustion theory. RIB at 89.

Respondents also argue that canisters including another BAX product, BAX 1100LD, should not be counted as "proper DI Products" because BAX 1100LD is made in China. RIB at 110. Respondents, however, acknowledge that "Dr. Vander Veen did not rely on investments in BAX 1100LD." *Id.* And the fact that one component of a DI Canister is made overseas does not necessarily take away from that canister's status as an authorized, patent-practicing product (*i.e.*, a product which can be relied on to satisfy technical prong).

Respondents argue Ingevity has improperly counted investments that occur after the filing of the complaint in this investigation. RIB at 110-111. They also argue in their reply brief that Ingevity's offer to allocate any 2018 amounts by 10/12 (83.3%) is untimely and cannot be accepted. RRB at 66. Such a simple and straightforward adjustment should not be disregarded in this way; it reliably reduces any entity's 2018 investments to avoid post-complaint expenditures, and has been employed throughout this economic prong analysis.

[redacted]

Respondents also argue that expenses related "general and administrative" (G&A) functions and "finance and IT business functions" have been improperly included. RIB at 110 (citing *Certain Dynamic Random Access Memories, Components Thereof, and Prods. Containing Same*, Inv. No. 337-TA-242, 1987 ITC LEXIS 170, at *103-104 (Nov. 1987)). I disagree. The more typical non-cognizable activities are sales, marketing, and other activities that would be expected of mere importers of products. *See, e.g.*, *Certain Clidinium Bromide & Prods. Containing Same*, Inv. No. 337-TA-1109, Order No. 11 at 5-6 ("Paying wholesalers to distribute pharmaceutical products is a cost of sale borne by pharmaceutical manufacturers selling to those entities, regardless of whether or not the pharmaceutical is imported or made domestically. . . . [The] fees are nothing more than standard U.S. expenses of a mere importer, which should not be considered in a domestic industry analysis."). Even then, the Commission has shown latitude in including sales, marketing, or general administrative investments when they are provided in support of other qualifying activities:

> In the case at hand, PopSockets is not relying solely on marketing and sales expenditures to satisfy the economic prong. While PopSockets has included sales and marketing expenditures, it has also provided evidence of significant expenditures in its employment of labor in other qualifying activities, such as engineering, product development, product assembly, supply chain and operation management, and customer service, as well as capital expenditures for fixtures, furniture, software, and equipment used for design, engineering, and operation management, which are sufficient to establish the existence of a domestic industry under subsection (B).

Certain Collapsible Sockets for Mobile Electronic Devices and Components Thereof, Inv. No. 337-TA-1056, Comm'n Op. at 19-20 (July 9, 2018) (public version) ("*Collapsible Sockets*"). Given the undisputed evidence that qualifying manufacturing activities occur at each of Ingevity's [redacted] and [redacted] locations, and G&A, IT, and finance activities are understandably connected thereto, they may be counted for economic prong purposes under the Commission's flexible analysis.

[redacted]

Similar to their disputes on BAX 1700 and BAX 1100LD, Respondents argue Dr. Vander Veen's investment base improperly includes BAX 1500E and BAX 950, as these were not claimed as "DI Carbons" (RIB at 109), and there is no evidence they are contained within a DI Canister (*id.*). Respondents contend BAX 1500E and BAX 950 "form a large portion of the allocation base." *Id.* at 110 (citing Hr'g Tr. at 297:24-299:2, 324:5-328:22, 329:14-331:9; CX-0065C; CX-0532C; RX-0382C at Q/A 112, 117, 149). Ingevity successfully refutes this: "Respondents [] ignore Dr. Vander Veen's testimony that BAX 1500E is the same product as 1500, with the E indicating that certain quality controls were not met so the product is sold at a lower price" (CRB at 69 (citing Hr'g Tr. at 328:23-329:6)), and they "ignore Dr. Vander Veen's testimony that he did not include BAX 950 in his calculations" (*id.* (citing Hr'g Tr. at 329:14-25)). *Compare* CX-0065C *with* CDX-0002C.3.

In sum, Ingevity's own investment in the production of the DI Products cannot be counted in the economic prong analysis because no connection has been shown between the adsorbents produced (*i.e.*, the DI Products) and the adsorbents included in the exact set of canisters relied on to show practice of the patent (*i.e.*, the DI Canisters). On review, the Commission may permit Ingevity to show this connection using the evidence of record, but it is not discernible in Ingevity's post-hearing briefing. Ingevity's own investments are therefore not included in the subsection (A) significance analysis below.

b. Licensee Investments

In addition to its own investments, Ingevity also presents the plant and equipment expenses of four of its implied licensees—Leehan, Kayser, Stant, and MAHLE—towards the manufacture

[redacted]

of each licensee's respective portion of the DI Canisters for economic prong consideration.[11] CIB at 113-114.

For Leehan, Ingevity's expert, Dr. Vander Veen, reports total plant and equipment investments for making canisters in [redacted] of: [redacted] in 2016; [redacted] in 2017; [redacted] in 2018. CX-0910C at Q/A 102-103. He then applied allocation percentages of [redacted] and [redacted] (for years 2016-2018) to these amounts to reflect, according to Ingevity, those "practicing the Patent using DI Products." CIB at 113 (citing CX-0910C at Q/A 102-103; CX-0160C). The expert notes [redacted] CX-0910C at Q/A 103 (citing CX-0676C and CX-0156C). The foregoing reference to "honeycomb" is material because Ingevity claims one type of non-honeycomb adsorbent nonetheless qualifies as a low-IAC adsorbent—BAX-LBE. *See* CIB at 113. Although Dr. Vander Veen offers to use an allocation to remove Mexico-shipped canisters using exhibit JX-0013C (CX-0910C at Q/A 103), this is unnecessary; the products are still manufactured in the United States, which is a practice of claim 43 of the 844 patent. Dr. Vander Veen's calculus also provides data on 2019 (CX-0910C at Q/A 103), but I decline to consider these investments as they are after the November 8, 2018 filing date of Ingevity's complaint. For that same reason, it is appropriate to apply the same post-complaint allocation used in consideration of Ingevity's own investments above.

The investments made by Leehan are nevertheless over-inclusive. Dr. Vander Veen testified that he used allocations of [redacted] and [redacted] as "percentage of Revenue for Canisters

[11] Ingevity does not present plant and equipment investment for licensee Futaba in its initial post-hearing brief. *See* CIB at 113-114.

[redacted]

Incorporating Ingevity Content" to arrive at how much of Leehan's total investment is "related to the Domestic Industry Products." CX-0910C at Q/A 103. These percentages come from CX-0676C, which is email correspondence between Leehan and Ingevity counsel. Several tables are included within CX-0676C, two of which can be combined to show which Leehan model numbers are captured by the [redacted] and [redacted] allocations, for the relevant time frame of 2016-2018. As shown below, two models, 31400-H9700 and 31400-M7000, are captured in these allocations but are not DI Canisters:

Leehan Models Captured By Dr. Vander Veen's Allocation for 2016-2018 **(CX-0676C; CX-0910C at Q/A 103)**	**Leehan DI Canisters** **(CIB at 36)**
31400-F3500 (Ada), (BDm)	31400-F3500
31400-S2500 (TMa)	31400-S2500
31400-D5500 (Jfa)	31400-D5500
31400-D5600 (Jfa)	31400-D5600
31400-H9500 (SC/HC)	31400-H9500
31400-H9600 (SC/HC)	31400-H9600
31400-H9700 (SC/HC)	
31400-M7600 (BDm)	31400-M7600
31400-M7000 (BDm)	
	31400-S9000 (no production prior to 2019)
	3QF201797A (no production prior to 2019)

Unlike this issue with Ingevity, however, Leehan's over-inclusive allocation is easily remedied. The allocation can be reduced to eliminate the canister product categories which include the 31400-H9700 and the 31400-M7000—"SC/HC" and "BDm." CX-0676C at *3. Thus, the allocations become [redacted] for 2016, [redacted] for 2017, and [redacted] for 2018. Respondents' additional challenges to the Leehan investments (RIB at 111; RX-0382C at Q/A 222-224) are not persuasive.

[redacted]

For licensee Kayser, Dr. Vander Veen again reports overall investment for making canisters in [redacted] of: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. CX-0910C at Q/A 113-114. He then applies allocation percentages of [redacted] and [redacted] (for years 2016-2018) to these amounts to reflect those "contain[ing] honeycombs (HCA and BAX carbons)" and are therefore "practicing the Asserted Patent." *Id.* at Q/A 114. As with Leehan and Ingevity above, no 2019 expenditures are considered and the same post-complaint allocation is applied.

As with Leehan and Ingevity, Dr. Vander Veen's allocations for Kayser are over-inclusive. Dr. Vander Veen applies allocations of [redacted] in 2016, [redacted] in 2017, and [redacted] in 2018, in order to capture the amount of honeycomb-containing canisters out of all canisters produced. CX-0910C at Q/A 113-114. Although he does not explain his calculation, it seems these percentages come from the per-model production volumes reported in CX-0668C (2016), CX-0669C (2017), and CX-0670C (2018). *See generally* CX-0910C at Q/A 114. Based on my own calculations from these spreadsheets, it appears Dr. Vander Veen included models which are listed as containing a BAX Product and a honeycomb product, but are not among the Kayser DI Canisters. For example, in 2016, the only BAX and honeycomb product is E2XX 23212909, and this canister indeed makes up [redacted] of the total canister production volume for that year, consistent with Dr. Vander Veen's percentage above. *See* CX-0668C. E2XX 23212909 is not a DI Canister, however, and there is no explanation in the deposition of Kayser's witness (JX-0229C) that suggests mislabeling or that it goes by a different model number. This canister appears to have been included in the same way for 2017, again, where my own calculations show Dr. Vander Veen's [redacted] percentage comes not from adding up the DI Canister models, but from simply adding up all canisters listed which contain BAX and honeycomb adsorbents. *See* CX-0669C.

[redacted]

Thus, Dr. Vander Veen's allocations are over-inclusive, resembling the same deficiency affecting Ingevity and Leehan. To reiterate, economic prong must be tied to the products that have been shown (or, at a minimum, alleged) to practice the 844 patent (*i.e.*, the DI Canisters), and not just any canister that happens to have BAX and a honeycomb.

Respondents' expert, Dr. Akemann, also observes that the overall investment amounts Dr. Vander Veen relies on (*see* CX-0910C at Q/A 114; CX-0025C) are overall amounts for Kayser's [redacted]—which also include, at least, [redacted] (RX-0382C at Q/A 252; JX-0229C at 33:17-34:10, 112:6-113:17, 118:16-120:6). Yet no allocation has been applied to remove investments allocable to these non-canister activities.

Thus, there are at least two grounds showing an over-inclusive allocation for licensee Kayser. While the inclusion of canister models that are not DI Canisters could be rectified with a line-by-line elimination of models from CX-0668C, CX-0669C, and CX-0670C, the record is insufficient to allow for this. So Dr. Vander Veen's opinion regarding Kayser investments cannot be considered in the significance analysis below.

For licensee Stant, Dr. Vander Veen again reports overall investment for making canisters in [redacted] of: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. CX-0910C at Q/A 106 (citing CX-0012C; CX-0017C). To these amounts, Ingevity alleges he applied allocation percentages of: [redacted] and then [redacted] for 2016; [redacted] and [redacted] for 2017; and [redacted] and [redacted] for 2018. CIB at 113-114; *see* CX-0910C at Q/A 106. According to Ingevity, each of the former percentages reflect "using Ingevity DI Products" and the latter, "containing a honeycomb." CIB at 113-114. The same process was applied to the canister manufacture taking place at [redacted] facility. Dr. Vander Veen reports investment of [redacted] in 2016, with allocation percentages of [redacted] and then [redacted] *See* CIB at 113-114; CX-0910C at Q/A

[redacted]

106. As with all prior investments above, no 2019 expenditures are considered the post-complaint allocation removes November and December 2018 amounts.

Unlike the previous entities, however, the investments from licensee Stant are not over-inclusive. The two levels of allocation Dr. Vander Veen applied to Stant's total investments (*see* CX-0910C at Q/A 105-106; CX-0017C) capture the same twelve models which are listed in Ingevity's list of DI Canisters (CIB at 36). Respondents' additional challenges to the Stant investments (RIB at 111; RX-0382C at Q/A 231-233) are not persuasive.

Lastly, for the licensed activity of respondent MAHLE, Ingevity applies a "book value of MAHLE's plant and equipment for production lines without MPAC for making canisters [redacted] which are production lines manufacturing only canisters with an Ingevity honeycomb to practice the Patent . . . ." of [redacted] CIB at 114 (citing CX-0910C at Q/A 111; CX-0144C at 337:10-340:21, 342:2-7); *see* CX-0553C. For this authorized activity, Dr. Vander Veen applies no allocation but draws the [redacted] figure directly from CX-0553C, which is the combined book value (column G) of canister production lines that do not include MPAC (with the exception of the "8 and 20" line). CX-0910C at Q/A 111.

This, however, does not match the list of MAHLE DI Canisters. As determined above, the MAHLE DI Canisters include, as recited in Ingevity's brief, those manufactured for the [redacted] CIB at 35 (citing, *inter alia*, CX-0641C at *3-4; CX-0909C at Q/A 2072-2077; JX-0095). This includes the top table of models listed in CX-0641C (along with the one [redacted] canister that includes MPAC but is subject to written license), but not the bottom table of "service" canisters. But at the deposition of John Jackson, it was explained that the [redacted]

[redacted]

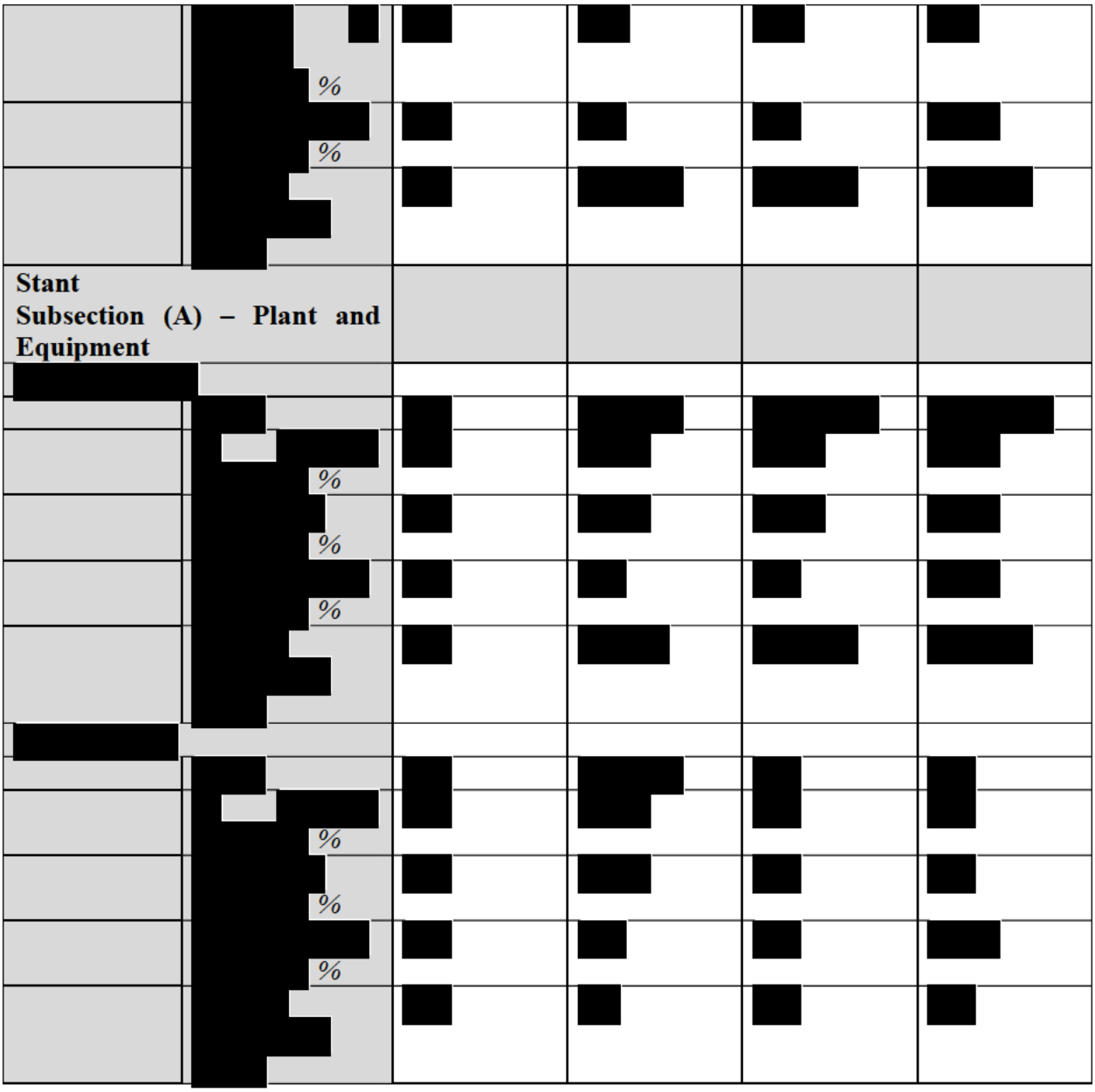
[redacted] JX-0230C at 337:10-338:8. Thus, based on Ingevity's own identification of the MAHLE DI Canisters (CIB at 35), the allocation is over-inclusive and there is no discernible way to rectify this problem given the evidence. So Dr. Vander Veen's opinion regarding MAHLE investments cannot be considered in the significance analysis below.

Respondents present an overarching argument that "Ingevity . . . identifies no legal authority for relying on a Respondent's [(*i.e.*, MAHLE's)] activities to prove DI." RIB at 102. In fact, Respondents themselves provide the legal authority, stating "[o]nly the products and activities of a patentee or its licensee(s) can satisfy the domestic industry requirement" (*id.* at 101-102 (citing *Certain Audiovisual Components and Products Containing Same*, Inv. No. 337-TA-837, Initial Determination at 318-319 (July 19, 2013)). There is no logical reason why a respondent's licensed domestic activity may be not be used for domestic industry, at the same time the respondent's unlicensed activity may be used to prove infringement. Respondents state "[t]he purpose of Section 337 is to protect and encourage investments in domestic industries." RIB at 102 (citation omitted). Indeed, an exclusion order against such a respondent would serve that exact purpose—encourage the respondent to invest in their licensed domestic activity over the unlicensed infringing activity.

Taken together, it is appropriate to consider the following licensee investments in plant and equipment for purposes of subsection (A):

	2015	2016	2017	2018
Leehan Subsection (A) – Plant and Equipment				
[redacted]				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]



It is also helpful at this time to discuss the plant and equipment investments from licensee Futaba, even though these are not presented in Ingevity's initial post-hearing brief. Dr. Vander Veen's analysis of these investments suffers not so much from an over-inclusive allocation, but an allocation that is far removed from Futaba's business. The business and canister data received from Futaba and relied on by Dr. Vander Veen is contained in CX-0041C/RX-0366C. *See* CX-0910C at Q/A 108-109). It reports [redacted]

[redacted] for years 2016-2018. CX-0041C at *2. The document does not actually report how many of the three Futaba DI Canisters (*see* CIB at 35) were produced during 2016-2018 as a percentage of all canisters (it has such forecast data for 2019); nor does it contain any indication that any amount of the three canisters were made during this time. *See id.* at *2-3. At the deposition of Futaba's witness, however, it was confirmed that those production volume numbers listed in CX-0041C (corresponding to the labor and production investments mentioned above) represent "only those canisters" listed at CX-0041C at *3. JX-0227C at 35:23-36:8.

This is far from an ideal set of information from which to determine how much of Futaba's 2016-2018 investment can properly be attributed to the three Futaba DI Canisters, as it lumps these canisters in with three others that do not contain HCA, HCA-LBE, or BAX-LBE. *See* CX-0041C at *3 (identifying 17300-TMB-H013, 42035AL00C, 14950-9FT0A). This is perhaps why Dr. Vander Veen was only able to apply Ingevity's own "Tier 3" forecast data as surrogate allocation. CX-0910C at Q/A 109 (citing CX-0062C). Respondents challenge the use of this allocation (*see generally* RIB at 111-112; RX-0382C at Q/A 241), but it is not so problematic as to justify discounting all of Futaba's investments. As noted below in the labor and capital discussion, the Tier 3 allocation consists of percentages of: [redacted] in 2016, [redacted] in 2017, and [redacted] in 2018. *See* CX-0910C at Q/A 61, 92; CX-0062C. These values are conservative, given Futaba's 2019 projections which would have the three Futaba DI Canisters consisting of *at least* [redacted] *See* CX-0041C at *3 (percentage assuming no contribution from the 42035AL01C DI Canister). Dr. Vander Veen's calculations for the Futaba investments, discussed now but only

[redacted]

counted in the labor and capital context below per Ingevity's briefing, are therefore sound. *See* CIB at 113-114.

2. Subsection (B), Labor and Capital

a. Ingevity Investments

For subsection (B), Ingevity considers its employment of labor and capital at each of the [redacted] and [redacted] locations. *See* CIB at 114-118. Similar to its subsection (A) analyses, it begins with overall investments in labor and capital for each location, then allocates those amounts down to reflect that which can allegedly be attributed to canisters practicing the 844 patent. *See id.* This allocation, however, suffers in the same way as the plant and equipment allocations—no connection has been shown between the investments and the specific set of products, which are the DI Canisters as opposed to any product in which an Ingevity honeycomb (or BAX LBE) might end up. For this reason alone, it is not proper to count these expenses. Nevertheless, to aid the Commission, I address Dr. Vander Veen's labor and capital analysis below.

For [redacted] Dr. Vander Veen calculated overall labor expenses of: [redacted] in 2015; [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. CX-0910C at Q/A 96. Dr. Vander Veen describes this labor force as "working in operations, performance materials, finance, and IT business functions," "manufacturing employees," and those [redacted] *See id.* at Q/A 94-95. He also identifies overall capital expenses of [redacted] in 2015; [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. *Id.* at Q/A 96. Onto these amounts he applied the same [redacted] and [redacted] allocation percentages identified above in the subsection (A) analysis to estimate the amount attributable to the production of honeycomb adsorbent at this location. *Id.* at Q/A 97-99; CX-0062C; CX-0063C. Ingevity notes, as it did for plant and equipment, that these

[redacted]

labor and capital investment amounts "can be allocated to address Canada, China, Europe, and MAHLE's Accused Canisters." CIB at 115 n. 49. It is helpful, in an abundance of caution, to similarly apply an allocation percentage to remove post-complaint expenditures as well. In sum, the alleged investments in labor and capital for the Waynesboro location are as follows:

Ingevity Subsection (B) – Labor and Capital	2015	2016	2017	2018
[redacted]				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Ingevity also presents investments related to labor and capital at the [redacted] and [redacted] Dr. Vander Veen describes the [redacted] and [redacted] labor force roughly as "working in operations, performance materials, finance, and IT business functions," "manufacturing employees," and those [redacted] CX-0910C at Q/A 84; *see id.* at Q/A 89. He identifies labor expenses of [redacted] and [redacted] in 2015-2018 for [redacted] and [redacted]

[redacted]

[redacted] and [redacted] in 2015-2018 for [redacted] *Id.* at Q/A 91, 86. He identifies capital expenses for [redacted] of [redacted] and [redacted] in the same timeframe; and those for [redacted] as [redacted] and [redacted] *See id.* at Q/A 86, 91.

Applying the same procedures outlined above under subsection (A) to the labor and capital expenditures for the [redacted] and [redacted] locations, yields the following even though, for reasons explained above, the amounts are not considered for economic prong purposes:

Ingevity Subsection (B) – Labor and Capital	2015	2016	2017	2018
[redacted]				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	9[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

See CIB at 116-117 (citing CX-0910C at Q/A 84-88; JX-0027C; JX-0018C).

Ingevity	2015	2016	2017	2018

[redacted]

Subsection (B) – Labor and Capital				
[redacted]				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted] A	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

	Attributable PP&E				

See CIB at 117 (citing CX-0910C at Q/A 89-93; JX-0027C; JX-0018C).

In addition to the foregoing amounts of labor and capital, Ingevity also claims it "employs [redacted] R&D employees working on the DI Products in South Carolina" who "have worked on [redacted] for the DI Products. CIB at 117 (citing CX-0910C at Q/A 75-76); *see* CX-0910C at Q/A 77. Dr. Vander Veen calculates salary and benefits for these R&D employees as: [redacted] in 2015; [redacted] in 2016; [redacted] in 2017, and [redacted] in 2018. CX-0910C at Q/A 79; JX-0011C. Dr. Vander Veen testified that [redacted] spent between [redacted] and [redacted] of their time on the Domestic Industry Products, and [redacted] employees spent [redacted] of their time on the Domestic Industry Products," based on project logs, conversations with Ingevity personnel, and other witness testimony. *Id.* at Q/A 80-81. He thus applied varying allocation percentages to each of the [redacted] employees to capture the amount of their salaries attributable to products which would be understood as practicing the 844 patent.

Unlike the calculations for [redacted] and [redacted] Ingevity does not offer to further allocate these labor expenses to remove canisters destined for the Canada, China, and Europe Markets, or MAHLE's accused canisters. *See* CIB at 117-118. It is appropriate to do so, however, given the lack of any indication that the research and development efforts do not apply to such products. *See* CX-0910C at Q/A 76-77 (describing nexus between research and development and all "Domestic Industry Products" as a whole), 80-81 (describing same). An

[redacted]

allocation removing any post-complaint expenditures is warranted as well.[12] The resulting investment with all of these allocations applied is shown below, even though the amounts are not considered for economic prong purposes due to a lack of connection to the DI Canisters:

Ingevity Subsection (B) – Labor and Capital	2015	2016	2017	2018
[redacted]				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]				
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted] %	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Apart from those criticisms from Respondents discussed above, which apply to both subsection (A) and (B) analyses (*see* RIB at 109-114), Respondents raise a number of criticisms specific to Ingevity's R&D labor and capital calculus. They do not, however, undermine the

[12] Dr. Vander Veen removes a December salary for [redacted] employees on the grounds that they no longer worked at Ingevity by that time (CX-0910C at Q/A 79), so a post-complaint allocation of [redacted] is redundant for their salaries. This duplication cannot easily be undone, however, and is otherwise not a significant loss given the overall amounts at issue.

[redacted]

claimed investments beyond Ingevity's consistent failure to allocate down to the DI Canisters. I discuss each below to aid the Commission's analysis.

Respondents argue an Ingevity [redacted] has been improperly included as this group, as confirmed by Ingevity witness, Mr. Williams, to do [redacted] in an [redacted] RIB at 114 (citing RX-0382C at Q/A 166-168; RX-0746C at 638:22-640:3; Hr'g Tr. at 169:24-170:10; CX-0911C at Q/A 5-6). This activity need not be excluded in a subsection (A) or (B) analysis, however, given the Commission's general guidance that technical customer service, or even technical sales staff, may be cognizable when it supports otherwise qualifying domestic activities. *See Collapsible Sockets*, Inv. No. 337-TA-1056, Comm'n Op. at 17-20; *Certain Non-Volatile Memory Devices and Products Containing Same*, Inv. No. 337-TA-1046, Initial Determination at 185-186 (Apr. 27, 2018) ("*Non-Volatile Memory*") (aff'd in relevant part); *Certain Marine Sonar Imaging Devices, Including Downscan and Sidescan Devices, Products Containing the Same, and Components Thereof*, Inv. No. 337-TA-921, Comm'n Op. at 57-58 (Jan. 6, 2016). Notably, the efforts of the [redacted] include [redacted] CX-0913C at Q/A 57-73.

With that said, Ingevity's contention that while this group was included in the labor allocation base, it would have been excluded by Dr. Vander Veen's allocation of "time spent by each R&D employee to include only the R&D specific to DI products while removing other projects unrelated to DI Products," is unpersuasive. CRB at 71 (citing CX-0910C at Q/A 80-81; CX-0912C at Q/A 240-253). The allocation percentages provided in CDX-0002C.7 are so high that to view them as excluding [redacted] is to leave almost no time for personnel

[redacted]

to fulfill this role. *See* CX-0913C at Q/A 36 (noting [redacted] 42-73 (variety of services offered), 75 (activities are "frequent and regular").

Respondents argue that Ingevity's R&D expenses cannot possibly apply to the "claimed DI Product" because the DI Products (BAX and honeycombs) are not new or in development and have been established for some time (*see* RIB at 115-116 (citing RX-0382C at Q/A 170-171, 201-202; CX-0910C at Q/A 77; JX-0250C at 38:12-25, 406:11-407:19, 425:9-429:5, 483:11-484:10629:17-646:1; JX-0252 at 373:18-376:21, 447:3-448:15, 451:13-16; JX-0001 at 8:10-18). But Ingevity has presented credible testimony that despite the long term offerings of BAX and honeycomb products, [redacted] *See* CX-0912C at Q/A 240-253; *compare* JX-0252C at 373:18-24 *with* JX-0252C at 374:4-376:8. Further, Ingevity has adequately explained Respondents' cited example of [redacted] (RIB at 116 (citing RX-0382C at Q/A 173; JX-0250C at 631:1-18)) as [redacted] (*see* CRB at 71 (citing JX-0250C at 631:1-14)).

I am similarly not moved by Respondents' insistence that a certain spreadsheet, excluded from evidence via Order No. 21, is critical to support the claims of these R&D efforts such that its absence means Ingevity's witness testimony is unreliable. *See* RIB at 116. It is not seriously disputed that Mr. Williams has personal knowledge of the same information that spreadsheet would have contained.

b. Licensee Investments

In addition to its own investments, Ingevity presents the labor and capital expenses of its licensees—Leehan, Kayser, Stant, Futaba, and MAHLE—for economic prong consideration. CIB at 118-120.

[redacted]

For Leehan, Ingevity's expert, Dr. Vander Veen, reports total labor investments for making canisters in [redacted] of: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. CX-0910C at Q/A 103; *see* CX-0160C. He reports total capital investments as: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. CX-0910C at Q/A 103; *see* CX-0160C. Ingevity notes that the same allocation percentages as for plant and equipment can be applied (CIB at 119), and this is done in the table that follows, taking into account those allocation adjustments deemed necessary in the plant and equipment analysis above.

For Futaba, Dr. Vander Veen reports it manufactures fuel vapor canisters in [redacted] which make up about [redacted] of the factory's output. *See* CIB at 119 (citing CX-0910C at Q/A 108). He explains that those canisters in turn make up about [redacted] of all canisters Futaba produces. CX-0910C at Q/A 108. He identifies labor investments of: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. *Id.* at Q/A 109. He also identifies capital investments "specifically related to the canister business – which includes operational costs such as utilities, materials, depreciation, overhead, and equipment" of: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. *Id.* He and Ingevity note that these amounts should be then allocated to reflect "the percentage of vehicles meeting Tier 3 emissions standards as estimated by Ingevity (in the same way as above)." *Id.*; CIB at 119. Through division of Dr. Vander Veen's ultimate investment figures, this appears to mean those allocation percentages identified in Q/A 61 of his witness statement: [redacted] in 2016, [redacted] in 2017, and [redacted] in 2018. *See* CX-0910C at Q/A 61, 92; CX-0062C. For reasons explained above in the plant and equipment context, these allocation percentages are reliable, even conservative. As with all other calculations of the DI Canisters, a post-complaint allocation for year 2018 is applied, as well.

[redacted]

For Stant, Dr. Vander Veen reports total "direct manufacturing labor and indirect support labor" for making canisters in [redacted] of: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. CX-0910C at Q/A 106. He also reports "operations (including supplies used for manufacturing, utility expenses, etc.)" expenses of: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. *Id.* For [redacted] he reports labor investments of: [redacted] in 2016; and [redacted] in 2017. *Id.* For capital investment at the same location he reports: [redacted] in 2016; and [redacted] in 2017. *Id.* To these figures, he applies the same allocations as in plant and equipment, and these allocations are adopted.

For respondent MAHLE, Dr. Vander Veen reports "direct labor" involved in the manufacture of canisters that do not contain MPAC at [redacted] in 2017; and [redacted] in 2018. CX-0910C at Q/A 111. He further identifies operating expenditures "includ[ing] machine costs that are allocated to each unit produced, freight costs, as well as material overhead costs" of: [redacted] *Id.* As with plant and equipment, he applies no further allocations, but the same post-complaint allocation as with all other similar activities that stretch into 2018 is applied. As explained above in the plant and equipment context, however, Dr. Vander Veen's allocations are over-inclusive, as they encompass more canister models than those identified as DI Canisters. As this cannot be remedied using the available record, it is inappropriate to consider MAHLE's labor and capital investments for economic prong purposes.

For Kayser, Dr. Vander Veen reports total labor investment for making canisters in [redacted] of: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. CX-0910C at Q/A 114. He also reports capital investment of: [redacted] in 2016; [redacted] in 2017; and [redacted] in 2018. *Id.* To these figures he applies the same allocations as in plant and equipment,

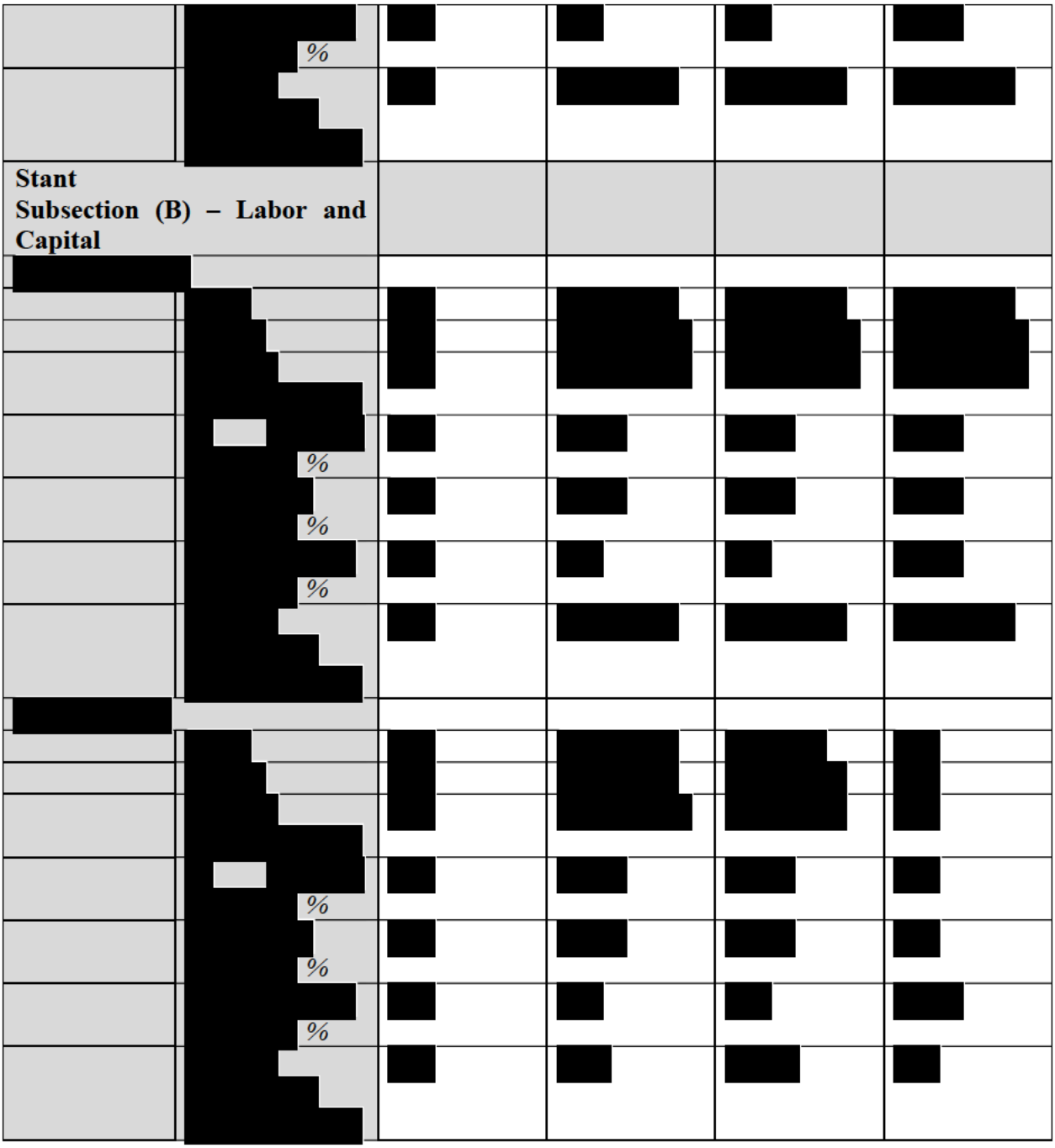
[redacted]

and these are accepted. Again, however, Dr. Vander Veen's Kayser allocations are over-inclusive as they encompass more canister models than those identified as DI Canisters, and more business activity than can be attributed to canister production. As this cannot be remedied using the available record, it is inappropriate to consider Kayser's labor and capital investments for economic prong purposes.

Respondents do no present any disputes over labor and capital investments from these entities, apart from those discussed above in the plant and equipment context. Taken altogether then, the available licensee investments in labor and capital for economic prong consideration are below:

	2015	2016	2017	2018
Leehan Subsection (B) – Labor and Capital				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted] %				
[redacted] %				
[redacted]				
Futaba Subsection (B) – Labor and Capital				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted] %				

[redacted]



3. Subsection (C), Research and Development

Alongside subsections (A) and (B), Ingevity contends it satisfies economic prong under subsection (C) due it its own research and development efforts "on projects relating to the DI Products." CIB at 120. Ingevity references the same [redacted] scientists and engineers discussed

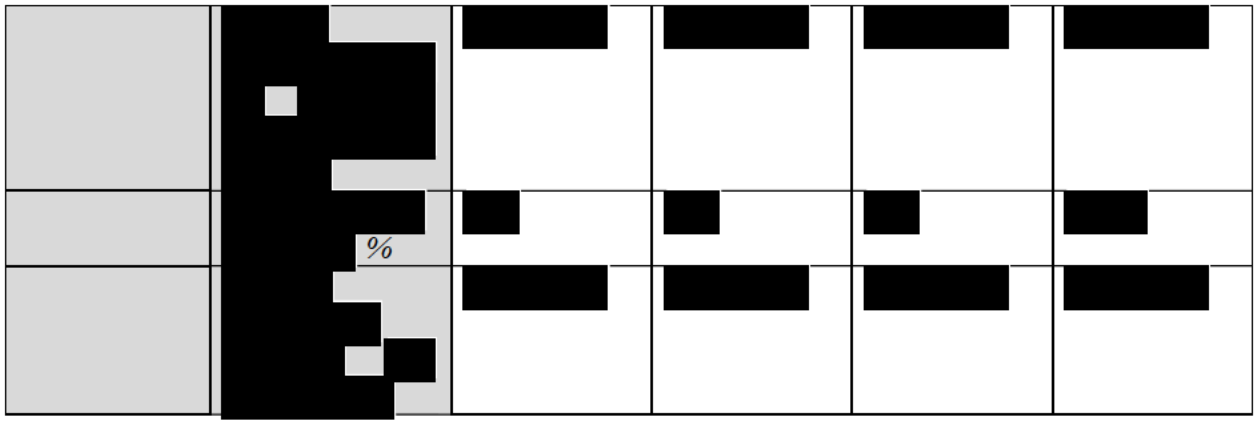
[redacted]

above for the [redacted] location, and references Dr. Vander Veen's calculations of attributable salary as: [redacted] in labor for 2015; [redacted] in 2016; $[redacted] in 2017; and [redacted] in 2018. *Id.* at 120-121 (citing CX-0910C at Q/A 77-82, 127-128; JX-0011C). Unlike the evaluation of this labor in the subsection (B) context, only one additional allocation is necessary here—removal of efforts occurring after the filing of the complaint. The "nexus" requirement for subsection (C) can be met through allocation to patent-practicing articles, but it is not necessary, as there is only a need to have a nexus to the asserted intellectual property. *Integrated Circuit Chips*, Inv. No. 337-TA-859, Comm'n Op. at 36-37. For this reason, the lack of a connection between Ingevity's plant, equipment, labor, and capital expenses, and the actual set of DI Canisters, does not apply for subsection (C) purposes.

With respect to that required "nexus," Ingevity argues "[t]he included R&D projects have a nexus to the '844 Patent because they involve R&D relating to DI Products used to practice the patent." CIB at 121 (citing CX-0912C at Q/A 240). Ingevity continues, "[t]hese R&D activities include improvements in [redacted] and in the [redacted] practicing the '844 Patent." *Id.* (citing CX-0912C at Q/A 243-245; CX-0910C at Q/A 130-131). Given that the research and development efforts funded by Dr. Vander Veen's calculated investments are related to adsorbents which would serve either as the "initial adsorbent volume" or the "subsequent adsorbent volume" in, for example, claim 1 of the 844 patent, the requisite nexus is met. The resulting investments in exploitation of the 844 patent are shown in the table below:

Ingevity Subsection (C) – Research and Development	2015	2016	2017	2018
[redacted]				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]



On this topic, the majority of Respondents' concerns have already been addressed above under subsection (B). *See* RIB at 115-116. As to subsection (C) specifically, Respondents complain that "Dr. Vander Veen's nexus analysis is based entirely on conversations with Ingevity," and not on any expertise. RIB at 117 (citing RX-0382C at Q/A 199; CX-0910C at Q/A 129-132). Respondents also contend the age of the 844 patent must mean the R&D efforts from 2015-2019 cannot be in relation to it, and are otherwise "not tied to the '844 patent or any DI Product." *Id.* (citing RX-0382C at Q/A 200). Respondents also highlight a [redacted] as one mentioned by Dr. Vander Veen in support of nexus, but admitted to relate to a [redacted] which is not one of the DI Products. *See id.* (citing Hr'g Tr. at 337:2-338:12).

None of these points affects the determination that Ingevity's cited R&D has a connection to adsorbents that would serve either as the "initial adsorbent volume" or the "subsequent adsorbent volume" according to the 844 patent claims. Subsection (C) research and development is not limited to the development of the patent itself, as Dr. Akemann would suggest. *See* RX-0382C at Q/A 200. With respect to Dr. Vander Veen's reliance on conversations with Mr. Williams on this topic (CX-0910C at Q/A 131), Mr. Williams testified to the same information (CX-0912C at Q/A 245) and there is no reason to question its reliability. Further, Dr. Vander Veen explained at the hearing that [redacted] was a project excluded from his subsequent

[redacted]

second-round allocation, based on his conversations with Mr. Williams. Hr'g Tr. at 336:23-338:12; *see* CX-0912C at Q/A 246-253.

B. "Significant" or "Substantial"

The next step in the evaluation of domestic industry is to determine if the investment amounts identified above are "significant," as in subsections (A) and (B), or "substantial," as in subsection (C). The most recent precedential decision by the Court of Appeals for the Federal Circuit addressing this determination is *Lelo*, which restated law applicable to a number of issues surrounding the economic prong of domestic industry. *See* 786 F.3d at 883-85. In particular, the Federal Circuit held that the statutory terms "'significant' and 'substantial' refer to an increase in quantity, or to a benchmark in numbers" and "[a]n 'investment in plant and equipment' therefore is characterized quantitatively, *i.e.*, by the amount of money invested in the plant and equipment." *Lelo*, 786 F.3d at 883. Continuing, the Federal Circuit held "[a]ll of the foregoing requires a quantitative analysis in order to determine whether there is a 'significant' increase or attribution by virtue of the claimant's asserted commercial activity in the United States." *Id.* In short, "[q]ualitative factors cannot compensate for quantitative data that indicate insignificant investment and employment." *Id.* at 885. The Commission has since made clear that some sort of comparative analysis must be made before significant or substantial can be found. *See, e.g.*, *Certain Gas Spring Nailer Products and Components Thereof*, Inv. No. 337-TA-1082, Notice of Comm'n Determination at 3 (Dec. 12, 2019) ("*Gas Spring Nailers*"); *Certain Carburetors and Products Containing Such Carburetors*, Inv. No. 337-TA-1123, Comm'n Op. at 17-19 (Oct. 28, 2019) ("*Carburetors*")

As explained above, Ingevity's own investments under subsections (A) and (B) are not sufficiently tied to the DI Canisters to warrant consideration of significance. The same is true for

[redacted]

licensees Kayser and MAHLE. What remains are: the plant and equipment expenses of licensees Leehan and Stant under subsection (A); the labor and capital expenses of Leehan, Stant, and Futaba under subsection (B); and the research and development expenses of Ingevity under subsection (C). Whether each has been shown to be "significant" (for subsections (A) and (B)), or "substantial" (for subsection (C)) is discussed below.

Although made in a context where all of the alleged investment from all of the licensees is accepted and considered, Ingevity's initial post-hearing brief argues the investments "are between [redacted] and [redacted] of manufacturing production in 2018 at the identified plants, making [them] significant." CIB at 114 (citing CX-0910C at Q/A 138). Ingevity's reply post-hearing brief phrases the rationale slightly differently, stating, "Dr. Vander Veen also found the investments significant based on the percentage of investments made in the U.S. for canisters that practice the Patent as opposed those that do not practice the patent." CRB at 70 (citing CX-0910C at Q/A 138). In both discussions, the same explanation from Dr. Vander Veen is cited, however, and that testimony reads:

> Q138. Did you form an opinion as to whether the investments third party manufacturers have made in the domestic industry are significant?
>
> A138. Yes. As discussed above, third party manufacturers have also made domestic investments related to the articles protected by the Asserted Patent and are additional investments in the domestic industry. Based on the limited information produced to date, [redacted] (CX-0156C, CX-0012C, CX-0036C and JX-0028C [[Deposition of Dong Yoon Kwak, July 9, 2019, at page 29; Deposition of Julien Chemali, July 8, 2019, at pages 43-44; Deposition of James Freyman, July 9, 2019, at Exhibit 5; KAYSER0001]]). Furthermore, the third party manufacturing related to the Domestic Industry Products accounts for between [redacted] and [redacted] of overall production in 2018 (based on information produced by Leehan, Stant, and Kayser). These investments totaled between [redacted] and [redacted] in 2018 and further support the significance of the domestic industry investments in plant, equipment, and the employment of labor and capital.

[redacted]

CX-0910C at Q/A 138. In contrast, Respondents' expert, Dr. Akemann, offers no opinion on whether such customers' investments are significant or not. *See* CRB at 70 (citing Hr'g Tr. at 803:24-804:24); *see* RX-0382C at Q/A 213-255.

Dr. Vander Veen's reference to [redacted] and [redacted] of overall production seems to mean the allocation percentages he used for Stant in 2018 (*see* CX-0910C at Q/A 106 (product of [redacted] and [redacted])) and Kayser in 2018 (*see id.* at Q/A 114). Leehan's respective percentage, under the same approach, would be [redacted] *Id.* at Q/A 103. I understand these percentages to reflect the percentage of overall facility activity. *See* CX-0676C at *3 (Leehan); CX-0017C at *3 (Stant). Dr. Vander Veen's reference to [redacted] is explained as the sum of plant, equipment, labor, and capital from Leehan, Stant, and Kayser, together. *Id.* at Q/A 115. The [redacted] figure is the same sum but, with MAHLE and Futaba added. *Id.* at Q/A 115.

In keeping with the same analytical framework as Dr. Vander Veen (which is limited to evaluating only year 2018), and considering those allocation and evidentiary issues discussed above, the relevant manufacturing percentages of products practicing the patent as compared to total facility production for Leehan, Futaba, and Stant become [redacted] and [redacted] respectively.[13] Further, the combined plant, equipment, labor, and capital expenses for the same year becomes [redacted][14] As to this latter calculation, the Commission typically determines "significant" or "substantial" investment for each of subsections (A), (B), and (C), individually (*see Certain Robotic Vacuum Cleaning Devices and Components Thereof such as Spare Parts*,

[13] For Futaba, the [redacted] figure is based on the product of Dr. Vander Veen's assertion "that [redacted] of the [redacted] business is dedicated to cannister related business," and Ingevity's tier 3 canister proportion of [redacted] for the year 2018.

[14] This is the sum of [redacted] (Leehan 2018 plant and equipment), [redacted] (Stant 2018 plant and equipment), [redacted] (Leehan 2018 labor and capital), [redacted] (Futaba 2018 labor and capital), and [redacted] (Stant 2018 labor and capital).

[redacted]

Inv. No. 337-TA-1057, Comm'n Op. at 11 (July 16, 2018) ("Given that these [subsections] are listed in the disjunctive, satisfaction of any one of them will be sufficient to meet the domestic industry requirement.") ("*Robotic Vacuums*")), but Dr. Vander Veen's combination of them is reasonable. A significant sum spread across domestic plant and labor has the same beneficial value to the United States as a significant sum directed to labor alone. Thus, there is no obvious error in a combined subsection (A) and (B) approach, and Respondents have not raised one either.

But significance has nonetheless not been adequately shown through these metrics. The Commission recently made clear that the absolute value of investment, devoid of any context, is insufficient to show significance. *Carburetors*, Inv. No. 337-TA-1123, Comm'n Op. at 17-18; *see Gas Spring Nailers*, Inv. No. 337-TA-1082, Notice of Comm'n Determination at 3. The Commission also stated that "[s]ignificance is based on the marketplace conditions regarding the articles protected by the Asserted Patents. The fact that a complainant may have substantial sales of other products is not pertinent to this analysis." *Carburetors*, Inv. No. 337-TA-1123, Comm'n Op. at 28. A natural extension of this rule is that an entity's activities or investments in support of other products (*i.e.*, that which would lead to sales) are also not pertinent to the analysis.

As discussed, Dr. Vander Veen proposes to evaluate significance using the percentage of manufacturing output for each licensee. *See* CX-0910C at Q/A 138. This equates to a comparison of activity in support of articles protected by the 844 patent and activity in support of "other products." According to the Commission's instruction in *Carburetors*, this is not pertinent. As this is the only context Dr. Vander Veen proposes (*see id.*), he has not sufficiently explained significance. Thus, the domestic industry requirement has not been shown under subsections (A) and (B).

[redacted]

As to subsection (C), Ingevity argues its research and development labor expenditures of between [redacted] and [redacted] per year between 2015 and 2018 occurs [redacted] CIB at 121 (citing CX-0910C at Q/A 137). Ingevity reasons that [redacted] these domestic investments are substantial compared to Ingevity's foreign investments." *Id.* (citing *Carburetors*, Inv. No. 337-TA-1123, Comm'n Op. at 18-19). Ingevity adds that it represents [redacted] "further demonstrating its substantiality." *Id.* Dr. Vander Veen's testimony, cited by Ingevity, is slightly different. He explains [redacted] CX-0910C at Q/A 137. Respondents' expert, Dr. Akemann, calls substantiality into question based on 2018's reported R&D expense of [redacted] as being only [redacted] of "Ingevity's total 'Research and technical expenses'" for that year, and [redacted] of Ingevity's Net Sales. RX-0382C at Q/A 208.

The record supports finding Ingevity has invested [redacted] in research and development in exploitation of the 844 patent between 2015-2018. This is substantial, especially in view of Dr. Vander Veen's uncontested statement that [redacted] occurs overseas (CX-0910C at Q/A 137). Dr. Akemann's metrics, comparing DI Product R&D to all other R&D (for all products/projects) or overall sales are effectively comparisons to "other products" and are thus "not pertinent" given *Carburetors*. Additionally, while the instruction in *Carburetors* was given in regard to "significant" under subsections (A) and (B), the Federal Circuit has held "substantial" under subsection (C) is an analogous concept. *Lelo*, 786 F.3d at 884 ("the terms "significant" and "substantial" refer to an increase in quantity, or to a benchmark in

[redacted]

numbers"). Accordingly, I find economic prong domestic industry is satisfied under subsection (C).

VI. CONCLUSIONS OF LAW

1. The Commission has *in rem* jurisdiction over the accused products, fuel vapor canisters containing MPAC.

2. The importation or sale requirement of Section 337 is satisfied for all respondents.

3. Ingevity, its customers, and operators of the domestic industry articles have been shown to practice claims 1-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 37, 38, 39, 41, 43, 45, 48, 49, 50, 51, and 53 of U.S. Patent No. RE 38,844.

4. The domestic industry requirement is satisfied with respect to the 844 patent.

5. Respondent MAHLE directly and/or indirectly infringes claims 1-5, 8, 11, 13, 18, 19, 21, 24, 31, 33, 36, 38, 43, 45, 48, and 50 of the 844 patent.

6. Respondents Kuraray and Nagamine indirectly infringe claims 1-5, 8, 11, 13, 18, 19, 21, 24, 31, 33, 36, 38, 43, 45, 48, and 50 of the 844 patent.

7. Claims 1-5, 8, 11-14, 16, 18, 19, 21, 24-27, 29, 31, 33, 36, 37, 38, 39, 41, 43, 45, 48-51, and 53 of the 844 patent have been shown to be invalid under 35 U.S.C. § 102 and/or 35 U.S.C. § 103.

8. Independent claim 18, and those depending therefrom, have been shown to be invalid under 35 U.S.C. § 112.

9. Independent claims 1, 31, and 43, and those depending therefrom, have not been shown to be invalid under 35 U.S.C. § 112.

10. The 844 patent has not been shown to be unenforceable.

11. Patent exhaustion does not bar Ingevity's sought relief.

12. There is no violation of Section 337 with respect to the 844 patent.

[redacted]

VII. RECOMMENDED DETERMINATION ON REMEDY AND BOND

The Commission's Rules provide that subsequent to an initial determination on the question of violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, the administrative law judge shall issue a recommended determination concerning the appropriate remedy in the event that the Commission finds a violation of section 337, and the amount of bond to be posted by respondent during Presidential review of the Commission action under section 337(j). *See* 19 C.F.R. § 210.42(a)(1)(ii).

The Commission has broad discretion in selecting the form, scope, and extent of the remedy in a section 337 proceeding. *Viscofan, S.A. v. Int'l Trade Comm'n*, 787 F.2d 544, 548 (Fed. Cir. 1986). Under Section 337(d)(1), if the Commission determines as a result of an investigation that there is a violation of section 337, the Commission is authorized to enter either a limited or a general exclusion order. 19 U.S.C. § 1337(d)(1). A limited exclusion order instructs the U.S. Customs and Border Protection ("CBP") to exclude from entry all articles that are covered by the patent at issue and that originate from a named respondent in the investigation. A general exclusion order instructs the CBP to exclude from entry all articles that are covered by the patent at issue, without regard to source. *Certain Purple Protective Gloves*, Inv. No. 337-TA-500, Comm'n Op. at 5 (Dec. 22, 2004). Under section 337(f)(1), the Commission may issue a cease and desist order in addition to, or instead of, an exclusion order. 19 U.S.C. § 1337(f)(1). The Commission generally issues a cease and desist order directed to a domestic respondent when there is a "commercially significant" amount of infringing, imported product in the United States that could be sold, thereby undercutting the remedy provided by an exclusion order. *See Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-293, USITC Pub. 2391, Comm'n Op. on Remedy, the Public Interest and Bonding at 37-42 (June 1991); *Certain Condensers, Parts Thereof*

[redacted]

and Prods. Containing Same, Including Air Conditioners for Automobiles, Inv. No. 337-TA-334 (Remand), Comm'n Op. at 26-28, 1997 WL 817767, at *11-12 (U.S.I.T.C. Sept. 10, 1997).

Additionally, during the 60-day period of Presidential review under 19 U.S.C. § 1337(j), "articles directed to be excluded from entry under subsection (d) . . . shall . . . be entitled to entry under bond prescribed by the Secretary in an amount determined by the Commission to be sufficient to protect the complainant from any injury." *See* 19 U.S.C. § 1337(j)(3). "The Commission typically sets the bond based on the price differential between the imported infringing product and the domestic industry article or based on a reasonable royalty. However, where the available pricing or royalty information is inadequate, the bond may be set at one hundred (100) percent of the entered value of the infringing product." *Certain Industrial Automation Systems and Components Thereof Including Control Systems, Controllers, Visualization Hardware, Motion and Motor Control Systems, Networking Equipment, Safety Devices, and Power Supplies*, Inv. No. 337-TA-1074, Comm'n Op. at 13 (Apr. 23, 2019) ("*Automation Systems*") (public version) (citation omitted).

A. Limited Exclusion Order

Should a violation be found, Ingevity argues limited exclusion orders should issue against all Respondents and their affiliates "based on their ability to import and distribute those products." CIB at 122 (citing, *inter alia*, 19 U.S.C. § 1337(d)(1); *Spansion, Inc. v. Int'l Trade Comm'n*, 629 F.3d 1331, 1359-60 (Fed. Cir. 2010)). Ingevity continues, "[n]o exemptions to the limited exclusion order are warranted," as Respondents have known of the 844 patent for many years. *See id.* at 123. Ingevity adds that no certification provision is appropriate because "no canister system that uses MPAC avoids infringement 100% of the time but if one is used, Respondents should be required to certify MPAC would be used in canister systems that never infringe." *Id.*

[redacted]

Respondents oppose the entry of limited exclusion orders against each of MAHLE, Kuraray, and Nagamine, on the same grounds they disputed the importation requirement discussed above. *See* RIB at 119-120. As determined above, the importation requirement is satisfied for each of MAHLE, Kuraray, and Nagamine. Further, the Commission has instructed that limited exclusion orders are intended to prevent importation of infringing products as well as components of those products, as "any other rule would allow manufacturers of infringing products to circumvent the order by simply importing the components instead of the finished products and assembling the finished products once the components are already in the United States." *Certain Road Milling Machines and Components Thereof*, Inv. No. 337-TA-1067, Comm'n Op. at 13 (Aug. 7, 2019) (citation omitted). As MPAC is a significant imported component of MAHLEs finished infringing products, there is no reason a limited exclusion order should not apply to importers of MPAC (*i.e.*, Kuraray) or those who sell it for importation (*i.e.*, Nagamine). Accordingly, under 19 U.S.C. § 1337(d)(1), it is my recommended determination that limited exclusion orders should issue against each respondent should a violation be found.

Respondents also request a delay of 12-18 months for any exclusion order to take affect "so non-Respondent automobile manufacturers can design and certify replacement canisters and avoid unintended adverse consequences, particularly here where environmental pollution is at stake." RIB at 124 (citing RX-0449; JX-0252C at 225:9-15). Respondents further request a "grandfather clause" to "mitigate the adverse impact to third parties using Respondents' products, or who ordered a product from Respondents prior to the entry of a remedial order." *Id.* at 125. It seems clear each of these requests is based on public interest grounds, but the Commission has not directed me to make findings on the public interest. *See* 83 Fed. Reg. 64,356 (Dec. 14, 2018); RIB

[redacted]

at 124 (citing RX-0449 (respondent MAHLE Public Interest Statement)). Thus, I decline to determine whether a delay or grandfather clause is warranted.

Last, Respondents argue any exclusion order should include a certification provision, because "Respondents import unaccused products, including canisters that do not use MPAC and MPAC lots for which it is impossible to determine infringement." RIB at 125 (citing RX-0370C at Q/A 92-112; Hr'g Tr. at 196:25-197:13). Ingevity argues a certification is not appropriate because "no canister system that uses MPAC avoids infringement 100% of the time, but if one is used, Respondents should be required to certify MPAC would be used in canisters systems that never infringe." CIB at 123.

The Commission has instructed that "[c]ertification provisions aid U.S. Customs and Border Protection ('CBP') in enforcing Commission orders but 'do not mandate that CBP accept certification as proof that the articles in question are not covered' by the limited exclusion order." *Certain Robotic Vacuum Cleaning Devices and Components Thereof Such as Spare Parts*, Inv. No. 337-TA-1057, Comm'n Op. at 55 (Feb. 1, 2019). Additionally, according to the Commission, "[t]he standard provision does not allow an importer to simply certify that it is not violating the exclusion order. Rather, CBP only accepts a certification that the goods have been previously determined by CBP or the Commission not to violate the exclusion order" and "it has been Commission practice for the past several years to include certification provisions in its exclusion orders to aid CBP." *See Road Milling Machines*, Inv. No. 337-TA-1067, Comm'n Op. at 15, 15 n. 5 (citations omitted). As Respondents do not appear to argue for any non-standard certification provision, it is my recommendation that any limited exclusion order should include the Commission's standard certification provision.

[redacted]

B. Cease and Desist Order

Ingevity contends "[a] cease-and-desist order is necessary because it is undisputed that [redacted] *See* CIB at 123 (citing CX-0296C; CX-0297C; CX-0910C at Q/A 143). Ingevity adds that "there is no requirement that any inventory be maintained or that any inventory be 'commercially significant.'" *Id.* (citing *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. No. 337-TA-833, Comm'n Op. at 147 (Apr. 10, 2014); *Certain Table Saws Incorporating Active Injury Mitigation Technology and Components Thereof*, Inv. No. 337-TA-965, Comm'n Op. at 6-7 n.2 (Feb. 1, 2017)). Ingevity argues it cannot be faulted for failing to provide sales information as Respondents failed to provide it (*see id.* at 123-124), and, in the event a violation is found, Kuraray, through CCC, has an incentive "to ramp up production overseas and stockpile [] additional volume and [it] has the capacity to do so" (*id.* at 124 (citing JX-0230C at 420:23-25, 421:2-19)). Ingevity also suggests respondents MAHLE NA, MAHLE Mexico, and MAHLE Canada maintain inventory because OEM agreements require them "to have a certain amount of replacement parts" (*id.* (citing JX-0230C at 300:5-18; CX-0641C at *3-4; JX-0232C at 38:13-24, 39:1-3, 39:5-13)).

In opposition, and as to respondent MAHLE, Respondents highlight that Ingevity's remedy expert, Dr. Vander Veen, "admitted he presented no opinion or discussion regarding MAHLE'[s] inventory of MPAC or any Accused Canister" (RIB at 120 (citing Hr'g Tr. at 312:10-18)), while their own expert, Dr. Akemann, "testified that MAHLE's small inventory levels of Accused Products is not, in his opinion, commercially significant" (*id.* at 120-121 (citing RX-0382C at Q/A 267-272)). Respondents also allege the evidence rebuts the accusation that "MAHLE is

[redacted]

stockpiling, or even would or could stockpile." *Id.* at 121 (citing RX-0382C at Q/A 284; JX-0224C at 29:23-30:2; JX-0241C at 94:21-95:9; JX-0040C; JX-0226C at 53:13-24; RX-0733C; RX-0734C).

As to Nagamine, Respondents state flatly "Nagamine has no U.S. presence, and thus, no U.S. inventory." RIB at 121 (citing, *inter alia*, RX-0378C at Q/A 44; RX-0379C at Q/A 30; RX-0382C at Q/A 80, 287; JX-0134C; JX-0242C at 74:19-21). As to Kuraray, Respondents admit Kuraray, through its subsidiary CCC, "is the only Respondent that imports MPAC or holds U.S. inventory," yet this inventory is [redacted] and, therefore, not commercially significant. *See id.* at 121-122 (citing, *inter alia*, RX-0382C at Q/A 275-277). Again, Respondents dispute Kuraray, through CCC, is stockpiling MPAC in the United States or has an incentive to, based on the Supply Agreement with MAHLE. *Id.* at 122-123 (citing RX-0382C at Q/A 284-286; RX-0733C; RX-0734C; JX-0226C at 53:13-24; RX-0200C).

Complainants bear the burden on the issue of cease and desist orders. *Certain Microfluidic Devices*, Inv. No. 337-TA-1068, Comm'n Op. at 23 (Jan. 10, 2020). Such orders "are generally issued when, with respect to the imported infringing products, respondents maintain commercially significant inventories in the United States or have significant domestic operations that could undercut the remedy provided by an exclusion order." *Id.* at 22-23 (citations omitted). Ingevity does not argue a cease and desist order should apply to Nagamine, and I similarly do not recommend one because it simply sells its product to Kuraray in Japan. As to Kuraray, and its subsidiary CCC, Respondents have admitted that they hold [redacted] of their annual MPAC production in the United States, which amounts to approximately [redacted] RIB at 122 (citing RX-0382C at Q/A 277). Further, despite Respondents' characterization (RIB at 122), Ingevity's

[redacted]

expert, Dr. Vander Veen, did provide a standard to evaluate commercial significance—the number of months worth of inventory. CX-0910C at Q/A 143. Whether the [redacted] of MPAC comprises [redacted] of inventory is of little significance; as Respondents' expert, Dr. Akemann, testified, [redacted] is "in line with overall average manufacturing industry levels" and "consistent with modern business practices." RX-0382C at Q/A 276 (citing RX-0761; RX-0762). Although this latter observation was given, presumably, as evidence that [redacted] of inventory is not commercially significant, it is actually persuasive evidence of significance. If one competitor in the market does not have [redacted] of inventory on-hand, and all others do, that one actor is at a commercial disadvantage compared to the others (*i.e.*, commercial significance). And [redacted] of MPAC is surely not trivial. Accordingly, it is my recommendation that a cease and desist order should issue against Kuraray and its wholly-owned subsidiary CCC.

As to MAHLE, Ingevity has not met its burden to show a commercially significant inventory, or really, a meaningful inventory at all. Ingevity cites deposition testimony of MAHLE witness Mr. Lau, for support (CIB at 124 (citing JX-0232C at 38:13-39:13)), but Mr. Lau also testified that MAHLE [redacted] even for canister models that are 15-25 years old. JX-0232 at 39:18-41:14. This [redacted] testimony is consistent with the only other evidence Ingevity cites for this issue (*see* CIB at 124 (citing JX-0230C at 300:1-18)) and does not show a commercially significant inventory. Further, given the limited exclusion order keeping out any further importations of MPAC or the Foreign Accused Products, and the cease and desist order controlling Kuraray MPAC stockpile in the United States, there is little room left for MAHLE to continue manufacturing and selling any infringing Accused Product. "A complainant seeking a cease and desist order must demonstrate, based on the record, that this remedy is necessary to address the violation found in the investigation so as to not

[redacted]

undercut the relief provided by the exclusion order." *Road Milling Machines*, Inv. No. 337-TA-1067, Comm'n Op. at 20 (citations omitted). Accordingly, it is my recommendation that a cease and desist order not issue against MAHLE.

C. Bond

As to the amount of bond during the presidential review period, Ingevity seeks a 100% rate. CIB at 124. Ingevity contends "[a] price comparison is not appropriate" because "Respondents produced limited pricing information for MPAC and none for the Accused Canisters" and "Respondents use varying weights of MPAC in the Accused Canisters to replace Ingevity's honeycomb, so an MPAC-HCA price comparison would vary from canister to canister and is not possible on this record." *Id.* at 124 (citing CX-0910C at Q/A 146-149; CX-1151C at *61-62), 125 (citing CX-0910C at 146-149). Ingevity contends a reasonably royalty rate is also not appropriate because "this record [] does not enable a comparison between per-canister royalty rates in licenses with a weight of imported MPAC." *Id.* at 125 (citing Hr'g Tr. at 804:25-506:19). Ingevity argues and attempts to support both of these positions, but avers there is no requirement that it do so in the first place. *See* CRB at 75 (citing *Certain Rubber Antidegradants, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-533, Comm'n Op. at 40 (July 21, 2006)).

Respondents argue the bond "should be set at zero, or a negligible amount." RIB at 123. Specifically, Respondents propose a reasonable royalty rate of $1.00 per canister, [redacted] and more reasonable than [redacted] *See id.* (citing, *inter alia*, RX-0382C at Q/A 294; JX-0136C).

[redacted]

"The complainant bears the burden of establishing the need for a bond." *Robotic Vacuums*, Inv. No. 337-TA-1057, Comm'n Op. at 68. "When reliable price information is available in the record, the Commission has often set the bond in an amount that would eliminate the price differential between the domestic product and the imported, infringing product." *Id.* (citations omitted). Ingevity takes a confusing approach to this issue, as it argues a 100% bond is appropriate because of the impracticality of a price comparison (CIB at 124-125; CRB at 75), while also presenting expert testimony that a price differential would warrant the same 100% rate (CX-0910C at Q/A 148 (using average MPAC weight per-canister, per-weight MPAC pricing, and honeycomb pricing to calculate price differential). In fact, the expert's price comparison is appropriate and practical. MAHLE's interrogatory responses reveal MPAC was designed to be a replacement for Ingevity's more-expensive honeycombs. CX-0638C at *46; *see* JX-0236C at 55:23-56:12; JX-0244C at 93:2-96:23, 106:22-108:10 [redacted] Dr. Vander Veen's testimony (CX-0910C at Q/A 148) reflects a sufficiently reliable method for determining the value of MPAC needed to replace an Ingevity honeycomb. As his calculations result in approximately $2 worth of MPAC serving as a replacement "subsequent adsorbent volume" for approximately $9 worth of Ingevity honeycomb, the price differential is over 100%. Moreover, 100% of $2 is $2, which is not far off from Respondents' proposal of a $1 royalty fee per canister. RIB at 123-124 (citing RX-0382C at Q/A 298-299). Accordingly, it is my recommendation that a bond be set at 100% during the presidential review period.

[redacted]

VIII. INITIAL DETERMINATION AND ORDER

Based on the foregoing,[15] it is my Initial Determination that there is no violation of Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337, in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain multi-stage fuel vapor canister systems and activated carbon components thereof, in connection with the asserted claims of U.S. Patent No. RE 38,844.

Furthermore, it is my determination that a domestic industry in the United States exists that practices or exploits the asserted patent.

The undersigned hereby certifies to the Commission this Initial Determination, together with the Record of the hearing in this investigation consisting of the following: the transcript of the evidentiary hearing, with appropriate corrections as may hereafter be ordered; and the exhibits accepted into evidence in this investigation as listed in the appendices hereto.[16]

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.

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[15] The failure to discuss any matter raised by the parties or any portion of the Record herein does not indicate that said matter was not 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 brief which were otherwise unsupported by Record evidence or legal precedent have been accorded no weight.

[16] The pleadings of the parties filed with the Secretary need not be certified as they are already in the Commission's possession in accordance with Commission rules.

[redacted]

Confidentiality Notice:

This Initial Determination is being issued as confidential, and a public version will be issued pursuant to Commission Rule 210.5(f). Within seven (7) days of the date of this Initial Determination, the parties shall jointly submit: (1) a proposed public version of this opinion with any proposed redactions bracketed in red; and (2) a written justification for any proposed redactions specifically explaining why the piece of information sought to be redacted is confidential and why disclosure of the information would be likely to cause substantial harm or likely to have the effect of impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions.[17]

SO ORDERED.

Cameron Elliot
Administrative Law Judge

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[17] Under Commission Rules 210.5 and 201.6(a), confidential business information includes: information which concerns or relates to the trade secrets, processes, operations, style of works, or apparatus, or to the production, sales, shipments, purchases, transfers, identification of customers, inventories, or amount or source of any income, profits, losses, or expenditures of any person, firm, partnership, corporation, or other organization, or other information of commercial value, the disclosure of which is likely to have the effect of either impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions, or causing substantial harm to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained, unless the Commission is required by law to disclose such information. *See* 19 C.F.R. § 201.6(a). Thus, to constitute confidential business information the disclosure of the information sought to be designated confidential must likely have the effect of either: (1) impairing the Commission's ability to obtain such information as is necessary to perform its statutory functions; or (2) causing substantial harm to the competitive position of the person, firm, partnership, corporation, or other organization from which the information was obtained.

CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF

INV. NO. 337-TA-1140

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **Initial Determination** has been served upon the following parties as indicated, on FEB 26 2020.

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

FOR COMPLAINANTS INGEVITY CORP. & INGEVITY SOUTH CAROLINA, LLC	
Jeffrey T. Thomas, Esq. **GIBSON, DUNN & CRUTCHER LLP** 3161 Michelson Dr. Irvine, CA 92612	( ) Via Hand Delivery (✓) Express Delivery ( ) Via First Class Mail ( ) Other: _____
FOR RESPONDENTS MAHLE FILTER SYSTEMS NORTH AMERICA, INC., MAHLE FILTER SYSTEMS JAPAN CORP., MAHLE SISTEMAS DE FILTRACION DE MEXICO S.A. DE C.V., and MAHLE FILTER SYSTEMS CANADA, ULC	
David A. Hickerson, Esq. **FOLEY & LARDNER LLP** 3000 K Street NW Washington, DC 20007	( ) Via Hand Delivery (✓) Express Delivery ( ) Via First Class Mail ( ) Other: _____
FOR RESPONDENTS KURARAY CO., LTD., KURARAY AMERICA, INC., NAGAMINE MANUFACTURING CO., LTD., & CALGON CARBON CORPORATION	
Goutam Patnaik, Esq. **PEPPER HAMILTON LLP** 600 14th Street, NW Washington, DC 20005	( ) Via Hand Delivery (✓) Express Delivery ( ) Via First Class Mail ( ) Other: _____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF	**Investigation No. 337-TA-1140**

NOTICE OF COMMISSION DETERMINATION NOT TO REVIEW AN INITIAL DETERMINATION GRANTING IN PART A MOTION FOR SUMMARY DETERMINATION

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined not to review an initial determination ("ID") (Order No. 29) issued by the presiding administrative law judge ("ALJ"), granting in part a motion for summary determination.

FOR FURTHER INFORMATION CONTACT: Robert Needham, Office of the General Counsel, U.S. International Trade Commission, 500 E Street, SW., Washington, D.C. 20436, telephone (202) 708-5468. 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 (*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 14, 2018, based on a complaint filed by Ingevity Corp. and Ingevity South Carolina, LLC, both of North Charleston, South Carolina (together, "Ingevity"). 83 FR 64356 (Dec. 14, 2018). The complaint, as supplemented, alleges violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain multi-stage fuel vapor canister systems and activated carbon components thereof by reason of infringement of certain claims of U.S. Patent No.

RE38,844. *Id.* The Commission's notice of investigation named as respondents MAHLE Filter Systems North America, Inc. of Murfreesboro, Tennessee; MAHLE Filter Systems Japan Corp. of Saitama, Japan; MAHLE Sistemas de Filtracion de Mexico de C.V. of Monterrey, Mexico; MAHLE Filter Systems Canada, ULC of Tilbury, Canada; Kuraray Co., Ltd. of Tokyo, Japan and Kuraray America, Inc. of Houston, Texas (together, Kuraray); and Nagamine Manufacturing Co., Ltd. of Manno, Japan. *Id.* The Commission subsequently amended the notice of investigation to add Calgon Carbon Corporation as a respondent and to remove Kuraray. Order No. 5 (Feb. 26, 2019), *not reviewed* Notice (Mar. 21, 2019). The Office of Unfair Import Investigations is not participating in this investigation. *Id.*

On September 19, 2019, Ingevity moved for summary determinations on many issues, including summary determination that the respondents failed to show that certain prior art rendered invalid any asserted claims under 35 U.S.C. 102(a), (b), and (f), and that respondents failed to establish their asserted defenses of unclean hands, waiver, estoppel, laches, and acquiescence.

On October 10, 2019, the ALJ issued the subject ID and granted-in-part Ingevity's motion for summary determination. The ALJ found that the respondents failed to present evidence under 35 U.S.C. 102(f), and did not oppose Ingevity's motion for summary determination with respect to the remaining defenses set forth above. Accordingly, the ALJ granted summary determination of legal insufficiency with respect to the following defenses: (1) invalidity under 35 U.S.C. 102(a), (b) and (f); (2) unclean hands; (3) waiver; (4) estoppel; (5) laches; and (6) acquiescence. The ALJ denied the remainder of the summary determination motion. No party petitioned for review of the subject ID.

The Commission has determined not to review the subject 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: October 31, 2019

CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF

Inv. No. 337-TA-1140

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served upon the following parties as indicated, on 11/1/2019.

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

On Behalf of Complainants Ingevity Corp. and Ingevity South Carolina, LLC:

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Washington, DC 20036-5306

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On Behalf of Respondents MAHLE Filter Systems North America, Inc., MAHLE Filter Systems Japan Corp., MAHLE Sistemas de Filtracion de Mexico S.A. de C.V., and MAHLE Filter Systems Canada, ULC:

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On Behalf of Respondents Nagamine Manufacturing Co., Ltd., Kuraray Co., Ltd., and Calgon Carbon Corporation:

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UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of	
CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF	Inv. No. 337-TA-1140

ORDER NO. 29: INITIAL DETERMINATION GRANTING-IN-PART COMPLAINANTS' MOTION FOR PARTIAL SUMMARY DETERMINATION

(October 10, 2019)

On September 19, 2019, complainants Ingevity Corp. and Ingevity South Carolina, LLC ("Ingevity") moved (1140-022) for partial summary determination on a variety of issues. Respondents MAHLE Filter Systems North America, Inc., MAHLE Filter Systems Japan Corp., MAHLE Sistemas de Filtración de México S.A. de C.V., and MAHLE Filter Systems Canada ULC (collectively, "MAHLE"), Kuraray Co., Ltd. and Calgon Carbon Corporation (collectively, "Kuraray"), and Nagamine Manufacturing Co., Ltd. ("Nagamine") (collectively, "Respondents") opposed the motion on October 1, 2019. On October 2, 2019, Respondents moved (1140-026) for leave to file two exhibits to their opposition out of time, with a representation that the requested leave is unopposed. Respondents' unopposed motion for leave (1140-026) is granted. Ingevity's motion for partial summary determination (1140-022) is granted-in-part.

Summary determination shall be rendered if there is no genuine issue of material fact and the moving party is entitled to summary determination as a matter of law. 19 C.F.R. § 210.18(b). A motion for summary determination may be supported by pleadings, depositions, interrogatory answers, admissions, and affidavits. 19 C.F.R. § 210.18(b)-(c). In order to raise a genuine issue

of material fact, a party must submit conflicting evidence in the form of affidavit or other admissible evidence. *Ferring B.V. v. Barr Labs., Inc.*, 437 F.3d 1181, 1193 (Fed. Cir. 2006); *Amgen v. U.S. Int'l Trade Comm'n*, 565 F.3d 846, 849 (Fed. Cir. 2009) (Commission summary determinations are governed by the criteria of summary judgment). Where the moving party bears the burden of proof on a particular issue, the moving party must show that there is no genuine issue of material fact as to every element. *See Meyers v. Asics Corp.*, 974 F.2d 1304, 1307 (Fed. Cir. 1992). Where the nonmoving party bears the burden of proof on a particular issue, the moving party must show that the nonmoving party failed to produce evidence on an essential element of its claim or defense. *See Eli Lilly and Co. v. Barr Labs., Inc.*, 251 F.3d 955, 962 (Fed. Cir. 2001).

Ingevity first argues that it is entitled to summary determination that a domestic industry exists. (*See generally* Mot. Mem. at 2-23.) In order to satisfy the technical prong of this requirement, it is sufficient to show that the domestic industry practices any claim of the patent in suit. *Certain Ammonium Octamolybdate Isomers*, Inv. No. 337-TA-477, Comm'n Op. at 55 (Aug. 28, 2003). In order to satisfy the economic prong, the domestic industry must involve: (1) significant investment in plant or equipment; (2) significant employment of labor or capital; or (3) substantial investment in the invention's exploitation, including engineering, research and development, or licensing. *Id.* (citing 19 U.S.C. § 1337(a)(3)).

Respondents correctly note that Ingevity's expert reports—which form the principal factual bases for Ingevity's arguments—were not executed under oath. (Opp'n at 4-5.) Although this is an easily-remedied defect, and the law is not entirely clear that unsworn expert reports are incompetent for summary determination purposes, the reports' unsworn status

[redacted]

counsels against granting summary determination. *See GASA Inc. v. United States*, 79 Fed. Cl. 325, 362 n.61 (Fed. Cl. 2007). On the technical prong more specifically, not all disputed claim terms have been construed, so it is impossible to determine whether any particular claim is practiced. (*See* Opp'n at 14.) In particular, all asserted claims possess either the term "adsorbent volume" or the term "vapor adsorbent material," neither of which have been construed. (Order No. 15 at 25, 30.) Oddly, Ingevity's expert report, provided as the evidentiary basis for summary determination, noted that "vapor adsorbent material" had not been construed but nonetheless purported to adopt that term's construction and then opined that over 25 different domestic industry canisters practice claims possessing that limitation. (Mot., Ex. 1 at 28, 98-99.) As for the economic prong, Respondents' expert report is also not sworn. (*See* Opp'n, Ex. 2.) Even treating both sides' expert reports as competent evidence, however, Respondents' expert evidence raises genuine issues of material fact; for example, issues as to whether the domestic industry is sufficiently "significant" and/or "substantial," and whether it has been allocated correctly. (*See, e.g.*, Opp'n, Ex. 2 at 6.) For at least the above reasons, the domestic industry portion of Ingevity's motion is denied.

Ingevity next argues that a "Hydrocarbon Bleed Emission Scrubber with Low Restriction," documented on [redacted] in a "Record of Invention" by [redacted] of third-party Delphi (the "Delphi Canister"), is not prior art under 35 U.S.C. § 102. (Mot. Mem. at 24; Mot., Ex. 10.) The Record of Invention states that the Delphi Canister was conceived on [redacted] (Mot., Ex. 10 at DELPHI-002119.) The Delphi Canister is the subject of U.S. Patent No. 6,896,852, which issued on May 24, 2005, based on a provisional application filed March 29, 2000. (Mot., Ex. 11 at 86:8-17; Mot., Ex. 15.) The patent in suit, the 844 patent, was

[redacted]

re-issued on October 25, 2005, based on a non-provisional application filed March 18, 2002, and for present purposes Ingevity adopts March 18, 2002, as the 844 patent's conception date. (Mot. Mem. at 28, 28 n.7.)

Ingevity asserts that the Delphi Canister does not satisfy four statutory prior art provisions; namely, 35 U.S.C. § 102, paragraphs (a), (b), (f), and (g)(2). (Mot. Mem. at 23-35.) These provisions correspond to the four recited by Respondents in their contention interrogatory responses as grounds for invalidating the 844 patent. (Mot., Ex. 23 at 66-75.) In their Opposition, however, Respondents represent they "will not pursue invalidity under 35 U.S.C. § 102(a) or (b)" (Opp'n at 1) and thus do not contest Ingevity's motion on these two paragraphs. As for paragraph (f), Respondents do not cite any evidence in support of their Section 102(f) defense. (*Compare* Mot. Mem. at 27 (citing Mot., Ex. 23 at 67-70) *with* Opp'n at 30.)

Moreover, Respondents' Opposition fails to provide any legal analysis whatsoever of 35 U.S.C. § 102(f). (*See* Opp'n at 19-31.) Respondents bear the ultimate burden of persuasion regarding invalidity and also a burden of production in summary proceedings to show a genuine issue of material fact on the issue. *See Apotex USA, Inc. v. Merck & Co., Inc.*, 254 F.3d 1031, 1037-38 (Fed. Cir. 2001). Viewing the evidence on which Respondents rely regarding prior art provisions (a), (b), and (f) even in the light most favorable to them, they have either failed to meet their burden or simply not contested Ingevity's assertions, so it is appropriate to grant summary determination that the Delphi Canister is not prior art under 35 U.S.C. § 102, paragraphs (a), (b), and (f).

The same cannot be said, however, of 35 U.S.C. § 102(g)(2), which as of 2002 required proof that the invention had been previously "made in this country by another inventor who had

[redacted]

not abandoned, suppressed, or concealed it." Ingevity points to two elements as lacking evidence: (1) the Delphi Canister inventors did not appreciate what they had conceived, that is, the invention was not "made" by another; and (2) the identity of the Delphi Canister inventors is unclear, that is, the invention was not made by "another." (Mot. Mem. at 24-26.) As to the first element, even assuming that the Delphi Canister inventors did not appreciate what they had conceived, Respondents have produced evidence that the Delphi Canister was successfully tested, that is, the invention it embodies was actually reduced to practice, no later than [redacted] more than two years before the 844 patent's conception date. (Opp'n at 20-21 (citing Opp'n, Ex. 10 at DELPHI-002120).) Viewing such evidence in the light most favorable to Respondents, the precise conception date of the Delphi Canister is immaterial; even if in this instance "conception [was] delayed until a reduction to practice," the invention embodied by the Delphi Canister was still "made" before conception of the claims of the 844 patent. *See Invitrogen Corp. v. Clontech Labs.*, Inc., 429 F.3d 1052, 1061, 1064 (Fed. Cir. 2001) (citing 35 U.S.C. § 102(g)(2)). As to the second element, the Record of Invention identifies the Delphi Canister inventors, and is sufficient evidence to at least raise a triable issue of fact. (Mot., Ex. 10 at DELPHI-00211-18.) Summary determination on this issue is therefore not warranted.

Ingevity's next argument pertains to the knowledge requirement for proof of indirect infringement. (*See* Mot. Mem. at 35-37.) Specifically, Ingevity contends that a subjective belief of patent invalidity cannot defeat a claim of indirect infringement. (*See id.* (citing *Life Techs. Corp. v. Promega Corp.*, 137 S. Ct. 734, 742 n.7 (2017), *Commil USA, Inc. v. Cisco Sys., Inc.*, 135 S. Ct. 1920, 1926 (2015); *Global-Tech Appliances, Inc. v. SEB S.A.*, 563 U.S. 754, 764 (2011)).) Respondents do not explicitly dispute this contention. (*See* Opp'n at 31-33.) Ingevity

[redacted]

therefore reasons that at least some respondents' reception of a legal opinion stating "'all claims of the 844 patent are invalid'" (Mot. Mem. at 36 (citing Mot., Ex. 12 at 13-15)) "is not a defense to" indirect infringement in light of the case law (*id.* at 36-37 (citing Mot., Ex. 12 at 13-15)). Respondents also do not explicitly dispute this contention. (*See* Opp'n at 31-33.)

Nonetheless, summary determination on this issue is inappropriate. Respondents' Opposition points to evidence that they subjectively believed they were not infringing any claim of the 844 patent, including an additional "oral" opinion from "legal counsel" of noninfringement, that is, "that MAHLE's MPAC product could not [have] been covered by the claims." (*See* Opp'n at 32-33 (citing Opp'n, Ex. 24 at Q/A 73).) So there exists a genuine issue material fact regarding the knowledge element of indirect infringement. *E.g.*, *Omega Patents, LLC v. CalAmp Corp.*, 920 F.3d 1337, 1349 (Fed. Cir. 2019) (discussing the knowledge element of induced infringement). And a mere declaration that counsel's invalidity opinion is not a defense to a claim of indirect infringement, which is seemingly the only other relief Ingevity seeks, is not an appropriate subject for summary determination, even if such a declaration is uncontested. (*See* Mot. Mem. at 36-37.)

Ingevity's next contention, pertaining to patent misuse, is similarly inappropriate for summary determination. Ingevity argues that its "exclusive supply agreements" do not constitute patent misuse because the agreements do not qualify as licenses, and that its allegedly discriminatory pricing policy does not qualify as patent misuse. (Mot. Mem. at 39-41 (citing *Kimble v. Marvel Entm't, LLC*, 135 S. Ct. 2401, 2411 (2015)).) Admittedly, *Kimble* seemingly permits any sort of commercial contract after patent expiration other than one involving royalty payments, and Respondents point to no evidence that Ingevity's supply agreements include such

[redacted]

post-expiration royalties. (*See* Opp'n at 41-43.) But Ingevity cites no authority for the proposition that discriminatory pricing is irrelevant to a patent misuse defense, and in any event adjudication of narrow legal theories, as opposed to claims or defenses (*see* Mot. Mem. at 39-41), is more suitable for post-hearing proceedings than for summary determination.

Otherwise, Respondents have raised genuine issues of material fact regarding their patent misuse defense. Respondents admit that the statutory term "market power" does not appear verbatim in their contention interrogatory responses, but they do assert the equivalent in those responses—namely, that Ingevity has "substantially foreclosed others from access to the customer base necessary to effectively grow and compete." (*Compare* Mot. Mem. at 37-39 (citing 35 U.S.C. § 271(d)) *with* Opp'n at 37-38 (citing Opp'n, Ex. 29 at 131), 37 n.12.) And in support, the contention responses and Opposition cite sworn testimony by an Ingevity employee that is sufficient to raise a genuine issue of material fact regarding market power. (Opp'n at 37-38, 39-40; Opp'n, Ex. 29 at 131 (citing Mot., Exs. 3 and 43); Mot., Ex. 31 at 31-32.)

Ingevity further contends that Respondents' patent exhaustion defense is ripe for summary determination. (Mot. Mem. at 41-42.) The patent exhaustion doctrine provides that the initial sale of a patented item terminates, or exhausts, the patent rights to that item. *Quanta Computer, Inc. v. LG Electronics, Inc.*, 553 U.S. 617, 625 (2008). Exhaustion is triggered when the only reasonable and intended use of an item is to practice a patent, and the item embodies essential features of the invention. *Id.* at 631. Ingevity argues that its base carbon products have noninfringing uses, that is, the practicing of the 844 patent is not their "only reasonable and intended use." (Mot. Mem. at 41-42 (citing *Quanta*, 553 U.S. at 625, 631).) But as Respondents point out, Ingevity "'intends that is Base Carbon products . . . be used in fuel vapor canister

[redacted]

systems,'" and according one of its executives, at least one Ingevity customer possesses an implied license to practice the 844 patent because of its purchase of Ingevity adsorbents. (Opp'n at 46 (citing Mot., Ex. 5 at 147; Mot., Ex. 31 at 194:17-195:1).) This is sufficient to raise a genuine issue of material fact as to whether the only reasonable and intended use of Ingevity's products is to practice the 844 patent.

Lastly, Ingevity argues that various non-patent specific defenses asserted by Respondents fail as a matter of law. (Mot. Mem. at 42-43.) Here again, Respondents have represented they are not asserting these defenses (*see* Opp'n at 1) and otherwise do not contest Ingevity's position (*see generally* Opp'n), so it is appropriate to grant summary determination that the defenses of unclean hands, waiver, estoppel, laches, and acquiescence are unproven.

In summary, it is my determination that Ingevity's motion (1140-022) be granted-in-part in that the following defenses are summarily determined to be legally insufficient and will not be considered at the hearing:

1. Invalidity under 35 U.S.C. § 102(a).
2. Invalidity under 35 U.S.C. § 102(b).
3. Invalidity under 35 U.S.C. § 102(f).
4. Unclean hands, waiver, estoppel, laches, and acquiescence.

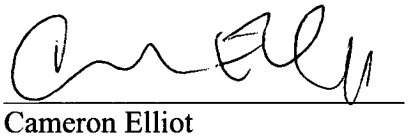
Ingevity's motion is otherwise denied. This Initial Determination is hereby certified to the Commission.

Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall be the determination of the Commission thirty (30) days after the date of service of the initial determination, unless a party files a petition for review of the Initial Determination within five (5) business days after

service of the initial determination 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 herein. Any issue or argument not raised in a petition for review, or response thereto, will be deemed to have been abandoned and may be disregarded by the Commission in reviewing the Initial Determination pursuant to 19 C.F.R. §§ 210.43(b) and (c).

Within seven days of the date of this document, the parties shall submit to the Office of the Administrative Law Judges a joint statement as to whether or not they seek to have any portion of this document deleted from the public version. If the parties do seek to have portions of this document deleted from the public version, they must submit to this office a copy of this document with red brackets indicating the portion or portions asserted to contain confidential business information. The submission may be made by email and/or hard copy by the aforementioned date and need not be filed with the Commission Secretary.

SO ORDERED.



Cameron Elliot
Administrative Law Judge

CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF

INV. NO. 337-TA-1140

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **Order No. 29** has been served upon the following parties as indicated, on OCT 18 2019.

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

FOR COMPLAINANTS INGEVITY CORP. & INGEVITY SOUTH CAROLINA, LLC	
Jeffrey T. Thomas, Esq. **GIBSON, DUNN & CRUTCHER LLP** 3161 Michelson Dr. Irvine, CA 92612	( ) Via Hand Delivery (✓) Express Delivery ( ) Via First Class Mail ( ) Other: _____
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UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of	
CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF	**Inv. No. 337-TA-1140**

ORDER NO. 15: CONSTRUING TERMS OF THE ASSERTED CLAIMS

(June 21, 2019)

TABLE OF CONTENTS

I. INTRODUCTION

This Investigation was instituted by the Commission on December 14, 2018 to determine whether certain multi-stage fuel vapor canister systems and components thereof infringe U.S. Patent No. RE38,844 ("the '844 patent"). *See* 83 Fed. Reg. 64356-7 (Dec. 14, 2018). The complainants are Ingevity Corp. and Ingevity South Carolina, LLC (together, "Ingevity" or "Complainants"). The respondents are MAHLE Filter Systems North America, Inc., MAHLE Filter Systems Japan Corp., MAHLE Sistemas de Filtracion de Mexico S.A. de C.V., MAHLE Filter Systems Canada, ULC, Kuraray Co., Ltd., Kuraray America, Inc., and Nagamine Manufacturing Co., Ltd. (together, "Respondents") (all collectively, "the Parties").

Pursuant to Ground Rule 8, a *Markman* hearing was held June 4, 2019 regarding the interpretation of certain terms of the patent at issue. Prior to the hearing, the Parties filed a joint claim construction chart setting forth a limited set of terms to be construed, with an updated joint chart after the hearing, and a corrected updated joint chart thereafter (EDIS Doc. No. 678649). The Parties also filed initial and reply claim construction briefs, wherein each party offered its construction for the claim terms in dispute, along with support for its proposed interpretation.[1] In lieu of a live presentation, and per my request, the Parties further prepared and filed a joint tutorial on the technology at issue. (EDIS Doc. No. 677977.)

[1] For convenience, the briefs and amended chart submitted by the Parties are referred to hereafter as:

CIMB	Complainants' Initial *Markman* Brief
CRMB	Complainants' Reply *Markman* Brief
RIMB	Respondents' Initial *Markman* Brief
RRMB	Respondents' Reply *Markman* Brief
JC	Corrected Updated Joint Claim Construction Chart
Hr'g Tr.	*Markman* hearing transcript
Tutorial	Joint Technology Tutorial

II. RELEVANT LAW

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*) (internal citations omitted), *aff'd*, 517 U.S. 370 (1996). Claim construction is a "matter of law exclusively for the court." *Id.* at 970-71. "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." *Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1347 (Fed. Cir. 2000).

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*); *see also Markman*, 52 F.3d at 979. As the Federal Circuit in *Phillips* explained, courts must analyze each of these components to determine the "ordinary and customary meaning of a claim term" as understood by a person of ordinary skill in the art at the time of the invention. 415 F.3d at 1313. "Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001).

"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.'" *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)). "Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular claims terms." *Id.* at 1314; *see also Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) ("In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is

that language that the patentee chose to use to 'particularly point [ ] out and distinctly claim [ ] the subject matter which the patentee regards as his invention."). The context in which a term is used in an asserted claim can be "highly instructive." *Phillips*, 415 F.3d at 1314. Additionally, other claims in the same patent, asserted or unasserted, may also provide guidance as to the meaning of a claim term. *Id.* "Courts do not rewrite claims; instead, we give effect to the terms chosen by the patentee." *K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1364 (Fed. Cir. 1999).

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." *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). "[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs." *Id.* at 1316. "In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor." *Id.* 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. In the end, "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be ... 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 claims and the specification, the prosecution history should be examined, if in evidence. *Phillips* at 1317; *see Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004). 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." *Phillips*, 415 F.3d at 1317; *see Chimie v. PPG Indus. Inc.*, 402 F.3d 1371, 1384 (Fed. Cir.

2005) ("The purpose of consulting the prosecution history in construing a claim is to exclude any interpretation that was disclaimed during prosecution.").

When the intrinsic evidence does not establish the meaning of a claim, then extrinsic evidence (*i.e.*, all evidence external to the patent and the prosecution history, including dictionaries, inventor testimony, expert testimony, and learned treatises) may be considered. *Phillips*, 415 F.3d at 1317. Extrinsic evidence is generally viewed as less reliable than the patent itself and its prosecution history in determining how to define claim terms. *Id.* "The court may receive extrinsic evidence to educate itself about the invention and the relevant technology, but the court may not use extrinsic evidence to arrive at a claim construction that is clearly at odds with the construction mandated by the intrinsic evidence." *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 977 (Fed. Cir. 1999).

If, after a review of the intrinsic and extrinsic evidence, a claim term remains ambiguous, the claim should be construed so as to maintain its validity. *Phillips*, 415 F.3d at 1327. Claims, however, cannot be judicially rewritten in order to fulfill the axiom of preserving their validity. *See Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed. Cir. 1999). Thus, "if the only claim construction that is consistent with the claim's language and the written description renders the claim invalid, then the axiom does not apply and the claim is simply invalid." *Id.*

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 GE Lighting Sols., LLC v. AgiLight, Inc.*, 750

F.3d 1304, 1309 (Fed. Cir. 2014) ("the specification and prosecution history only compel departure from the plain meaning in two instances: lexicography and disavowal."); *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." *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1366-67 (Fed. Cir. 2012); *see 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). As the Federal Circuit has explained, "[w]e do not read limitations from the specification into claims; we do not redefine words. Only the patentee can do that." *Thorner*, 669 F.3d at 1366.

A claim must also be definite. Pursuant to 35 U.S.C. § 112, second paragraph: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2. In *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014), the Supreme Court held that § 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." A claim is required to "provide objective boundaries for those of skill in the art," and a claim term is indefinite if it "might mean several different things and no informed and confident choice is among

the contending definitions." *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014). A patent claim that is indefinite is invalid. 35 U.S.C. § 282(b)(3)(A).

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); *Vanderlande Indus. Nederland BV v. Int'l Trade Comm'n*, 366 F.3d 1311, 1323 (Fed. Cir. 2004) (noting that the administrative law judge need only construe disputed claim terms). 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." *Id.* at 1362 (quoting *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997)); *see also Embrex*, 216 F.3d at 1347 ("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. Claim construction, however, is not an "obligatory exercise in redundancy." *U.S. Surgical Corp.*, 103 F.3d at 1568. "[M]erely rephrasing or paraphrasing the plain language of a claim by substituting synonyms does not represent genuine claim construction." *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 863 (Fed. Cir. 2004).

III. LEVEL OF ORDINARY SKILL

In its opening brief, Ingevity contends:

> A person of ordinary skill in the art as of the filing date of the '844 Patent would have at least a Bachelor of Science degree in chemistry or chemical engineering, or the equivalent, and at least one year of experience working with adsorbents, adsorption measurements, or adsorption-related processes, or the equivalent.

(CIMB at 3.)

In their opening brief, Respondents contend:

> [A] PHOSITA of the Asserted Patent at or around the time of filing would have: at least a bachelor's degree in chemistry or chemical or mechanical engineering; at least one year of experience working primarily on issues related to the control of automotive evaporative emissions; and, based on their education, background, and experience, understand the chemistry and physics associated with the phenomena of fuel vapor adsorption, desorption, and diffusion.

(RIMB at 8-9 (citing RIMB, Ex. A at ¶ 51).)

These proposed levels of skill are sufficiently similar that they can be readily combined. It stands to reason that a mechanical engineer working in the automotive industry could possess ordinary skill in the art, and familiarity with adsorption measurement is important to every asserted claim. So I find that one of ordinary skill in the art would have a bachelor's degree in chemistry, chemical engineering, or mechanical engineering, and at least one year of experience working with automotive emissions such that they are familiar with the phenomena of vapor adsorption and desorption and their measurement.

IV. THE ASSERTED PATENT

The '844 patent, entitled "Method for Reducing Emissions from Evaporative Emissions Control Systems," was re-issued on October 25, 2005 to Laurence H. Hiltzik, Jacek Z. Jaqiello, Edward Don Tolles, and Roger S. Williams. The '844 patent reports an assignment on its face to MeadWestvaco Corporation.

A. Technical Background

Gasoline evaporation from motor vehicle fuel systems "is a major potential source of hydrocarbon air pollution." ('844 patent at 1:28.) Such emissions may occur when "a vehicle has been parked and subjected to diurnal temperature changes over a period of several days." (*Id.* at 2:45-46.) These temperature changes cause pressure fluctuations in the vehicle's fuel tank, which

in turn cause gases to flow in and out of the fuel tank vent. (Tutorial at 11.) Vapor emissions arising from this process are known as diurnal breathing loss emissions. (*Id.*; '844 patent at 2:49.)

Diurnal breathing loss emissions can be reduced by "canister systems" placed in the vent conduit "that employ activated carbon to adsorb and hold the vapor." ('844 patent at 1:33-34.) Adsorption is the process by which, in this case, gasoline vapor molecules weakly attach themselves to the adsorbent material in the canister. (Tutorial at 7.) The adsorbent material is not limited to activated carbon, but may consist of various organic and inorganic materials. (*See* '844 patent at 9:5-63.) Vapor molecules are released, or desorbed, from the adsorbent material when fresh air flows from the atmosphere into the canister via the fuel tank vent. (Tutorial at 7, 9.) Although desorption occurs on a daily cycle in the case of diurnal breathing losses, it may also occur when the vehicle engine is operating. (*See* Tutorial at 5.) This is because the canister system contains a "vacuum purge connection" which pulls air through the canister and into the engine air intake, and in the process causes vapor molecules to diffuse into the purge air. (*Id.* at 5, 9; '844 patent at 1:62-63.)

The '844 patent discloses the use of multiple layers, or stages, of adsorbents, with successive stages possessing distinct adsorption characteristics. ('844 patent at Abstract.) In particular:

> On the fuel source-side of the canister, standard high working capacity carbons are preferred. On the vent-side, the preferred adsorbent volume exhibits a flat or flattened adsorbent isotherm on a volumetric basis in addition to certain characteristically desirable adsorptive properties across broad vapor concentrations, specifically relatively low incremental capacity at high concentration vapors compared with the fuel source-side adsorbent volume.

(*Id.* at 3:46-53.) Two approaches to achieving such "a flat or flattened adsorbent isotherm on a volumetric basis" are taught. (*Id.* at 3:43-64.) One approach, which is seemingly not a substantial concern for claim construction purposes, comprises "employ[ing] an adsorbent with the desired isotherm properties" near the vent, that is, using a vent-side adsorbent material having a "relatively

low incremental capacity at high concentration vapors compared with the fuel source-side adsorbent volume." (*Id.* at 3:46-53, 3:57-58.)

The disputed claim terms generally pertain to the other approach: "a filler and/or bed voidages as a volumetric diluent." ('844 patent at 3:55-56.) The '844 patent refers to this approach as "volumetric dilution." (*Id.* at 7:7.) Volumetric dilution may be accomplished by adding a non-adsorbing filler to the adsorbent material, forming the adsorbent into a "high voidage shape," or using inert spacer particles, foams, fibers, and screens external to the adsorbent material, among other techniques. (*Id.* at 10:6-24.)

B. The Asserted Claims

The '844 patent has 54 claims. As of the date of this order, claims 1-5, 8, 11, 13, 15, 18, 19, 21, 24, 28, 31, 33, 36, 38, 40, 43, 45, 48, 50, and 52 are asserted in this Investigation. The asserted claims read as follows (with the first instance of the agreed-upon terms in *italics* and the first instance of the disputed terms highlighted in **bold**):

1. A method for reducing fuel vapor emissions in automotive evaporative emissions control systems comprising the steps of contacting the fuel vapor with an **initial adsorbent volume** having **incremental adsorption capacity** at 25° C. of greater than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane and at least one **subsequent adsorbent volume** having an incremental adsorption capacity of less than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane.
2. The method of claim 1 comprising a single **subsequent adsorbent volume**.
3. The method of claim 1 comprising multiple **subsequent adsorbent volumes**.
4. The method of claim 2 wherein the **initial adsorbent volume** and the **subsequent adsorbent volume** are located within a single automotive evaporative emission control canister.

5. The method of claim 3 wherein the **initial adsorbent volume** and the **subsequent adsorbent volumes** are located within a single automotive evaporative emission control canister.

8. The method of claim 1 wherein the **initial adsorbent volume** and the **subsequent adsorbent volume** are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer having been activated by a process selected from the group consisting of chemical, thermal, and combined chemical/thermal activation methods.

11. The method of claim 1 wherein the **subsequent adsorbent volume** exhibits **adsorption capacities** achieved by volumetric dilution.

13. The method of claim 11 wherein the volumetric dilution is accomplished by forming the adsorbent into *high voidage shapes* selected from the group consisting of stars, **hollow cylinders**, asterisks, spirals, **cylinders**, and configured ribbons.

15. The method of claim 11 wherein the volumetric dilution is accomplished by the use of inert spacer particles, **trapped air spaces**, foams, fibers, and screens external to the adsorbent.

18. In a method of reducing fuel vapor emissions in an automotive evaporative emissions control system comprising removing at least one volatile organic compound from a volatile organic compound-containing fuel vapor by routing the fuel vapor through a vapor adsorbent, the improvement comprising sequentially routing the fuel vapor through an **initial adsorbent material-containing volume** wherein the **initial adsorbent material** is characterized by an **incremental adsorption capacity** at 25° C. of greater than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane before routing the fluid stream through at least one **subsequent adsorbent-containing volume** prior to venting to the atmosphere

wherein the subsequent adsorbent-containing volume is characterized by an incremental adsorption capacity at 25° C. of less than 35 g n-butane/L between vapor concentrations of 5 vol % and 50 vol % n-butane.

19. The method of claim 18 wherein the **initial adsorbent volume** and the **subsequent adsorbent volume** are located in a single automotive evaporative emissions canister.

21. The method of claim 18 wherein the **initial adsorbent volume** and the **subsequent adsorbent volume** are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer and activated by chemical and/or thermal activation methods.

24. The method of claim 18 wherein the **subsequent adsorbent volume** exhibits **adsorption capacities** achieved by volumetric dilution.

28. The method of claim 24 wherein the volumetric dilution is accomplished by the use of inert spacer particles, **trapped air spaces**, foams, fibers, and screens external to the adsorbent.

31. In an evaporative emissions control system for a vehicle comprising, in combination, a fuel tank for storing a volatile fuel, an engine having an air induction system and adapted to consume the fuel, a canister containing an **initial volume of fuel vapor adsorbent material** for temporarily adsorbing and storing fuel vapor from the tank, a conduit for conducting fuel vapor from the tank to a canister vapor inlet, a fuel vapor purge conduit from a canister purge outlet to the induction system of the engine, and a vent/air opening for venting the canister and for admission of air to the canister during operation of the engine induction system, wherein the canister is defined by a fuel vapor flow path via the canister vapor inlet through the **initial volume of vapor adsorbent** within a first region of the canister toward the vent/air opening, and an air flow path through a **subsequent volume of adsorbent** within a

second region of the canister at the vent/air opening and the first region at the purge outlet, such that fuel vapor formed in the tank flows through the vapor inlet into the **initial volume of adsorbent** where it is adsorbed and, during operation of the engine induction system, ambient air flows in a path to and through the vent/air opening and along the air flow path in the canister through the initial volume and the purge outlet to the induction system of the engine, the flow of air removing a portion of the adsorbed fuel vapor but leaving a residue of fuel in the initial volume,

the improvement wherein at least one **subsequent volume of vapor adsorbent material** comprises a volume of 1 % to 100 % of the first volume and is located either inside of the canister within the second region thereof or outside of the canister, and wherein the initial volume of vapor adsorbent material is characterized by an **incremental adsorption capacity** at 25° C. of greater than 35 g n-butane/L-bed between vapor concentrations of 5 vol % and 50 vol % n-butane before routing the air flow through at least one subsequent volume of vapor adsorbent material wherein the subsequent volume of vapor adsorbent material is characterized by an incremental adsorption capacity at 25° C. of less than 35 g n-butane between vapor concentrations of 5 vol % and 50 vol % n-butane.

33. The system of claim 31 wherein the **initial volume of vapor adsorbent material** and the **subsequent volume of vapor adsorbent material** are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer having been activated by a process selected from the group consisting of chemical, thermal, and combined chemical/thermal activation methods.

36. The system of claim 31 wherein the **subsequent volume of vapor adsorbent material** exhibits **adsorption capacities** achieved by volumetric dilution.

38. The system of claim 36 wherein the volumetric dilution is accomplished by forming the adsorbent material into *high voidage shapes* selected from the group consisting of stars, **hollow cylinders**, asterisks, spirals, **cylinders**, and configured ribbons.

40. The system of claim 36 wherein the volumetric dilution is accomplished by the use of inert spacer particles, **trapped air spaces**, foams, and screens external to the adsorbent.

43. A canister operative for use in automotive systems for emission control defined by a canister vapor inlet to permit a fuel vapor flow path through an **initial volume of vapor adsorbent** within a first region of the canister toward a canister vent/air opening to permit a continued air flow path through a **subsequent volume of adsorbent** within a second region of the canister at the vent/air opening and the first region at a canister purge outlet, such that fuel vapor formed in a tank for storing volatile fuel flows through the canister vapor inlet into the **initial volume of adsorbent** where it is adsorbed and, during operation of an engine induction system, ambient air is caused to flow in a path to and through the vent/air opening and along the air flow path in the canister through the initial volume and the purge outlet to the induction system of the engine, wherein the flow of air removing a portion of the adsorbed fuel vapor but leaving a residue of fuel in the initial volume, and wherein at least one **subsequent volume of vapor adsorbent material** comprises a volume of 1% to 100 % of the initial volume and is located either inside of the canister within the second region thereof or outside of the canister, and wherein the initial volume of vapor adsorbent material is characterized by an **incremental adsorption capacity** at 25° C. of greater than 35 g n-butane/L-bed between vapor concentrations of 5 vol % and 50 vol % n-butane before routing the air flow through at least one subsequent volume of vapor adsorbent material wherein the subsequent volume of vapor adsorbent material is characterized by an

incremental adsorption capacity at 25° C. of less than 35 g n-butane between vapor concentrations of 5 vol % and 50 vol % n-butane.

45. The canister of claim 43 wherein the **initial volume of vapor adsorbent material** and the **subsequent volume of vapor adsorbent material** are activated carbon derived from materials selected from the group consisting of wood, peat, coal, coconut, lignite, petroleum pitch, petroleum coke, coal tar pitch, fruit pits, nut shells, sawdust, wood flour, synthetic polymer, and natural polymer having been activated by a process selected from the group consisting of chemical, thermal, and combined chemical/thermal activation methods.

48. The canister of claim 43 wherein the **subsequent volume of vapor adsorbent material** exhibits **adsorption capacities** achieved by volumetric dilution.

50. The canister of claim 48 wherein the volumetric dilution is accomplished by forming the adsorbent material into *high voidage shapes* selected from the group consisting of stars, **hollow cylinders**, asterisks, spirals, **cylinders**, and configured ribbons.

52. The canister of claim 48 wherein the volumetric dilution is accomplished by the inclusion of inert spacer particles, **trapped air spaces**, foams, and screens external to the adsorbent.

V. CLAIM CONSTRUCTION

A. Construction of the Agreed-Upon Claim Terms

Prior to the *Markman* hearing, the Parties reached agreement regarding the construction of one term:

Claim Term	Relevant Claims	Agreed Construction
"high voidage shapes"	'844 patent claims 13, 26, 38, 50	"the Markush group consisting of stars, hollow cylinders, asterisks, spirals, cylinders, and configured ribbons"

(JC at 1.)

B. Construction of the Disputed Claim Terms

1. "incremental adsorption capacity" / "adsorption capacities"

The Parties disagree on the proper claim construction and have proposed the following constructions:

Relevant Claims	Ingevity	Respondents
'844 patent at claims 1, 11, 18, 24, 31, 36, 43, 48	**No construction required:** terms should be given their plain and ordinary meaning as understood by a person of ordinary skill in the art in light of the intrinsic record. To the extent the plain and ordinary meaning is not apparent on the face of the claims themselves, "incremental adsorption capacity" should be understood, in the context of the claims, as "the difference in adsorption capacity of the adsorbent volume between the conditions recited in the claims and expressed in the recited units." And, "adsorption capacities," which appears only in claims 11, 24, 36, and 48, refers to the "incremental adsorption capacity" recited in the independent claim from which these claims depend.	Claim terms are indefinite and not susceptible to construction. ***Respondents' Alternative Position for claim term "incremental adsorption capacity":*** If the ALJ does not find that "incremental adsorption capacity" is indefinite, then Respondents offer the following construction: "a property of an adsorbent substance measuring the increase in mass of fuel vapor adsorbed at equilibrium by the adsorbent substance at two different vapor concentrations based on the density of the adsorbent substance determined using ASTM D2854"

(JC at 1-2.)

a. Meaning of the Terms

Complainants agreed at the hearing that the quantity labeled on the y-axis of Figure 3 of the '844 patent, "Mass adsorbed, g/L," is equivalent to "adsorption capacity." (Hr'g Tr. at 111; *see* '844 patent at 7:17 (describing the "Example 1" curve in Figure 3 as an "adsorption isotherm").) Respondents also agreed, with the qualification that the labeled quantity was "purportedly" "adsorption capacity." (Hr'g Tr. at 94; *see* RIMB, Ex. A at 12 ("adsorption capacity for a specific

gas (*e.g.*, n-butane) can be defined as the amount (mass) of the gas that a unit (volume or mass) of the adsorbent can adsorb").) According to Figure 3 and its explanatory text, this quantity varies with n-butane vapor concentration, measured in percent by volume, and is isothermal, that is, the temperature (here, 25°C) is "fixed." (RIMB, Ex. A at 12; '844 patent at Figure 3, 8:40 (referencing 25°C), 9:35-40 (same).) And it is apparently measured at equilibrium, that is, when the rates of adsorption and desorption are equal. (*Id.* at 2:17; *see* RIMB, Ex. A at 11.) Therefore, "adsorption capacity" is the mass of a particular gas adsorbed at a particular vapor concentration and temperature, at equilibrium, by a particular adsorbent volume.

By extension, "incremental adsorption capacity" is the difference in "adsorption capacity," at constant temperature and between two different vapor concentrations. Complainants' proposed construction is substantially the same and I generally adopt their language. (*See* JC at 1-2.) However, "adsorption capacity" may be determined without also determining "incremental adsorption capacity," so I reject Complainants' contention that "adsorption capacities" means "incremental adsorption capacity." (*See id.*) Instead, "adsorption capacities" is simply the plural of "adsorption capacity," and need not otherwise be construed.

Respondents' proposed construction generally includes the language defining "adsorption capacity," and refers to the difference between two different vapor concentrations. (*See JC at 1-2.*) However, Respondents' proposed construction is otherwise inappropriate because it includes additional language not found in the claims, including "property," "adsorbent substance," "based on the density," and "ASTM D2854." (*Id.*) Respondents' proposed construction also reads the term "adsorbent volume" completely out of the claims. (*See* RIMB at 34 (arguing that incremental adsorption capacity should not consider "canister hardware, inert spacer particles, foams, fibers, and screens external to the adsorbent in its determination.").) And Respondents place too much weight on an information disclosure statement distinguishing the claims of the '844 patent's parent over the

prior art by referencing "the properties of the adsorbent contained therein." (*See* RIMB at 33-34 (citing RIMB, Ex. AA at 2).) Respondents offer no evidence that the examiner relied on this statement, and in any event the applicants seemingly could just as easily have referenced "the properties of the adsorbent volume contained therein." (*See id.*)

b. Indefiniteness in General

Respondents present several unpersuasive arguments for the indefiniteness of "incremental adsorption capacity." For example, Respondents point out that the patent does not "explain what 'incremental adsorption capacity' means and does not disclose any method to determine" that quantity. (RIMB at 10.) But Respondents' own expert understands the meaning of "adsorption capacity," and describes multiple procedures for measuring it. (*See* RIMB, Ex. A at 11-13, 33-42, 50-51.) This strongly suggests the term has a plain meaning. *Phillips*, 415 F.3d at 1313 (the "ordinary and customary meaning of a claim term" is the one understood by a person of ordinary skill in the art at the time of the invention).) Indeed, "incremental adsorption capacity" is simply the difference between two "adsorption capacities" under certain conditions.

I find the '844 patent was not required to disclose a particular method for measuring that quantity because one skilled in the art would have known how to measure "adsorption capacity" under two sets of conditions, and then subtract one measurement from the other. (*See* Hr'g Tr. at 93 ("I would agree that a person of skill would have known or heard of the term 'adsorption capacity,' and would have been familiar with some of the many methods.").) That multiple measurement methods produce different results, and with different degrees of precision, accuracy, and consistency, does not change this conclusion. (*See generally* RIMB at 14-25.) Indeed, it is hardly surprising that "two methods us[ing] different means . . . can produce different results even for the same sample." *Takeda Pharm. Co. Ltd. v. Zydus Pharms. USA, Inc.*, 743 F.3d 1359, 1366

(Fed. Cir. 2014). Therefore, "[t]hat there is more than one way of determining [the claimed parameter] does not render that clear claim language indefinite." *Id.* at 1367.

The case law on which Respondents rely is not to the contrary. In *Dow Chemical Co. v. Nova Chemicals Corp. (Canada)*, 803 F.3d 620, 631 (Fed. Cir. 2015), the quantities requiring laboratory measurement were the tensile force applied to a material sample and the resultant lengthening of that sample. The claim language, however, required determination of a more abstract quantity that apparently could not be directly measured in the laboratory, namely, the maximum value of the "slope of strain hardening," or the maximum change in length divided by the change in force causing it. *Id.* at 633. Because this more abstract quantity required, in essence, estimation by interpolation or curve-fitting, and there was no standard method for such estimation known to one skilled in the art, the claim language was held indefinite. *Id.* at 634-35. Here, by contrast, there is no dispute that "adsorption capacity" is a physical parameter that may be measured in the laboratory, and "incremental adsorption capacity" is easily determined by subtraction. (*See generally* RIMB at 14-25.)

Similarly, in *Teva Pharmaceuticals USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1338 (Fed. Cir. 2015), the claims used the term "molecular weight," without specifying whether that referred to "peak average molecular weight," "number average molecular weight," or "weight average molecular weight," all of which are calculated differently. Here, there is no ambiguity about the definition of "adsorption capacity," notwithstanding that it can be measured using different techniques. (*See* RIMB, Ex. A at 11 (defining adsorption capacity).)

Respondents also argue that the '844 patent's disclosure is "deficient" because a later patent assigned to Complainants has a different specification and more detail regarding "incremental adsorption capacity." (RIMB at 25-26 (citing U.S. Patent No. 9,732,649 ("the '649 patent")).) To be sure, the '649 patent's disclosure appears to be more fulsome on the meaning of "incremental

adsorption capacity" than the '844 patent's, but this does not mean that the '844 patent's claims are so lacking as to be indefinite, nor does it amount to a concession of that point by Complainants. (*See* RIMB, Ex. Z at 13:38-14:32.)

Respondents further argue that the European Patent Office rejected the '844 patent's European counterpart on grounds equivalent to indefiniteness. (*See* RIMB at 27-29.) This is immaterial, because the European Patent Office does not apply U.S. indefiniteness rules. (*See* RIMB, Ex. E at 8.)

Respondents' final unpersuasive argument is that because there are "[n]o specific test points within th[e] range" of vapor concentrations recited in the claims, the "incremental adsorption capacity" can vary depending on the test points selected. (RIMB at 26-27.) This argument is foreclosed by the definition of "incremental adsorption capacity," where the test points are the parameters recited in the claims; in this case, 5% and 50% vapor concentration.

c. Potential Indefiniteness of "adsorbent volume"

All that said, Respondents do raise one substantial question of indefiniteness: the meaning of "adsorbent volume." This issue was raised most clearly during the hearing, when Respondents' counsel asked, "if [the adsorbent volume] is supposed to include something more than just the carbon, . . . [h]ow do I know where it ends and where it begins?" (Hr'g Tr. at 136.) One concrete example of this ambiguity was shown with reference to Figure 2 of the '844 patent:

> If you have a foam insert separating region 9 into two separate regions, what's to say that that's still a single volume under [Complainants'] proposed construction[?] Why would that not now become two separate subsequent adsorbent volumes[?]

(*Id.* at 146-47.) Complainants' counsel asserted that column 7 of the '844 patent discloses "foam layers as part of the adsorbent volume 9." (*Id.* at 145.) In fact, column 7 of the '844 patent discloses volumetric dilution by addition of filler pellets and by a honeycomb with an "open cell structure,"

but it does not disclose foam layers, or volumetric dilution by any other method. ('844 patent at 7:6-67.)

Similarly, Respondents' counsel argued that:

> [A] person of ordinary skill trying to understand what the adsorbent volume would be could not determine whether region 8, if they are trying to determine the incremental adsorption capacity in region 8, whether it should include whatever volume would be taken up by the support screen or whether it should include that air that's reflected in the bottom of that canister. Should that be attributed to the volume of the adsorbent material in region 8 or should it be attributed to the adsorbent materials as shown in region 9?

(Hr'g Tr. at 135-36.) In response, Complainants' counsel "[took] the position that the space with 2, that seems to link 8 and 9 past the dividing wall, . . . that's not a volumetric diluent for either 8 or 9," but gave no specific reason for taking that position; later in the hearing, however, Complainants' counsel took the position that that region was a "trapped air space," which is undeniably a species of volumetric diluent according to the '844 patent. (*Id.* at 145, 174-75; '844 patent at 7:24-25, 11:35.) In any event, the '844 patent's description of Figure 2 is silent as to whether the air space shown at the bottom of the depicted canister is a volumetric diluent, and if so, which adsorbent or adsorbents it dilutes. ('844 patent at 6:30-42.)

This presents a serious question of indefiniteness for at least some of the asserted claims. A hypothetical adapted from the scenarios discussed at the hearing illustrates the severity of the problem. Assume a system configuration like that shown in Figure 1 of the '844 patent, comprising canister 1, connections 4, 5, and 6, and two bodies of adsorbent material 7. (*See* '844 patent at 1:58-64.) The interior of the canister is configured so that the two adsorbent bodies consist of the same material, they are separated by an impermeable dividing wall 3, and a support screen 2 holds them in place, with air in the space below the support screen external to, but communicating with, the two adsorbent bodies; I refer to this air space as the "air gap." With diurnal breathing loss emissions, vapor flows out of the fuel tank, into canister 1 via vapor source connection 5, through the first

adsorbent body 7, then through the air gap and the second adsorbent body 7, and finally out the vent port 4.

If the effect of the air gap is ignored, the material of the two adsorbent bodies is identical, and the size and shape of the two adsorbent bodies are identical, then this system does not fall within the scope of any claim of the '844 patent, because the "incremental adsorption capacities" of the two adsorbent bodies are necessarily the same. But assume instead that the first body of adsorbent material has an "incremental adsorption capacity" in excess of 35 g/L, and the second body is made of the same adsorbent material and it is volumetrically diluted with a "non-adsorbing filler," as recited in claim 12. ('844 patent at 11:19-20.) If the "non-adsorbing filler" is sufficient to reduce the "incremental adsorption capacity" of the second adsorbent body to less than 35 g/L, then the system would seemingly fall within the scope of claim 12 (and claims 1 and 11, from which claim 12 depends). And the measurement of the "incremental adsorption capacity" of the second adsorbent body is straightforward, because the volume of that body is readily determined.

There is no clear reason, however, why the effect of the air gap should be ignored. Assume again that the two adsorbent bodies are the same material and the same shape and size. Assume further that the air gap is the same volume as both of the two adsorbent bodies, and that the adsorbent material without dilution has an "incremental adsorption capacity" in excess of 35 g/L. Under these assumptions, the air gap would volumetrically dilute one or both of the adsorbent bodies. The specification explicitly discloses "simply trapped air space between layers of adsorbent" as a "method for diluting the vent-side region." ('844 patent at 7:18, 7:24-25.) And claim 15 expressly recites "trapped air spaces . . . and screens external to the adsorbent" as means for accomplishing volumetric dilution. (*Id.* at 11:35-36.) "Trapped air spaces" is construed below, and in such a way that the air gap falls within its scope.

If the air gap in its entirety volumetrically dilutes the second adsorbent body, it seems likely the second adsorbent body's "incremental adsorption capacity" would be approximately half that of the first adsorbent body (because the effect of the air gap is to double the second adsorbent body's effective volume in g/L units). In this case, the system could easily fall within the scope of claim 15 (and claims 1 and 11, from which claim 15 depends) if the resulting "adsorption capacity" of the second adsorbent body is less than 35 g/L. Conversely, if the air gap in its entirety volumetrically dilutes the first adsorbent body, the system would seemingly not fall within the scope of claim 15, because the "incremental adsorption capacity" of the first body would be too low, and the "incremental adsorption capacity" of the second body would be too high. And if the air gap volumetrically dilutes both bodies at the same time, whether the system falls within the scope of claim 15 depends on how that volumetric dilution is apportioned.

The patent is silent on such apportionment, that is, on how the hypothesized air gap dilutes the adsorbent bodies with which it communicates; there is no apparent reason that the air gap will only volumetrically dilute the "subsequent adsorbent volume" and not the "initial adsorbent volume." This problem is not merely hypothetical. One preferred embodiment, depicted in Figure 3, appears to possess just such an air gap, but the description of that preferred embodiment does not even label it. So unless one skilled in the art would already know how to apportion the volumetric dilution achieved by the air gap, it is not clear that a person of ordinary skill would be able to determine whether even the preferred embodiment falls within the scope of claims 1, 11, and 15. In other words, it appears that these claims, "viewed in light of the specification and prosecution history," do not "inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus*, 134 S. Ct. at 2129.

d. Deferral of the Issue

Nonetheless, it is inappropriate to rule on this issue yet, for three reasons. First, as noted by Complainants' counsel at the hearing, this particular hypothetical was "not something that's been briefed per se." (Hr'g Tr. at 145.) In fact, Respondents' argument on the indefiniteness of accounting for volumetric dilution in the measurement of "incremental adsorption capacity" appears to have evolved over time. The first explicit mention of this issue in the parties' claim construction briefs is a short argument by Respondents regarding a different claim term, "vapor adsorbent material." (RIMB at 40 ("it is not apparent whether any voidage between carbons or incidental components constitute 'vapor adsorbent material.'").) As noted, Respondents argue that "incremental adsorption capacity," if not indefinite, should be limited to the "incremental adsorption capacity" of the adsorbent substance alone, "as opposed to, *e.g.*, a property of the region of a fuel vapor canister." (*Id.* at 31.) But they do not argue in their initial brief that "incremental adsorption capacity" is indefinite for the same reason "vapor adsorbent material" is indefinite.

In their reply brief, by contrast, Respondents flatly assert that "nothing in the '844 patent instructs a PHOSITA where the relevant volume begins and ends" for purposes of measuring "incremental adsorption capacity." (RRMB at 13-14.) Complainants have not, of course, had an opportunity to respond to this prior to the hearing, and they pointed out at the hearing that they were "addressing this on the fly." (Hr'g Tr. at 145.) This may explain why their position at the hearing was conclusory and unsupported by the '844 patent. (*See id.*) In short, this issue has not been adequately litigated yet.

A second reason to defer resolution of this issue is the dearth of extrinsic evidence supporting indefiniteness. Whether a claim is indefinite must normally be evaluated from the standpoint of one skilled in the art. *See Nautilus*, 134 S. Ct. at 2129. It may be that there is a standard method, known to one skilled in the art but not disclosed in the '844 patent, for measuring the effect of volumetric

dilution on "adsorption capacity"; or there may be no such standard method. But Respondents' best extrinsic evidence of this is the declaration of their expert, Mr. James Lyons, who essentially does not discuss the issue at all. (*See generally* RIMB, Ex. A.) In particular, Mr. Lyons' opinion that "there was no industry standard method for measuring adsorption capacity" is based on an analogy to measuring a different parameter (butane working capacity) and is otherwise conclusory, and his opinion regarding the meaning of "vapor adsorbent material" does not allude to the uncertainty over how to apportion the effect of an air gap or other volumetric diluent external to the adsorbent. (RIMB, Ex. A at 33, 52-53, 66; *see* RIMB at 40.) Nor does Complainants' expert, Dr. David Rockstraw, address this issue in his declaration. (*See* CRMB, Ex. 11.) On balance, I cannot conclude by clear and convincing evidence at this time that Respondents have proven the indefiniteness of the term "adsorbent volume."

Thirdly, even if there were such evidence, the parties have not identified which asserted claims are indefinite. For example, claims 1, 11, and 15 might be indefinite because the claimed volumetric dilution is accomplished by air gaps and screens "external to the adsorbent." ('844 patent at 11:35-36.) But in claim 13, volumetric dilution is "accomplished by forming the adsorbent into high voidage shapes," that is, the volumetric dilution does not involve use of spaces external to the adsorbent. (*Id.* at 11:26-27.) Such shapes may avoid the problem presented by air gaps and screens, and claim 13 therefore may not be indefinite. But at the hearing Respondents' argument was presented only in the context of "vapor adsorbent material," a term found only in claims 31 and higher, and not "adsorbent volume," a term found in the lower-numbered claims. (*See* Hr'g Tr. at 135-36, 146-47.)

As another example, claim 18 recites an "initial adsorbent *material* [] characterized by an incremental adsorption capacity . . . of greater than 35 g n-butane/L" but a "subsequent adsorbent-containing *volume* [] characterized by an incremental adsorption capacity . . . of less than 35 g n-

butane/L." ('844 patent at 11:35-36 (emphasis added).) This difference may suggest that any calculation of adsorption capacity should not apportion volumetric dilution to the initial adsorbent volume at all. If so, that apportionment method may only apply to claim 18 and its dependent claims. Overall, further briefing is required regarding which specific claims may be indefinite.

In sum, it is premature to hold any claims implicated by the term "adsorbent volume" indefinite. I therefore defer ruling on this indefiniteness issue. All other indefiniteness arguments are rejected.

e. Construction

The term "adsorption capacity" is hereby construed as "the mass of a particular gas adsorbed at a particular vapor concentration and temperature, at equilibrium, by a particular adsorbent volume."

The term "incremental adsorption capacity" is hereby construed as "the difference in adsorption capacity of the adsorbent volume between the conditions recited in the claims and expressed in the recited units."

Inasmuch as "adsorbent volume" requires construction, I decline to construe it at this time.

2. "initial adsorbent volume" / "initial volume of adsorbent material" / "initial volume of vapor adsorbent material" / "initial volume of fuel vapor adsorbent material" / "subsequent adsorbent volume" / "subsequent volume of adsorbent" / "subsequent volume of vapor adsorbent material" / "second volume of vapor adsorbent material"

The Parties disagree on the proper claim construction. They have proposed the following constructions of the "initial" claim language:

Relevant Claims	Ingevity	Respondents
'844 patent at claims 1, 4-10, 18-23, 31, 33-35, 43, 45-47	**No construction required:** terms should be given their plain and ordinary meaning as understood by a person of ordinary skill in the art in light of the intrinsic record.	"an adsorbent substance located in the fluid stream of the fuel source-side region of the canister that first receives the fuel vapor from the fuel source"

	To the extent the plain and ordinary meaning is not apparent on the face of the claims themselves, these terms refer to "a volume containing an adsorbent that comes before, with respect to the flow of fuel vapors, the subsequent adsorbent volume."	

(JC at 2.)

They have proposed the following constructions of the "subsequent" claim language:

Relevant Claims	Ingevity	Respondents
'844 patent at claims 1-11, 18-24, 28, 31-36, 43-48	**No construction required:** terms should be given their plain and ordinary meaning as understood by a person of ordinary skill in the art in light of the intrinsic record. To the extent the plain and ordinary meaning is not apparent on the face of the claims themselves, these terms refer to "a volume containing an adsorbent that comes after, with respect to the flow of fuel vapors, the initial adsorbent volume."	"an adsorbent substance located in the fluid stream of the vent-side region of the canister that receives the fuel vapor after it passes through the fuel source-side region of the vapor canister"

(JC at 2-3.)

These meaning of these two sets of claim terms, which are interrelated and are properly considered together, was greatly clarified by the parties' tutorial. Referring to Figure 3 of the '844 patent, it may be inferred from the tutorial that:

> [D]uring the day, the tank heats up, pressure increases in the fuel tank, and the vapors and the air will flow from the tank [via vapor source connection 5] through the canister [and its contents, including adsorbent regions and bodies 7-12], and out to the air [via vent port 4].

(Hr'g Tr. at 11:10-13.) Conversely:

> [A]t night, when the temperature goes down, the pressure drops, and so air comes back in the opposite direction from the atmosphere [via vent port 4] through the canister [and its contents, including adsorbent regions and bodies 7-12]. And then into the fuel tank [via vapor source connection 5], presumably.

(*Id.* at 11:14-17.) During the flow of purge air, the air flow follows this second path, except that it exits the canister via vacuum purge connection 6 and then flows to the engine air intake. (*Id.* at 13:7-10, 13:19-22.)

Claim 1 covers a method "comprising the steps of contacting the fuel vapor with an initial adsorbent volume . . . and at least one subsequent volume." ('844 patent at 10:37-42.) Claim 2 covers a single "subsequent adsorbent volume," and claim 3 covers multiple "subsequent adsorbent volumes." (*Id.* at 10:45-48.) The initial and subsequent volumes may be in the same canister (claims 4 and 5) or separate canisters that are "connected to permit sequential contact by the fuel vapor" (claims 6 and 7). (*Id.* at 10:49-64.) Independent claim 18 and its dependent claims are to similar effect, however, as claim 18 covers "sequentially routing the fuel vapor through an initial adsorbent-containing volume . . . before routing the fluid stream through at least one subsequent adsorbent-containing volume prior to venting to the atmosphere." (*Id.* at 11:47-54.) Independent claims 31 and 43 and their dependent claims recite "routing the air flow through at least one subsequent volume." (*Id.* at 13:5-6, 14:14-15.) Dependent claim 32 recites "the second volume of vapor adsorbent material," which surely corresponds to a "subsequent volume." (*Id.* at 13:12-13.)

The parties agree that the "initial" and "subsequent" language should be construed consistently in all pertinent claims. (*See* CIMB at 24; RIMB at 36 nn.15-16.) And the parties agree that these terms impose a temporal limitation, that is, they "should be construed to identify [] the relative interaction-order with the fuel vapor." (RIMB at 36; *see* CIMB at 22-23.) Given the requirement in claim 18 that the vapor contact with all volumes be "prior to venting to the atmosphere," and the preferred embodiment shown in Figure 2, where the "fluid stream flow [is] from the primary canister body 1 to the supplemental canister body 12," and then to the atmosphere

via vent port 4, the relative interaction order is the one corresponding to daytime vapor venting. ('844 patent at 6:38-40.)

Respondents, however, contend that the construction should further include a limitation on "the adsorbent volume's location in the canister system." (RIMB at 36; *see* JC at 2-3 (reciting "fuel source-side" and "vent-side" regions of the canister).) It is true that claim 31 recites a "system," and claim 43 recites a "canister," suggesting some spatial configuration might be appropriate. ('844 patent at 12:40, 13:58.) It is also true that in describing the "subsequent adsorbent volume," the specification repeatedly refers to it as the "vent-side" volume, which also suggests a spatial configuration. (*Id.* at 3:47, 4:40, 5:57, 6:44; *see id.* at 4:42-44 ("Since it is the vapor near the purge inlet that eventually emerges as bleed, decreasing this concentration reduces the bleed emission level.").)

But nothing in the language of the claims imposes any spatial limitations, nor do Respondents identify any such language. (*See* RIMB at 36-39.) That the "effectiveness of the invention" (*id.* at 39) may depend to some extent on the proximity of a "subsequent adsorbent volume" to the vent port does not mean proximity should be read into the claims when the claims are by their own terms silent on the issue. *Phillips*, 415 F.3d at 1323 (holding that particular examples or embodiments discussed in the specification are not to be read into the claims as limitations).

Therefore, the claim terms refer solely to interaction order, and more precisely to the interaction order when vapor flows out of the fuel tank, through the adsorbent material system or canister, and out to the atmosphere. I therefore adopt Complainants' proposed construction, except that, for clarity, I use the expression "flow of vapors from the fuel tank" rather than "flow of fuel vapors." Complainants have stated they have no objection to this amendment. (Hr'g Tr. at 119.)

Accordingly, "initial adsorbent volume," "initial volume of adsorbent material," "initial volume of vapor adsorbent material," and "initial volume of fuel vapor adsorbent material," are hereby construed as "a volume containing an adsorbent that comes before, with respect to the flow of vapors from the fuel tank, the subsequent adsorbent volume."

"Subsequent volume of adsorbent," "subsequent volume of adsorbent," "subsequent volume of vapor adsorbent material," and "second volume of vapor adsorbent material" are hereby construed as "a volume containing an adsorbent that comes after, with respect to the flow of vapors from the fuel tank, the initial adsorbent volume."

And again, inasmuch as "adsorbent volume" requires its own construction, I decline to construe it at this time.

3. "vapor adsorbent material"

The Parties disagree on the proper claim construction and have proposed the following constructions:

Relevant Claims	Ingevity	Respondents
'844 patent at claims 31-36, 43-48	**No construction required:** term should be given its plain and ordinary meaning as understood by a person of ordinary skill in the art in light of the intrinsic record.	"substance useful for adsorbing fuel vapor"

(JC at 3.)

In every instance where this term appears in the claims, it is preceded by the term "volume of" or "volume of fuel." ('844 patent at 12:40-14:42; *see* CIMB at 29 n.10.) The parties' dispute is over whether "incremental adsorption capacity" measurements are "limited to volumes of 'vapor adsorbent material,' [or should include] additional diluent volumes." (RRMB at 20; *see* CRMB at 21 ("Volume is a key concept that Respondents improperly attempt to write out of the claims.").) As explained above, volumetric dilution is a feature of many claims – *e.g.*, claims 36 and 48 both

explicitly recite "volumetric dilution" – but I decline to construe the term "adsorbent volume" at this time. The term "volume of vapor adsorbent material" or "volume of fuel vapor adsorbent material" appears to mean the same as "adsorbent volume," and I similarly decline to construe the terms "vapor adsorbent volume," "volume of vapor adsorbent material," or "volume of fuel vapor adsorbent material" at this time.

4. "cylinder" / "hollow cylinder"

The Parties disagree on the proper claim construction and have proposed the following constructions:

Relevant Claims	Ingevity	Respondents
'844 patent at claims 13, 26, 38, 50	**No construction required:** terms should be given their plain and ordinary meaning as understood by a person of ordinary skill in the art in light of the intrinsic record. To the extent the plain and ordinary meaning of "hollow cylinder" is not apparent on the face of the claims themselves, it is "a cylinder with one or more voids in it."	**Cylinder:** "a geometric solid with two circular bases and a curved surface" **Hollow Cylinder:** "an empty tube"

(JC at 3.)

The parties have two basic disputes over these terms. First, they dispute whether the term "cylinder" is limited to a shape having a cross section that is "essentially perfectly circular," or can include a shape having a cross section that is "substantially" circular. (Hr'g Tr. at 164:17, 167:1-4.) Second, they dispute whether, on the one hand, a "cylinder" must be solid and a "hollow cylinder" an empty tube (Respondents' position), or whether, on the other hand, a "cylinder" is simply a cylinder and a "hollow cylinder" is a cylinder with one or more voids in it (Complainants' position). (*See* Hr'g Tr. at 161:11-17; CRMB at 25.)

Extrinsic evidence is unnecessary to construe the term "cylinder," except for one undisputed point from the tutorial. Specifically, it is undisputed that one skilled in the art would have known that cylindrical pellets, which are expressly disclosed in the specification and surely fall within the scope of the pertinent claims, are substantially cylindrical but not necessarily perfectly cylindrical. (*See* Tutorial at 6.) And the terms "cylindrical" and "pellet," which are found in several places in the specification, imply a shape that is substantially, but not necessary perfectly, cylindrical. (*E.g.*, '844 patent at 2:26, 7:62.) The term "cylinder" therefore means a shape that is substantially cylindrical.

As for "hollow cylinder," the specification discloses volumetric dilution by "form[ing] the extrusion paste into high voidage shapes such as hollow cylinders, asterisks, stars, or twisted, bent, or spiral ribbon pieces"; the use of the adjective "hollow" at the beginning of the list of shapes suggests that all the shapes might be hollow. ('844 patent at 7:20-22.) However, according to the claims a solid "cylinder" may also be a high voidage shape: "volumetric dilution is accomplished by forming the [adsorbent or adsorbent material] into high voidage shapes selected from the group consisting of . . . cylinders." (*E.g.*, '844 patent at 14:49-53.) The specification discloses "high voidage" in at least four circumstances: (1) the objects are solid but voids are created by the gaps between them, as with pellets or granules; (2) the objects are "thin-walled cross-section shapes"; (3) the objects have some interior structure that nonetheless permits air flow through the object, such as a "monolith" possessing "voidages larger than 50Å"; and (4) the objects are honeycombs. (*Id.* at 2:26-27, 4:22-23, 7:26, 10:28-30.) "High voidage" may therefore be accomplished by how the shapes are arranged, for example, by shaping them and making them small enough so that there are gaps between them, or by making the shapes either partially hollow (as with a honeycomb) or completely hollow (as with an entirely hollow cylinder). So it may not be especially significant whether any particular shape – here, a "cylinder" – is completely hollow or completely solid or

something in between, so long as there is both volumetric dilution and adequate air flow. (*See, e.g., id.* at 3:14-20 (describing the "drawback" of "excessive flow restriction").)

On the other hand, it may be very significant, because the use of "hollow" in the claims only to modify "cylinders," and not other shapes, suggests that "cylinders" and "hollow cylinders" are distinct categories. (*See* RIMB at 41-42.) The parties cite extrinsic evidence to resolve this question, but there is intrinsic evidence that should also be considered, yet apparently has not. (*See* CIMB at 34; RIMB at 42-46.) Specifically, there are at least three unaddressed questions posed by the intrinsic evidence. First, does the fact that the Markush group includes cylinders and hollow cylinders, but not honeycombs or monoliths with voidages, mean that even cylindrical honeycombs or monoliths are not part of the Markush group? *See Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1360-61 (Fed. Cir. 2016) (holding that "selected from the group consisting of" means the claim element is closed to species other than those recited). Second, and relatedly, what is the significance of the fact that cylinders and hollow cylinders are found in one set of claims, but honeycombs and monoliths (even, perhaps, cylindrical ones) are found in a different set of claims, where neither set of claims depend from the other? (*Compare* '844 patent at 11:30-32 (claim 14) *with id.* at 11:33-36 (claim 15).) Third, does the specification's disclosure of "voidages larger than 50Å within the shaped particle" have any bearing on whether shaped particles not specifically claimed as "hollow" – *i.e.*, stars, asterisks, spirals, cylinders, and configured ribbons – may be partially hollow or otherwise possess some internal structure? (*See id.* at 10:29-30.)

Although there was some discussion of these matters in the briefs and at the hearing, and the parties specifically disagreed on whether honeycombs qualified as hollow cylinders, on the whole more briefing is needed on the intrinsic evidence before it is appropriate to rely heavily on extrinsic evidence. (Hr'g Tr. at 157, 163.) Therefore, I will defer construing the term "hollow cylinder" until after fuller briefing.

Accordingly, "cylinder" is hereby construed as "a substantially cylindrical shape." Inasmuch as "hollow cylinder" requires construction, I decline to construe it at this time.

5. "trapped air spaces"

The Parties disagree on the proper claim construction and have proposed the following constructions:

Relevant Claims	Ingevity	Respondents
'844 patent at claims 15, 28, 40, 52	**No construction required:** term should be given its plain and ordinary meaning as understood by a person of ordinary skill in the art in light of the intrinsic record.	"spaces where air or fuel vapors are prevented from escaping"

(JC at 4.)

Respondents' proposed construction takes an overly narrow view of "trapped." The specification discloses a "trapped air space" as a "method[] for diluting the vent-side region." ('844 patent at 7:18-26.) Dilution requires "contacting the fuel vapor" with adsorbent volumes, as recited in claim 1, where the adsorbent volumes "exhibit[] adsorption capacities achieved by volumetric dilution," as recited in claim 11. (*Id.* at 10:38, 11:16-17.) That is, the claims require air flow at least between initial and subsequent adsorbent volumes. (*E.g.*, *id.* at 12:51 (reciting a "fuel vapor flow path").) So Respondents' proposed construction is plainly incorrect, because a space where air or fuel vapor is prevented from escaping has no air flow, and necessarily cannot act as a volumetric diluent.

The specification sheds light on the issue. Volumetric dilution can be achieved "simply [with] trapped air spaces between layers of adsorbent." (*Id.* at 7:24-25.) "[S]imply trapped . . . between layers" suggests, first, simplicity – there is nothing in the space other than the vapor/air mixture – and second, that the vapor/air mixture is sandwiched between two objects – here, layers of adsorbent. And although the "trapped air space" must volumetrically dilute at least the

"subsequent adsorbent volume," nothing in the pertinent claims requires contact with layers of adsorbent, as opposed to, for instance, layers of inert foam. So one embodiment of a "trapped" air space is an air space that falls between two layers of material, either adsorbent or inert. Additionally, the space shown in Figure 2 below screen 2 may volumetrically dilute either or both adjacent adsorbent bodies, and it may thus constitute an embodiment of a "trapped air space" even though it is sandwiched between the canister wall and the adsorbents. Other configurations may also qualify as embodiments, so long as the "trapped air spaces" are: (1) otherwise empty, that is, air spaces; (2) located between two other components of the claimed system or canister, that is, internal to the system or canister; and (3) volumetric diluents.

Accordingly, "trapped air spaces" is hereby construed as "internal air spaces operative as volumetric diluents."

VI. PROCEDURAL ISSUES

I have construed the term "trapped air spaces" independently and have not relied on Complainants' points and authorities. And I have not considered patents assigned to Respondents in construing the claims. Respondents' objections to Complainants' arguments on these issues, to the extent they constitute motions to strike, are therefore denied as moot. (Hr'g Tr. at 169, 177.)

SO ORDERED.

Cameron Elliot
Administrative Law Judge

CERTAIN MULTI-STAGE FUEL VAPOR CANISTER SYSTEMS AND ACTIVATED CARBON COMPONENTS THEREOF

INV. NO. 337-TA-1140

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **Order No. 15** has been served upon the following parties as indicated, on JUN 2 1 2019.

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

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