



1401 Eye Street NW, Suite 800, Washington, DC 20005 • (202) 783-3300

January 5, 2024

Deanna Okun
(202) 626-8329
(202) 478-1950 Fax
dtokun@polsinelli.com

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

USITC Investigation No. 332-598
Total No. of Pages: 30

PUBLIC DOCUMENT

Re: Greenhouse Gas Emissions Intensities of the U.S. Steel and Aluminum Industries at the Product Level: Comments on Draft Questionnaire

Dear Secretary Barton:

On behalf of Outokumpu Stainless USA, LLC (“Outokumpu”), a domestic stainless steel producer, we hereby submit the following comments on the draft questionnaire issued by the International Trade Commission (“Commission”) for the factfinding investigation for the above-referenced proceeding as requested by the Commission.¹

¹ *Greenhouse Gas Emission Intensities of the U.S. Steel and Aluminum Industries at the Product Level; Proposed Information Collection; Comment Request; Greenhouse Gas (GHG) Emissions Intensity Questionnaire*, 88 Fed. Reg. 76,854 (Nov. 7, 2023); USITC, Draft Greenhouse Gas (GHG) Emissions Intensity Questionnaire (“USITC Draft Questionnaire”), https://www.usitc.gov/research_and_analysis/sa_emissions_draft_questionnaire_and_glossary.pdf.

I. General Comments on Reducing the Burden of the Draft Questionnaire

As an initial matter, Outokumpu expects that a company will likely require approximately 10 hours to respond to the questionnaire if the data is readily available, and up to 20 hours if not. Given the time required to fully complete the questionnaire, as other domestic steel producers testified in the hearing,² Outokumpu supports the Commission's distribution of the questionnaire in April 2024 after domestic producers have completed their annual statutory U.S. Environmental Protection Agency Greenhouse Gas Reporting Program ("EPA GHGRP") data submissions. Further, as the USTR noted that "{s}imilar requests will be made of the Commission in the future to account for developments in the domestic steel and aluminum industries," should the Commission decide to distribute a questionnaire again in the future for the data for 2023 or later, Outokumpu requests that the Commission continue to establish a questionnaire distribution schedule after the EPA GHGRP data submission deadline.³

Finally, to further mitigate the burden on respondents, Outokumpu requests that the Commission expand its Definitions/Glossary section in the questionnaire to include any definitions provided in its Proposed Methodology but not in the draft questionnaire.

II. The Commission Should Revise the Product Categories for Stainless Steel

The Commission's draft questionnaire currently categorizes stainless steel products into seven categories,⁴ but the Commission should further divide the hot-rolled flat stainless steel

² Hearing Tr. at 129 (Becker), 130 (Green).

³ June 5, 2023 letter from USTR to ITC, https://www.usitc.gov/research_and_analysis/sa_emissions_request_letter_332-598.pdf.

⁴ (1) Stainless semi-finished steel; (2) stainless hot-rolled flat steel products; (3) stainless cold-rolled flat steel products; (4) stainless seamless steel tubular products; (5) stainless non-seamless steel tubular products; (6) stainless hot-worked long steel products; (7) stainless cold-formed/finished long steel products. USITC Draft Questionnaire at 21-22.

product category into hot-rolled flat stainless steel that is annealed and/or pickled and hot-rolled flat stainless steel that is neither annealed nor pickled. Because emissions are created at certain key processing stages of stainless steel, it is necessary to identify the stainless steel product categories for an administrable emissions-based trade that accounts for the emissions from those key processing stages. In particular, in Outokumpu's experience, annealing (*i.e.*, heat-treating) and pickling (*i.e.*, removing iron oxide scale through a heated acid bath) result in noticeably different emissions intensities as these two processes both involve additional fuel combustion. Accordingly, hot-rolled stainless steel flat products that have undergone one or both of these processes will have higher emission intensities than hot-rolled stainless steel that has not (*i.e.*, "black band")⁵; calculating the average emission intensity of all hot-rolled products regardless of whether they have been annealed and/or pickled will artificially inflate the emission intensity of hot-rolled black band. Outokumpu therefore requests that the Commission divide its proposed category for hot-rolled stainless steel flat products into two subcategories in the final questionnaire – (1) hot rolled that has been annealed and/or pickled and (2) hot rolled that has been neither annealed nor pickled – which will result in eight categories that generally align with those proposed by Outokumpu in its Prehearing and Posthearing briefs,⁶ and will yield fair and accurate emissions

⁵ Stainless hot flat-rolled products can be sold either as "black" band, *i.e.*, not annealed or pickled, or as "white" band, *i.e.*, annealed and pickled.

⁶ Outokumpu Prehearing Brief at 40-41; Outokumpu Posthearing Brief at 16-17. Outokumpu suggested five categories, and eight total subcategories: (1) Semi-finished stainless steel; (2) **Hot-rolled flat stainless steel products**, including all plate, sheet, and strip, whether or not in coils, *neither annealed nor pickled*; (3) **Hot-rolled flat stainless steel products**, including all plate, sheet, and strip, whether or not in coils, *annealed and/or pickled*; (4) Hot-rolled long stainless steel products, including bars and rods, whether or not in coils, shapes, angles, or sections; (5) Cold-rolled flat stainless steel products, including all plate, sheet, and strip, whether or not in coils; (6) Cold-formed or cold-finished long stainless steel products; (7) Stainless pipe and tube; and (8) Wire, whether round or flat.

The Commission's proposed categories further divide Outokumpu's single proposed category for pipe and tube into seamless and welded pipe and tube; because Outokumpu does not produce pipe and tube products, it does

Continued on next page...

associated with each of these processes without creating an overly detailed and burdensome trade regime. Therefore, Outokumpu requests that the Commission revise the tables in the following questions in the draft questionnaire to incorporate this subdivision between hot-rolled flat stainless steel that has been annealed and/or pickled and hot-rolled flat stainless steel that has been neither annealed nor pickled (*i.e.*, black band):

- Question 2.1.1
- Questions 3.8-3.9
- Questions 3.11-3.12
- Question 5.1.3
- Questions 5.1.9a and b
- Question 5.1.17a

III. Comments on Scrap-related Questions in Sections 3 and 5

A. The Commission Should Revise its Definition of Run-Around Scrap to Prevent Potential Circumvention Issues

The Commission should redefine run-around scrap in the final questionnaire consistent with ISO 14021. The Commission currently defines “scrap, run-around” as “scrap that is generated within a facility and re-used as an input into the production processes at the same facility.”⁷

Specifically, Outokumpu recommends that the Commission revise the definition of “scrap, run-around” to incorporate limiting language consistent with ISO 14021 that will prevent circumvention of the material intended to be captured within this definition. This ISO definition distinguishes between two types of scrap – pre- and post-consumer scrap – and excludes from its

not weigh in on the appropriateness of this subdivision. Further, Outokumpu proposed an additional category for stainless steel wire products, which is not present in the Commission’s proposed categories.

⁷ USITC Draft Questionnaire at 14.

definition for pre-consumer scrap *any scrap re-used in the same process where it was generated without any processing before reuse*.⁸ Incorporating similar such language into the Commission's current definition of run-around scrap is necessary to prevent circumvention insofar as absent this language, a producer could produce slab, cut it up, deem it "scrap," and re-melt it. While this may not be cost effective, should the Commission continue to assign zero emissions to scrap⁹ (as recommended by Outokumpu and other producers¹⁰), doing so could artificially erase the emissions resulting from the first melting and casting. On the other hand, recovered material from the melting process would, consistent with the Commission's definition, remain run-around scrap – as it requires processing to recover that material – and be assigned zero emissions.

Thus, the definition of "scrap, run-around" should be revised as follows:¹¹

Scrap, run-around – also known as home scrap, internally generated scrap, internal scrap, turn-around scrap, or in-house scrap, is scrap that is generated within a facility and re-used as an input into the production processes at the same facility. *However, run-around scrap excludes any scrap that is reused, in any facility, in the same process in which it was generated without any processing before reuse.* The quantity of internally generated scrap

⁸ ISO defines scrap as follows: "scrap consists of material rejected or discarded material generated by a manufacturing process. *Scrap cannot be claimed as pre-consumer recycled material if it is fed back into and reused in the same process that generated it without any further processing before reuse.*" See, e.g., SCS Global Services, *Recycled Content Standard, V7.0* (Jul. 2014),

https://cdn.scsglobalservices.com/files/standards/scs_stn_recycledcontent_v7-0_070814.pdf (citing ISO14021:1999) (emphasis added); see also Outokumpu Posthearing Brief at 10.

⁹ USITC, Proposed Methodology for Generating Product-Level Emissions of U.S. Steel and Aluminum at 21, Nov. 7, 2023, https://www.usitc.gov/research_and_analysis/sa_emissions_proposed_methodology.pdf.

¹⁰ Outokumpu Posthearing Brief at 10; Hearing Tr. at 27 (Roa), 115 (Miracle), 119 (Becker), 122 (Hill).

¹¹ Although Outokumpu uses the facility-based structure proposed by the Commission, continuing to define run-around and externally-sourced scrap by "facility" is likely to impose an added burden for respondents to the questionnaire. When a producer has operations in multiple locations – *i.e.*, operates multiple facilities – it typically accounts for scrap produced in its steelmaking process at any location, and reused as an input into the melt and pour process, as home or internal scrap even if transferred between facilities. Meaning, for example, that cold-rolling trimmings at one facility may be transferred to the melt shop at a different facility within the same corporation and those trimmings would be considered home scrap. Accordingly, scrap is likely to be recorded on a company's books as home or run-around scrap but may, per the Commission's limitation by "facility," be properly reported here as "externally-sourced." Although ultimately both run-around and externally-sourced scrap will be assigned zero emissions, the need to account for this transfer against normal record-keeping will be an added burden for questionnaire respondents and underscores why, as argued in Outokumpu's prehearing and posthearing briefs, use of the EPA GHGRP's facility-based data is problematic here. See Outokumpu Prehearing Brief at 30; Posthearing Brief at 4.

does not usually affect the material balance sheet (raw material in and product out) of a facility.

This definition revision will clarify to respondents the scrap that should properly be reported in Question 5.1.14e.

B. The Commission Should Revise its Definition of Externally Sourced Scrap to Include “Blended Scrap” And Prevent Potential Circumvention Issues

Outokumpu further requests that the Commission revise its definition of “scrap, externally sourced,” which is currently defined only as “including” certain examples of scrap types – one of which is “pre-consumer scrap sourced from other facilities’ manufacturing processes.”¹² Outokumpu requests two revisions to this definition.

First, the Commission should incorporate into its “pre-consumer scrap” example similar language to that of ISO 14021 and proposed for inclusion in the run-around scrap definition. Again, absent such language, a producer could manufacture slab at one facility, deem it scrap, and report it as “externally sourced” scrap when re-melted at another facility.

Second, the Commission should include “blended scrap” as a type of externally sourced scrap in addition to pre-consumer scrap and post-consumer scrap.¹³ Blended scrap is produced by processors through shredding, followed by chemical analysis and sorting by alloy content; the sorted scrap is then blended to a customer’s preferred alloy specifications. It is a significant component of purchased scrap for stainless steel producers, including Outokumpu, because its known alloy content reduces the need for additional alloying elements in the melting and pouring

¹² USITC Draft Questionnaire at 14.

¹³ *Id.*

process.¹⁴ However, because of how the scrap is processed and blended before purchase, it is not knowable to Outokumpu whether (and how much of) the scrap is pre- or post-consumer scrap.

Therefore, Outokumpu requests that the Commission describe blended scrap as follows:

Revised Definition

Scrap, externally sourced – includes external fabrication scrap (pre-consumer scrap sourced from other facilities’ manufacturing processes, [other than scrap reused in the process that generated it without any further processing before reuse](#)), post-consumer scrap that has been recovered from end-of-life steel containing products (e.g., recycling of steel from cars), [and blended scrap \(e.g., scrap produced by processors through shredding, followed by chemical analysis and sorting by alloy content and then blended to a customer’s preferred alloy specifications\)](#).

This definition revision will clarify to respondents the scrap that should properly be reported in Question 5.1.18a.

C. The Commission Should Clarify Activities Constituting “Distributing Scrap” in Question 3.8

In Question 3.8, the Commission asks for the responding company’s quantity of fuel combustion associated with each steel-making process and lists as one of the process steps scrap processing including “shredding, processing, and distributing scrap.”¹⁵ With respect to “distributing scrap,” Outokumpu requests that the Commission clarify what the term “distributing scrap” means and what activities the Commission intended the term to. For example, it would be helpful for responding companies to understand whether “distributing scrap” refers to the distribution of externally-sourced scrap from the scrapyard to the steel producer; the internal transportation of scrap within a steel-making reporting facility; or is intended to cover other activities.

¹⁴ Outokumpu Posthearing Brief at 10 (citing Hearing Tr. at 138-39 (Kaplin)).

¹⁵ USITC Draft Questionnaire at Question 3.8.

IV. Comments on Section 5. Uses and Sources of Production Inputs

A. The Commission Should Standardize the List of the Countries of Melt and Pour Across Questions

Throughout Section 5.1, the Commission asks for information on the country of melt and pour for steel products including semifinished, hot- and cold-rolled flat steel, and tubular products.¹⁶ The Commission should continue to require this information in the final questionnaire to accurately determine the emissions intensity of stainless steel products, because the emissions for products in trade should be tied to where that steel was melted and poured.¹⁷ However, the Commission should standardize its list of countries across all questions and ensure the lists identify countries with significant melt and pour capacity such as China and Indonesia.

As discussed in Outokumpu's Prehearing and Posthearing briefs, the countries with excess, export-oriented stainless steelmaking capacity are more likely to provide intermediate steel products for downstream production, and steel sourced from these countries is more likely to have higher embedded emissions due to a lopsided prevalence of BF/BOF stainless steel production in these countries. For example, while all U.S. stainless steel production occurs via EAF, China and Indonesia have rapidly increased their stainless steel production capacity from 5.5 percent in 2000 to 67 percent in 2020,¹⁸ up to two-thirds of which is BF/BOF.¹⁹ As such, calculating the emissions

¹⁶ USITC Draft Questionnaire at Question 5.1.16f (semifinished), 5.1.17f (hot-rolled flat steel), 5.1.18f (cold-rolled flat steel), 5.1.19f (seamless steel tubular), 5.1.20f (non-seamless steel tubular), 5.1.21f (hot-worked long steel).

¹⁷ As discussed in Outokumpu's prehearing and posthearing briefs, country of melt and pour is frequently taken into account in addressing downstream steel products. Outokumpu Prehearing Brief at 38-39; Posthearing Brief at 18-20.

¹⁸ See People's Daily, *Stainless Steel Consumption Increasing* (Apr. 3, 2002), <http://www.china.org.cn/english/investment/30046.htm>; SMM, *China Stainless Steel Production Growth to Slow in 2020* (Dec. 20, 2019), <https://news.metal.com/newscontent/101007695/china-stainless-steel-production-growth-toslow-in-2020%C2%A0/>; see also Emmanouil N. Zevgolios and Konstantinos A. Daskalakis, *The Nickel Production Methods from Laterites and the Greek Ferronickel Production among Them* (Jan. 24, 2022), <https://www.mdpi.com/2673-4605/5/1/104>.

¹⁹ Sources: CRU Capacity Data, SMR Company group profiles, and Global Energy Monitor.org.

intensity of the domestic stainless steel industry for steel produced from domestically-melted versus foreign-melted steel will enable USTR to compare and contrast the emissions intensity of the products and better address the destabilizing impacts of steel excess capacity.

Furthermore, around 68 percent of the GHG emissions from stainless steelmaking are associated with the melt and pour process,²⁰ and the emissions are much more significant for stainless steel produced via BF/BOF. As the emissions intensity of the domestic stainless steel industry will depend heavily on where and how the initial steel product was melted and poured, providing the information on country of melt and pour will allow USTR to compare and contrast the emissions intensity of the domestic stainless steel industry. Therefore, the Commission should continue to require that producers report this information in its final questionnaire, take the country of melt and pour into account in choosing an emission factor for the steel input, and calculate the emissions intensity of the domestic stainless steel industry *separately* for steel produced from domestically-melted versus foreign-melted steel.

In requesting country of melt and pour information from respondents, however, Questions 5.1.16f, 5.1.17f, and 5.1.18f each list different countries of melt and pour for semi-finished, hot-rolled and cold-rolled flat steel products, respectively. Moreover, each question's list of countries omits countries with significant melt and pour capacity, such as China and Indonesia. The Commission should revise each of the tables in those three questions to list the same potential countries of melt and pour. That list should incorporate all countries with stainless steel melt and pour capacity as indicated by the U.S. Department of Commerce's Steel Import Monitoring and

²⁰ See, e.g., Wenjing Wei, *Assessment of Raw Materials in Stainless Steelmaking-Their Energy Consumption and Greenhouse Gas Emission* (2021), <https://www.diva-portal.org/smash/get/diva2:1587886/FULLTEXT01.pdf>; see also Outokumpu Prehearing Brief at 38-39; Outokumpu Posthearing Brief at 18-20.

Analysis (“SIMA”) Melt and Pour Dashboard.²¹ Accordingly, the first column in each of the tables in Questions 5.1.16f, 5.1.17f, and 5.1.18f should be revised to list the following countries of melt and pour:

Country of melt and pour
Australia
Belgium
Brazil
Canada
China
France
Finland
Germany
India
Indonesia
Italy
Japan
Korea
Mexico
Netherlands
Romania
Russia
Slovenia
South Africa
Spain
Sweden
Taiwan
Thailand
United Kingdom
Vietnam
All other or unknown country sources of melt and pour
Total

B. The Commission’s Questionnaire Should Redefine Iron Sinter To Exclude Sinter Used As An Alloy Source

²¹ International Trade Administration, Melt and Pour Dashboard, <https://www.trade.gov/data-visualization/melt-and-pour-dashboard>.

The Commission’s draft questionnaire defines “iron sinter” as “a fused aggregate of fine iron-bearing materials ... composed of a combination of ore fines, other finely divided iron-bearing material, and fuel ... and is typically 15–25 mm in size.”²² The Commission requests information on iron sinter production and consumption in various sections.²³ However, as currently defined, the Commission will encompass a sinter product used in stainless steel production which is more appropriately treated as an alloy source. Accordingly, the Commission should revise its definition of iron sinter to exclude this product.

While the carbon steel industry uses iron sinter that (upon Outokumpu’s information and belief) is nearly 100 percent iron as an iron source, the stainless steel industry uses sinter-based products, including sinter cake and briquettes, that are iron sinter with a high alloy content – typically nickel – and which replace an alternate alloy source, such as ferronickel.²⁴ This input is typically named for nickel if it is present in any appreciable quantity, *e.g.* nickel sinter cake or nickel briquette. Because the Commission’s draft questionnaire does not define iron sinter as having a maximum alloy threshold,²⁵ it is Outokumpu’s understanding that the Commission intended to ask about iron sinter in terms of iron source. To reflect the stainless steel industry’s use of high-alloy sinter cake as an alloy source, however, Outokumpu requests that the Commission revise its definition of iron sinter and to direct that all other sinter products be reported

²² USITC Draft Questionnaire at 12.

²³ USITC Draft Questionnaire at Questions 1.2.3, 5.1.2, and 5.1.8a.

²⁴ *See, e.g.*, Soft Magnetic Alloys.Com, Process for Manufacturing a Soft Magnetic Body of an Iron-nickel Alloy, https://www.softmagneticalloy.com/soft_magnetic_iron_nickel_alloy.html; *see also* Outokumpu Posthearing Brief Attachment 1 at 16. Sinter cake and briquettes are both sinter-based inputs that contain iron and alloy material, but are different in form: sinter cake is shaped like a porous sponge while nickel briquettes are dense and compact in form.

²⁵ The draft questionnaire currently defines iron sinter as “a fused aggregate of fine iron-bearing materials suited for use in a blast furnace. Sinter is composed of a combination of ore fines, other finely divided iron-bearing material, and fuel (typically coke breeze), and is typically 15–25 mm in size.” USITC Draft Questionnaire at 12.

as an alloy source (as further explained in Section V.B, below). In particular, the Commission should revise the definition of iron sinter to include a 65 percent threshold on the iron content. Any sinter input exceeding this threshold is considered to be iron sinter while all sinter inputs with iron content below the threshold²⁶ are considered to be an alloy source attributed to nickel or, if nickel is only present in a miniscule quantity, the highest alloy content among nickel, manganese, silicon, chromium, and molybdenum.

Revised Definition:

- **Iron sinter** – a fused aggregate of fine iron-bearing materials suited for use in a blast furnace. Sinter is composed of a combination of ore fines, other finely divided iron-bearing material, and fuel (typically coke breeze), and is typically 15–25 mm in size. **To be considered iron sinter, sinter must contain more than 65 percent iron content.**

Further, Outokumpu requests that the Commission request information regarding consumption of high-alloy sinter inputs as an alloy source as discussed in Section V.B. below.

V. The Commission Should Request Specific Alloy Usage Data and Utilize Alloy-specific Emissions Factors

A. The Commission Should Revise Its Definitions of “Alloying metals”

The Commission’s current draft questionnaire defines “alloying metals” as “metallic elements added during the melting of *aluminum* for the purpose of increasing corrosion resistance, hardness, or strength. Alloying metals *used in steel* are referred to as ‘ferroalloys’ (see below).”²⁷ The draft questionnaire further defines “ferroalloys” as “alloys of iron with one or more other metals, which are added to molten metal during the production of steel. The alloying metals delivered by ferroalloys impart distinctive qualities to steel such as control of inclusions, corrosion

²⁶ Alloy sinters can take a variety of forms.

²⁷ USITC Draft Questionnaire at 6 (emphasis added).

resistance, deoxidation, desulfurization, heat resistance and strength. Examples include ferrochromium, ferronickel, ferromanganese, and ferrosilicon.”²⁸

The definition of “Alloying metals” is problematic insofar as it suggests that all alloying agents in steel products are ferroalloys. This is incorrect. A wide variety of nonferrous alloying elements can be, and are, used in stainless steel production – including but not limited to nickel metal, manganese, molybdenum trioxide, aluminum, and copper. Moreover, certain iron- and alloy-containing materials, such as the sinter inputs (cake and briquettes) discussed above, are not considered within the industry to be ferroalloys. The definition of “Ferroalloys” is correct as relates to smelted and reduced ores – but incorrect insofar as the alloying elements can also be delivered in alternative forms.

Accordingly, Outokumpu suggests that the definition of “Alloying metals” be expanded as follows:

Revised Definition:

- **Alloying elements** –elements added during the melting of **steel or** aluminum for the purpose of **controlling inclusions, or** increasing corrosion resistance, hardness, or strength. Alloying metals used in steel **may include** “ferroalloys” (see below).

B. The Commission Should Ask for Information on Not Only Traditional Ferroalloys But All Non-scrap Alloy Sources

The Commission’s current draft questionnaire requests individual consumption data for ferrochromium, ferronickel, and ferromanganese while aggregating data for all other ferroalloys and, separately, all non-ferrous alloys.²⁹ However, as Outokumpu stated in its Prehearing and

²⁸ *Id.* at 10-11.

²⁹ See USITC Draft Questionnaire at Question 5.1.1.

Posthearing briefs,³⁰ the Commission should collect individual data on not only traditional ferroalloys but also for all non-scrap alloy sources.

Importantly, alloys provide the essential characteristics of stainless steel and have a disproportionate impact on both cost and emissions. For instance, common stainless steel grade 304 requires approximately 8 percent nickel, but that nickel content constitutes approximately 50 percent of the domestic price for stainless steel. Therefore, stainless steel producers are constantly searching for ways to decrease their alloy costs. One such method used by many Chinese and Indonesian stainless steel producers is to rely heavily on cheap and dirty low-grade nickel pig iron, despite the fact that the extraction and processing of low-grade nickel pig iron contribute heavily to the GHG emissions of the resulting steel product.

However, as Outokumpu testified at the hearing, even domestic stainless steel producers use alternative sources of alloys beyond their traditional ferrous versions.³¹ For example, what is conventionally considered within the stainless steel industry to be ferronickel (around 30 percent nickel and 70 percent iron)³² is not the sole source of nickel for stainless steel; instead, stainless steel producers may use other sources including nickel metal (nearly 100 percent nickel), nickel briquettes (typically 12 percent nickel and 10 percent chrome), nickel sinter cake (typically around 10 percent nickel and 12 percent chrome) or nickel pig iron (typically around 4 to 10 percent nickel). Notably, these alloy sources have wildly different emission intensities, with the emissions intensities of alloy sources generally inversely related to the percentage of nickel in the source.

³⁰ Outokumpu Prehearing Brief at 27; Outokumpu Posthearing Brief at 6-9.

³¹ Hearing Tr. at 155 (Kaplin) (“{W}e can take nickel from many sources.”).

³² See, cf. Nickel Institute, Ferronickel Life Cycle Data, <https://nickelinstitute.org/media/8d9bf11555fd1ac/202112-lca-ferronickel.pdf> (noting that the analysis considered “734,000t ferronickel with an average nickel content of 27%”).

For instance, the Nickel Institute recently calculated an average emissions intensity of 13 kg CO₂/kg Ni for high purity nickel metal³³ and an average emissions intensity of 45 kg CO₂/kg Ni for ferronickel.³⁴ The emissions intensity of nickel pig iron is substantially higher – between 60 and 85 t CO₂/t Ni.³⁵

For these reasons, the Commission should request information on all non-scrap alloys to avoid the possibility of obfuscating and omitting significant sources of emissions for stainless steel producers. In addition, the Commission should request information from respondents regarding the average alloy content for those sources. As Outokumpu explained in its Posthearing brief,³⁶ aggregating all ferronickel together conflates high-nickel content inputs with low-nickel content inputs. In addition, this aggregation obscures the emissions of producers relying on alloy sources other than conventional ferronickel, ferrochrome, and ferromanganese. For example, as Outokumpu testified during the hearing,³⁷ if a producer were to utilize nickel briquettes and respond to the Commission’s questionnaire as proposed, the producer could report this as either “ferronickel” (because it contains both iron and nickel, albeit at a higher nickel percentage, and therefore has a higher emission intensity) or as an “{o}ther ferrous alloying element{” (because

³³ Nickel Institute, Nickel Metal Life Cycle Data, <https://nickelinstitute.org/media/4809/lca-nickel-metal-final.pdf>.

³⁴ Nickel Institute, Ferronickel Life Cycle Data, <https://nickelinstitute.org/media/4861/lca-ferronickel-final.pdf>. Within the stainless steel industry, ferronickel is traditionally considered to be around 30 percent nickel and 70 percent iron. *See, cf.* Nickel Institute, Ferronickel Life Cycle Data, <https://nickelinstitute.org/media/8d9bf11555fd1ac/202112-lca-ferronickel.pdf> (noting that the analysis considered “734,000t ferronickel with an average nickel content of 27%”). The Nickel Institute *explicitly did not* calculate the emission intensity of nickel pig iron, which it considers a different and higher-emission product. *See* Nickel Institute, Ferronickel Life Cycle Data Q&A at 4, https://nickelinstitute.org/media/8d953376335b45d/lifecycledata-faq-update2020_new_july2021.pdf.

³⁵ worldstainless CO₂ Emissions Report at 8 (2021), https://www.worldstainless.org/files/issf/non-image-files/PDF/worldstainless_CO2_Emissions_Report.pdf.

³⁶ Outokumpu Posthearing Brief at 9.

³⁷ Hearing Tr. at 155 (Kaplin) (“We can use nickel briquettes, . . . and then somebody says, but that’s out of scope. So you should instead say nickel sources to get them all. Otherwise, there’s a risk of circumvention by just renaming to or having a slightly different approach to.”).

it is not conventional ferronickel, and may obtain a more beneficial emissions factor).³⁸ Therefore, the Commission should request individualized data regarding stainless steel producers' use of all forms of these alloys, ferrous and all other non-scrap alloy sources alike, and the alloy content of the source.

At minimum, Outokumpu requests that the Commission gather data for individual alloy sources **with a focus on nickel, chromium, manganese, molybdenum, and silicon** for stainless steel producers. These five alloys are used in significant quantities in stainless steel and have the largest impact on emissions. In light of the above, Outokumpu requests that the Commission revise the tables in Questions 5.1.1 and 5.1.10b as follows:

Question 5.1.1

Material	Did your facility use this material as a production input? (<i>check if yes</i>)
Natural gas (used as a reductant or cooling agent)	
Metallurgical coal (excluding metallurgical coke or coke breeze)	
Iron pellets	
Other agglomerated iron ore products (e.g., nodular and extruded iron)	
Sources of nickel	
Sources of chromium	
Sources of manganese	
Sources of molybdenum	
Sources of silicon*	
Other alloying elements (not embodied in scrap nor used in coating)	
Carbon electrodes	
Ferrous scrap	
Direct reduced iron (DRI) or hot briquetted iron (HBI)	

³⁸ See also Outokumpu Posthearing Brief at 9 & n.26.

Question 5.1.10b

Alloy Source³⁹		Specify the average alloy content	Quantity of material used by your facility for stainless steel production, by alloy type (short tons (st))
Sources of nickel	Ferronickel		
	Nickel metal		
	Nickel briquettes		
	Nickel sinter cake		
	Nickel matte		
	Nickel pig iron		
	Other: ⁴⁰ _____		
Sources of chromium	Ferrochrome		
	Other: ⁴¹ _____		
Sources of manganese	Ferromanganese		
	Other: ⁴² _____		
Sources of molybdenum	Ferromolybdenum		
	Molybdenum Trioxide		
	Other: ⁴³ _____		
Sources of silicon	Ferrosilicon		
	Other: ⁴⁴ _____		
All other alloy sources used ⁴⁵			

³⁹ When an alloy source contains more than one alloy, it should be reported as a nickel alloy if nickel is present at more than 1 percent, and otherwise as the alloy with the greatest percentage among chromium, manganese, molybdenum, or silicon; otherwise, it should be reported as an “other” alloy source used.

⁴⁰ Reporting companies should specify what “other” nickel sources they are reporting for this question. If more than one “other” source is used, please specify here each nickel source, the average nickel content of that source, and the quantity of material used by your facility for stainless steel production: _____.

⁴¹ Reporting companies should specify what “other” chromium sources they are reporting for this question. If more than one “other” source is used, please specify here each chromium source, the average chrome content of that source, and the quantity of material used by your facility for stainless steel production: _____.

⁴² Reporting companies should specify what “other” manganese sources they are reporting for this question. If more than one “other” source is used, please specify here each manganese source, the average manganese content of that source, and the quantity of material used by your facility for stainless steel production: _____.

⁴³ Reporting companies should specify what “other” molybdenum sources they are reporting for this question. If more than one “other” source is used, please specify here each molybdenum source, the average molybdenum content of that source, and the quantity of material used by your facility for stainless steel production: _____.

⁴⁴ Reporting companies should specify what “other” silicon sources they are reporting for this question. If more than one “other” source is used, please specify here each silicon source, the average silicon content of that source, and the quantity of material used by your facility for stainless steel production: _____.

⁴⁵ Please report what “other” alloying elements were used, along with the average alloy content of that source (for the alloy constituting the highest percentage content of that source) and the quantity of material used by your facility for stainless steel production: _____.

C. The Commission Should Utilize Alloy-Specific Emissions Factors

Outokumpu recommends that the Commission use actual emission factors for each alloy where available, and a standard emission factor appropriate to the specific alloy source and the region in which an intermediate steel product was produced when actual emission factors are not available.

In its proposed methodology, the Commission indicates its intent to use emission factors as follows: (1) for ferrochromium and ferronickel used in the production of stainless steel, input-specific scope 3 emission factors will be used; (2) ferromanganese, all other ferroalloys, and all nonferrous metallic additives, a standard emission factor for crude cast steel will be used.⁴⁶

This approach is problematic as relates to stainless steel production for multiple reasons. In Outokumpu's experience, Scope 3 emissions can account for up to two-thirds of the footprint of stainless steel,⁴⁷ and approximately 70 percent of Scope 3 emissions are derived from alloy sources, including ferroalloys and other non-scrap sources of nickel and chromium. Accordingly, the emission factor assigned to the alloy sources for stainless steel products has the potential to substantially (and artificially) undercount or inflate the emissions embedded in those products.

i. Ferrochromium

First, the use of a standard emission factor for ferrochromium is concerning in light of the wide variation in emission factors based on producer. Outokumpu proudly produces its own ferrochrome with an emission intensity 70 percent lower than the global ferrochrome industry

⁴⁶ USITC Proposed Methodology at 20.

⁴⁷ Nick Smith, *Interview: 'Sustainability is a guiding principle for today's buyers' – Camilla Kaplin, Outokumpu*, Engineering and Technology (Dec. 2, 2022), <https://engx.theiet.org/b/articles/posts/interview-sustainability-is-a-guiding-principle-for-today-s-buyers---camilla-kaplin-outokumpu>.

average: 1.6 t CO₂/t FeCr, as opposed to the industry average of 5.6 t CO₂/t for the same chrome content.⁴⁸ Outokumpu uses its internally produced ferrochrome for its production of stainless steel at its Calvert, AL mill, where it manufactures a substantial portion of all stainless steel produced domestically. Accordingly, use of a standard emission factor rather than an actual emission factor would artificially inflate the emission intensity of the domestic stainless steel industry as relates to the products Outokumpu produces. To the extent that other domestic stainless steel producers also make similar responsible sourcing efforts, these impacts would be substantially larger. Accordingly, the Commission should request, and use, an actual emission factor for ferrochrome.

However, to the extent that the Commission continues to use a standard emission factor, it should take both source country and the chromium content into account. Although the global ferrochrome industry average emission intensity is 5.6 t CO₂/t FeCr for the same chrome content, certain countries' industries are better on average, while others are worse on average. Accordingly, the source country of the ferrochromium provides a general indication of the emissions intensity of ferrochromium used by the producer.

Moreover, the emissions embedded in ferrochromium depend in large part on its chromium content (or, conversely, its carbon content). Low-carbon ferrochrome – generally ferrochrome with 70 percent or more chromium content – has a higher emission factor than standard ferrochrome which has a chromium content of between 50 and 60 percent. Accordingly, the Commission should request – and use – the actual emission factor for stainless steel producers' ferrochrome where known and rely on a standard ferrochrome emission factor only where not

⁴⁸ See Outokumpu Posthearing Brief, Attachment 1 (Responses to Staff Questions) at 17 and Confidential Attachment 2; *see also* Outokumpu, Annual Report 2022, Sustainability Review at 37, 42, <https://www.outokumpu.com/en/investors/materials/2022>.

known. If the Commission does not use an actual emission factor, the Commission should request the source country and average chrome content of all consumed ferrochromium reported in Question 5.1.10b and utilize a country-specific emission factor reflecting that chrome content.

ii. *Ferronickel*

Second, the use of a standard emission factor for ferronickel is troubling, particularly when there is ambiguity in the Commission's questionnaire as to what should be reported as ferronickel. As discussed above, ferronickel is traditionally considered within the stainless steel industry to contain around 30 percent nickel and 70 percent iron.⁴⁹ The Nickel Institute has calculated an average emissions intensity of 45 kg CO₂/kg Ni for ferronickel,⁵⁰ meaning that conventional ferronickel would have an emission factor of 13.5 t CO₂/t (*i.e.*, 30% Ni * 45 kg CO₂/kg Ni). However, nickel sinter cake is also predominately iron and nickel and has a nickel content of, typically, around 12 percent. The Commission's draft questionnaire does not define ferronickel, so it is unclear whether nickel sinter cake would be more appropriately reported as ferronickel (because it is predominately iron and nickel) or as an "other" ferroalloy (because it is not conventional ferronickel). If reported as ferronickel and the standard emission factor for ferronickel were used for that input, it would artificially more than double the emissions associated

⁴⁹ See, *cf.* Nickel Institute, Ferronickel Life Cycle Data, <https://nickelinstitute.org/media/8d9bf11555fd1ac/202112-lca-ferronickel.pdf> (noting that the analysis considered "734,000t ferronickel with an average nickel content of 27%").

⁵⁰ Nickel Institute, Ferronickel Life Cycle Data, <https://nickelinstitute.org/media/4861/lca-ferronickel-final.pdf>. Within the stainless steel industry, ferronickel is traditionally considered to be around 30 percent nickel and 70 percent iron. See, *cf.* Nickel Institute, Ferronickel Life Cycle Data, <https://nickelinstitute.org/media/8d9bf11555fd1ac/202112-lca-ferronickel.pdf> (noting that the analysis considered "734,000t ferronickel with an average nickel content of 27%"). The Nickel Institute *explicitly did not* calculate the emission intensity of nickel pig iron, which it considers a different and higher-emission product. See Nickel Institute, Ferronickel Life Cycle Data Q&A at 4, https://nickelinstitute.org/media/8d953376335b45d/lifecycledata-faq-update2020_new_july2021.pdf.

with that input (12% Ni * 45 kg CO₂/kg Ni = 5.4 t CO₂/t nickel sinter cake, as opposed to 13.5 t CO₂/t conventional ferronickel).

Similarly, nickel pig iron consists predominately of nickel and iron, but is produced through a different process than conventional ferronickel, resulting in substantially higher emissions per ton of nickel in pig iron: worldstainless estimates an emission intensity of between 60 and 85 t CO₂/t Ni in nickel pig iron.⁵¹ Again, because the Commission's draft questionnaire does not define ferronickel, nickel pig iron could be reported as either ferronickel (because it contains primarily iron and nickel) or as an "other" ferroalloy (because it is not conventional ferronickel). If reported as ferronickel and the standard emission factor for ferronickel were used for that input, it would artificially alter the Commission's calculation of the emission intensity of the domestic stainless steel industry.

Accordingly, the Commission should request that producers report all sources of nickel, with their average nickel content. The Commission should further request and use an actual emission factor for the nickel input where known. When an actual emission factor for the nickel input is not known, the Commission should use an emission factor specific to the nickel source and the average nickel content in that source as used by the reporting producer. For example, if a producer utilizes conventional ferronickel and also nickel sinter cake, the Commission would use standard emission factors specific to each of those inputs' nickel contents – *i.e.*, 13.5 t CO₂/t FeNi and 5.4 t CO₂/t nickel sinter cake.

iii. *Ferromanganese*

⁵¹ worldstainless CO₂ Emissions Report at 8 (2021), https://www.worldstainless.org/files/issf/non-image-files/PDF/worldstainless_CO2_Emissions_Report.pdf.

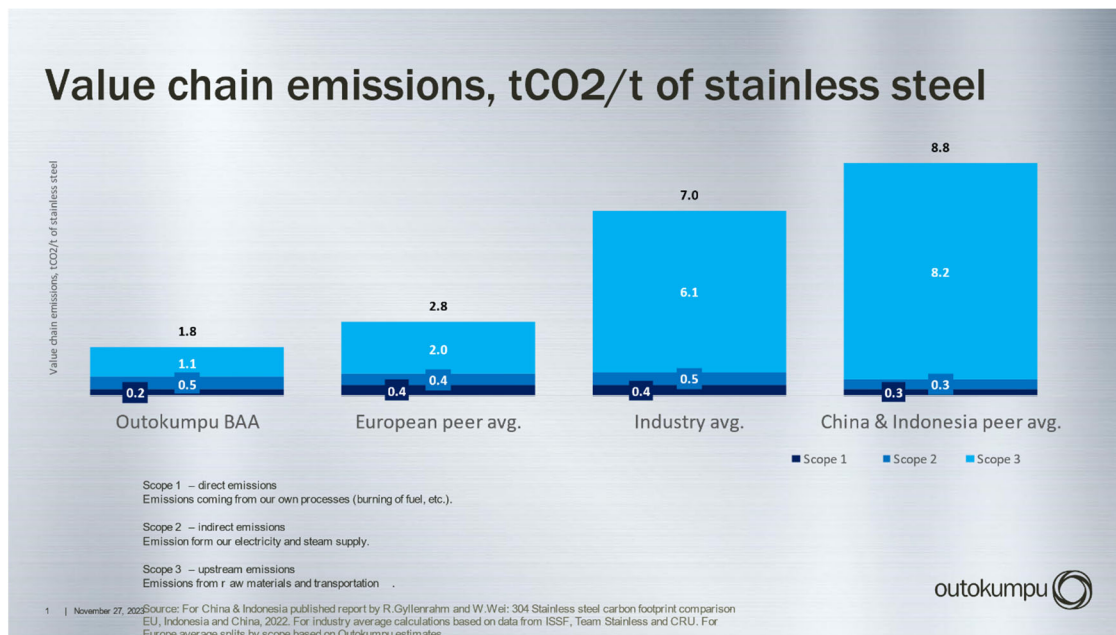
The use of a global crude cast stainless steel emission factor for ferromanganese has the potential to substantially inflate the emission intensity of products manufactured by the domestic stainless steel industry. The use of a regional crude cast stainless steel emission factor lessens this inflation but still has the potential to distort the Commission's calculations. Accordingly, we recommend that the Commission request that producers report all sources of manganese, with their average manganese content. The Commission should further request, and use, an actual emission factor for each manganese source where known, and a standard emission factor specific to the manganese source (based on the manganese content of that source) where not known.

As explained in Outokumpu's Prehearing and Posthearing briefs, the emissions embedded in crude stainless steel melted and poured in Asia, particularly China and Indonesia, are more than triple the emissions embedded in the same product melted and poured in the United States or Europe.⁵² Outokumpu's production at Calvert results in just shy of 2 MT of CO₂-equivalent per metric ton of stainless steel,⁵³ which Outokumpu believes is similar to or somewhat lower than its domestic peers. In contrast, Chinese and Indonesian stainless steel production results in 8.8 t CO₂/t of stainless steel on average (*i.e.*, inclusive of EAF production in those countries) and closer to 10 t CO₂/t of stainless steel when focused on BF/BOF production alone.⁵⁴ Moreover, due to the recent stainless steel capacity expansion in China and Indonesia, the global stainless steel emissions intensity factor is being dragged upwards – now approximately 7 t CO₂/t of stainless steel.

⁵² Outokumpu Posthearing Brief Attachment 1 at 6-10.

⁵³ Hearing Tr. at 91-92 (Weinert).

⁵⁴ Outokumpu Posthearing Brief Attachment 1 at 7-8 (citing worldstainless, CO₂ Emissions Report: Industry Emissions and Related Data at 9, https://www.worldstainless.org/files/issf/non-image-files/PDF/worldstainless_CO2_Emissions_Report.pdf).



The emission intensity of ferromanganese, in contrast, depends on its carbon and manganese content – but, in any event, is far lower than this global crude steel emission average. The Intergovernmental Panel on Climate Change (“IPCC”) Emission Factor Database supplies emission factors for ferromanganese of between 1.3 t CO₂/t FeMn and 1.6 t CO₂/t FeMn.⁵⁵ Therefore, should the Commission elect to use a domestic industry average stainless steel emission factor for alloy sources of approximately 2.0 t CO₂/t, the emissions from ferromanganese would be approximated but potential overstated; use of a global crude stainless steel emission factor of 7 t CO₂/t would nearly triple the emissions associated with stainless steel producers’ use of ferromanganese. The Commission should therefore request that producers report all sources of manganese, with each source’s average manganese content. In addition, the Commission should request, and use, an actual emission factor for each manganese source where known, and a standard

⁵⁵ Attachment 1, also available at https://www.ipcc-nggip.iges.or.jp/EFDB/find_ef.php. The emission factor Outokumpu uses for ferromanganese is contained in its Posthearing Brief at Confidential Attachment 2.

emission factor specific to the manganese source (based on the manganese content of that source) where not known.

iv. *All Other Ferroalloys and Nonferrous Metallic Additives*

The use of a crude cast stainless steel emission factor for all other ferroalloys and non-ferrous metallic additives in the Commission's calculation has the potential to considerably misrepresent the emission intensity of the domestic stainless steel industry. The emission factors for alloys vary widely both among alloys and among sources for a particular alloy. Take silicon, for example. Silicon is utilized in stainless steel production as a reducing agent, with a small amount of the silicon input remaining in the steel product as an alloy. Accordingly, silicon can be used in significant amounts, notwithstanding that very relatively little of that input remains in the stainless steel product. The IPCC provides emission factors for ferrosilicon of between 1.09 t CO₂/t FeSi (in 1996 for 50% Si) and 6.5 t CO₂/t FeSi (in 1996 for 90% Si).⁵⁶ In contrast, the emission factor for nickel metal is 13 kg CO₂/kg Ni.⁵⁷ No crude steel emission factor, whether regional or global, can approximate a producer's alloy input mix when these emission factors vary so widely. Accordingly, Outokumpu recommends that the Commission request that producers report all sources of alloys, with their average alloy content. The Commission should further request, and use, an actual emission factor for each alloy source where known, and where not known, a standard emission factor specific to the alloy source and reflecting the alloy content of that source.

⁵⁶ https://www.ipcc-nggip.iges.or.jp/EFDB/find_ef.php?ipcc_code=2.C.2&ipcc_level=2.

⁵⁷ Nickel Institute, Nickel Metal Life Cycle Data, <https://nickelinstitute.org/media/4809/lca-nickel-metal-final.pdf> (calculating an average nickel metal emission intensity of 13 kg CO₂/kg Ni).

VI. The Commission Should Clarify How to Treat Processes Undertaken by Respondents Using Leased Facilities

In Section 5 of the draft questionnaire, the Commission requests Scope 2-related information such as the quantity of natural gas used by the reporting facility in different processes ranging from iron sinter production to other steelmaking processes.⁵⁸ The directions, however, do not address whether and how the respondent should report emissions when it is using leased facilities for steelmaking processes (such that the producer does not know the actual fuel or electricity consumption), or when a respondent is leasing those facilities to another producer for use (and, therefore, its fuel or electricity consumption from the facility is not wholly attributable to its own production). In the final questionnaire, the Commission should clarify and specify how respondents should report processes undertaken in leased facilities in those questions.

* * * * *

Thank you for your attention to these comments. Please do not hesitate to contact the undersigned if you have any questions regarding this submission.

Respectfully submitted,



Deanna Tanner Okun
Lydia C. Pardini
Alissa Chase
Joonho Hwang

Polsinelli PC
1401 Eye ("I") Street, N.W.
Washington, DC 20005
(202) 783-3300

⁵⁸ See USITC Draft Questionnaire at 39-51.

The Honorable Lisa R. Barton
January 5, 2024
Page 26

dtokun@polsinelli.com
Counsel for Outokumpu Stainless USA, LLC

Dated: January 5, 2024

Attachment 1

IPCC web sites ▾

Home	Basic search	Fulltext search	Search by ID	Statistics	Documents	Help
------	--------------	-----------------	--------------	------------	-----------	------

Emission Factor Detail (ID: 214105)

Administrative information

Data Provider:	IPCC
Data Provider Country:	(Not applicable)
Data Provider Contact:	ipcc-efdb@iges.or.jp
Date calculated:	Unknown
Date submitted to EFDB by Data Provider:	(Not applicable)
Date posted to EFDB by IPCC:	

Technical information

Gas:	CARBON DIOXIDE
IPCC 1996 Source/Sink Category:	2C2 - Ferroalloys Production
IPCC 2006 Source/Sink Category:	2.C.2 - Ferroalloys Production
Properties	
Technologies/Practices:	
Parameters/Conditions:	Type of Ferroalloy: Ferromanganeses (7% C) (FeMn)
Region/Regional Conditions:	
Abatement/Control Technologies:	
Others:	
Description:	CO2 Emission Factor for Ferroalloy Production
Value:	1.3 tonne CO2/tonne ferroalloy produced
Value in common units:	
Equation:	Equation 4.15 in Volume 3 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
IPCC Worksheet:	2C2, Sheet 1 of 2, in Annex 1 (page A1.18) of Volume 3, 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Worksheet 2-11, Sheet 4 of 11, Vol.2 of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories (Volume 3, Chapter 4, Table 4.5)
Technical Reference:	Olsen, S.E. (2004). "CO2 Emissions from the Production of Manganese Alloys in Norway", STF80A04010, SINTEF, Trondheim 2004.
Reference language:	English
Abstract in English:	
Uncertainties expressed as 95% confidence limit:	Upper: <+25% Lower: >-25%
Data quality:	Unknown
Distribution shape:	
Data quality reference:	
Other info on data quality:	

Usage/Review information

Type of parameter:	2006 IPCC default
Comments from the data provider:	If any bio-carbon is used, this factor cannot be employed. For FeMn alloys the emission factors are based on production where the Mn containing raw materials are a mixture of oxide ores, carbonate ores and imported Mn-sinter. If the sinter is produced abroad it will not give any contribution to the national greenhouse gas inventory. Emission from sinter production must be reported where the production is located.
Comments from others:	
Link:	

[Back to Search Results](#)[Report to DOC](#)[Report to XLS](#)

IPCC web sites ▾

Home	Basic search	Fulltext search	Search by ID	Statistics	Documents	Help
------	--------------	-----------------	--------------	------------	-----------	------

Emission Factor Detail (ID: 214106)

Administrative information

Data Provider:	IPCC
Data Provider Country:	(Not applicable)
Data Provider Contact:	ipcc-efdb@iges.or.jp
Date calculated:	Unknown
Date submitted to EFDB by Data Provider:	(Not applicable)
Date posted to EFDB by IPCC:	

Technical information

Gas:	■ CARBON DIOXIDE
IPCC 1996 Source/Sink Category:	■ 2C2 - Ferroalloys Production
IPCC 2006 Source/Sink Category:	■ 2.C.2 - Ferroalloys Production
Properties	
Technologies/Practices:	
Parameters/Conditions:	Type of Ferroalloy: Ferromanganeses (1% C) (FeMn)
Region/Regional Conditions:	
Abatement/Control Technologies:	
Others:	
Description:	CO2 Emission Factor for Ferroalloy Production
Value:	1.5 tonne CO2/tonne ferroalloy produced
Value in common units:	
Equation:	Equation 4.15 in Volume 3 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
IPCC Worksheet:	2C2, Sheet 1 of 2, in Annex 1 (page A1.18) of Volume 3, 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Worksheet 2-11, Sheet 4 of 11, Vol.2 of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories (Volume 3, Chapter 4, Table 4.5)
Technical Reference:	Olsen, S.E. (2004). "CO2 Emissions from the Production of Manganese Alloys in Norway", STF80A04010, SINTEF, Trondheim 2004.
Reference language:	English
Abstract in English:	
Uncertainties expressed as 95% confidence limit:	Upper: <+25% Lower: >-25%
Data quality:	Unknown
Distribution shape:	
Data quality reference:	
Other info on data quality:	

Usage/Review information

Type of parameter:	2006 IPCC default
Comments from the data provider:	If any bio-carbon is used, this factor cannot be employed. For FeMn alloys the emission factors are based on production where the Mn containing raw materials are a mixture of oxide ores, carbonate ores and imported Mn-sinter. If the sinter is produced abroad it will not give any contribution to the national greenhouse gas inventory. Emission from sinter production must be reported where the production is located.
Comments from others:	
Link:	

[Back to Search Results](#)[Report to DOC](#)[Report to XLS](#)

IPCC web sites ▼

Home	Basic search	Fulltext search	Search by ID	Statistics	Documents	Help
------	--------------	-----------------	--------------	------------	-----------	------

Emission Factor Detail (ID: 22991)

Administrative information

Data Provider:	IPCC
Data Provider Country:	(Not applicable)
Data Provider Contact:	ipcc-efdb@iges.or.jp
Date calculated:	Unknown
Date submitted to EFDB by Data Provider:	(Not applicable)
Date posted to EFDB by IPCC:	2002-09-27

Technical information

Gas:	CARBON DIOXIDE
IPCC 1996 Source/Sink Category:	2C2 - Ferroalloys Production
IPCC 2006 Source/Sink Category:	2.C.2 - Ferroalloys Production
Properties	
Technologies/Practices:	It is assumed that all carbon is fossil carbon.
Parameters/Conditions:	Type ferroalloy: Ferromanganese
Region/Regional Conditions:	
Abatement/Control Technologies:	
Others:	
Description:	CO2 Emission Factor for Ferroalloy Production
Value:	1.6 Tonne CO2/Tonne Product
Value in common units:	
Equation:	Page 2.30 of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (Reference Manual), See Section 2.13.4.2.
IPCC Worksheet:	Worksheet 2-11, Sheet 4 of 11
Source of data:	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (Table 2-15 on Page 2.31 of the Reference Manual)
Technical Reference:	"Sintef (1991), Ferrolegering og CO2 STF34 A91056. 8 May 1991. Sintef Norway. AND Streibel, H. (1974), ""Silicon"", in Chemical and Process Technology Encyclopedia, D. Considine (ed.). McGraw Hill, Montreal."
Reference language:	Norwegian; English
Abstract in English:	
Uncertainties expressed as 95% confidence limit:	Upper: Unknown Lower: Unknown
Data quality:	IPCC default
Distribution shape:	
Data quality reference:	
Other info on data quality:	

Usage/Review information

Type of parameter:	1996 IPCC default
Comments from the data provider:	
Comments from others:	
Link:	

[Back to Search Results](#)[Report to DOC](#)[Report to XLS](#)