EUROFORGE

Study on Criteria for the Inclusion of NACE 2550 Products into the CBAM Scope (March 2026)

1. Objective and Scope

NACE 2550 includes forging, pressing, stamping, and roll-forming of metal, as well as powder metallurgy. This class is a key part of the manufacturing sector, focused on shaping metal products, primarily through mechanical means.

This study derives, on a technical basis, the criteria for the inclusion of products classified under NACE 2550 into the scope of the Carbon Border Adjustment Mechanism (CBAM). It builds on the Commission Impact Assessment and the legislative proposal COM (2025) 989.

The objective is to extract the regulatory selection criteria, operationalize them analytically, and apply them to NACE 2550 and related PRODCOM codes. Afterwards a mapping to CN codes is done for the forging sector. A detailed mapping of sheet metal codes will have to be executed separately.

2. Regulatory Context

The CBAM is designed to address carbon leakage by aligning the carbon costs of imports with those borne by EU producers. The mechanism initially focuses on basic goods but explicitly foresees an extension to downstream products.

The extension is driven by the increasing carbon price and the gradual phase-out of free allowances under the EU ETS, which shift carbon leakage risks further down the value chain.

The EU Commission has published a *Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) 2023/956 as regards the extension of its scope to downstream goods and anti-circumvention measures [1]* on 17.12.2025 accompanied by the *COMMISSION STAFF WORKING DOCUMENT / IMPACT ASSESSMENT REPORT* in two parts [2,3].

This study is based on the selection criteria defined in these documents for assessing the inclusion of products classified under NACE 2550 into the scope of the CBAM.

3. Core Selection Criteria

The Commission applies a multi-dimensional selection logic. The following criteria are consistently used in both the Impact Assessment and the Proposal.

Trade Intensity

Trade intensity is used as a proxy for the tradability of goods and their exposure to relocation risk [1, p. 6–7].

Trade Intensity (TI) = (Imports + Exports) / (Imports + EU Production)

Cost Push from CBAM Inputs

The cost push indicator captures the contribution of carbon-intensive inputs (e.g. steel, aluminium) to the total cost of downstream goods [1, p. 6].

Cost Push (CP) = Carbon Cost induced by CBAM / Gross Value Added indicator

Embedded Emissions

Products are filtered based on their total embedded emissions to ensure relevance [1, p. 6].

Embedded Emissions (EE) = Production sold x Material content % x Emission intensity at PRODCOM level (8-digit).

A product qualifies for inclusion if it meets the combined conditions:

- Trade Intensity > 10%
- Cost Push > 5%
- Embedded Emissions > 150 kt CO2-eq

4. Application to NACE 2550

NACE 2550 (forging, pressing, stamping and roll-forming of metal) is characterised by high dependence on steel and aluminium inputs, strong exposure to international markets, and significant embedded emissions through upstream materials.

The Impact Assessment indicates that downstream products containing CBAM inputs represent a large share of emissions and economic value [1, p. 9–10].

Trade Intensity of NACE 2550

In the context of a study on behalf of the German forging association “Industrieverband Massivumformung”, executed by pwc, the trade intensity of sector 2550 has recently been assessed.

Due to the lacking availability of the needed data (Import value, Export value, Production Sold) for PRODCOM 2550.xxxx in EUROSTAT statistics the auditors took 4 different approaches to determine the trade intensity for the years 2021-2023**. The results lay between 21,3% and 38,7% - all clearly above the required 10% defined by the EU Commission.**
[4, p. 11-13).

Cost Push of NACE 2550

For determining the cost push indicator of NACE 2550 goods, the following factors are used:

- EU production emissions [t CO2eq] = Emission factor [t CO2eq / €] x Sold production [€]

  Emission factor = Emission intensity [kg CO2eq / kg] x Value factor [kg / €]

  Emission intensity = 2,98 kg CO2eq / kg
  [5, p. 147, Product CN Code 7326, EU27 Total]

  Value factor = 0,27 kg / €
  [6, average]

  ⇨ Emission factor = 2,98 kg CO2eq / kg x 0,27 kg / € = 0,8046 kg CO2eq / € = 804,6 t CO2eq / m€

  Sold production 2023 = 57.953 m€
  [7])

  EU production emissions = 804,6 t CO2eq / m€ x 57.953 m€ = 46.629 t CO2eq

- Carbon price 2030 = 45 € / t COeq
  [3, p. 43]

- Value added 2023 = 21.839 m€
  [8]

- Turnover 2023 = 81.070 m€
  [8]

Cost Push = (EU production Emissions [t CO2eq] x Carbon price 2030 [€ / t CO2eq]) / (Production sold [m€] x (Gross Value added [m€] / Turnover [m€]))

= (46.629 t CO2e x 45 € / t CO2eq) / (57.953 m€ x (21.839 m€ / 81.070 m€))
= 13,4%

For determining the factors, not all data could be taken from EUROSTAT statistics. E.g. the value factor, that is used to “translate” the emission intensity per kg to an emission intensity per € was taken from the German statistics “Destatis”. This is considered as representative, as the average price / mass ratio should be similar in the EU27 due to the products competing in global markets and Germany is by far biggest European producer of PRODCOM 2550.xxxx (42% of the production sold value).

The calculated Cost Push is 13,4%, which is clearly above the required 5%. Due to the magnitude of the exceedance possible deviations or uncertainties in the assumptions can be allowed to a certain extent.

Embedded Emissions of NACE 2550

For calculating the Embedded emissions of NACE 2550, it is again not possible to find the necessary data in EUROSTAT on PRODCOM 8-digit level.

We therefore use additional sources and assumptions:

- Sold production 2023 = 57.953 m€
  [7]

- Export share = 102.911 m€ / 632.698 m€ = 16,3 %
  [4, p. 26]

- Material content of CBAM goods = 9% x 161% + 6% x 102% + 25% x 124% + 56% x 137% +4% x 100%= 132%

  [For the estimation of the basic good material content in 2550 goods the following information and expert assumptions have been used (net research):

  The material efficiency of forming processes is a critical factor in life cycle assessment and cost calculation. To derive representative values for material loss (flash, scale, and scrap), this study refers to established industry benchmarks and technical literature.

  Open Die Forging

  Material utilization in open-die forging is significantly lower than in net-shape processes due to the extended thermal cycles and the coarse geometric tolerances. According to Lange (2013) and industry data from the Steel Institute VDEh (Materialeffizienz in der Warmumformung von Edelstählen), total material loss is dominated by two factors:

  Scale Loss: Multiple reheating cycles result in oxidation losses of 3–8%.

  End Crops and Structural Discard: Removal of ingot segregation zones and forging ends accounts for 10–20%.

  Machining Volume: Since open-die forging produces near-net shapes with high allowances, subsequent machining often removes 25–50% of the forged mass to reach final dimensions (VDI 3131: Fertigungsmittel für das Freiformschmieden.).

  Open Die Forging makes 9% of the European Sales Value in 2023 [7]. From above information (staying on the lower end of the bandwidths) we take into account 38% of material loss, leading to a material content of 161% in the downstream product. All input materials are CBAM goods.

Cold Forging

Cold forming (e.g., cold extrusion, wire forming) is characterized by exceptional material efficiency, often exceeding 95%. Since the process occurs at room temperature, oxidation losses are non-existent.

Net-Shape Capability: High dimensional accuracy reduces or eliminates the need for subsequent machining, leading to a "near-zero" machining scrap rate (cf. Lange, 2013).

Process Scrap: Material loss is primarily limited to slugs from piercing operations or shearing losses from the initial wire-cutting stage, typically accounting for 2–5% of the total input mass (VDI 3138: Kaltfließpressen – Grundlagen, Werkstoffe, Werkzeuge, Feldmann, K. et al. (2014): Handbuch Ressourceneffizienz in der Produktion).

Cold Forging makes 6% of the European Sales Value in 2023 [7]. From above information (staying on the lower end of the bandwidths) we take into account 2% of material loss, leading to a material content of 102% in the downstream product. All input materials are CBAM goods.

Closed-Die Forging

In conventional closed-die forging, material loss is primarily driven by the necessity of flash to ensure complete cavity filling. According to Lange (2013), material utilization in traditional forging typically ranges between 70% and 80%, implying a total loss of 20% to 30%. This loss is further categorized as follows:

Flash loss: Significant portion (approx. 15–20%) required for process stability (Lange, K. (Ed.) (2013): Handbook of Metal Forming).

Scaling (Oxidation): High-temperature processing leads to a material loss of 1.5% to 4% due to scale formation (Schuler GmbH (Ed.) (2016): Metal Forming Handbook.).

Cutting and Bar Ends: Mechanical separation of billets accounts for approximately 3–5% of the input mass.

Closed Die Forging makes 25% of the European Sales Value in 2023 [7]. From above information (staying on the lower end of the bandwidths) we take into account 19,5% of material loss, leading to a material content of 124% in the downstream product. All input materials are CBAM goods.

Sheet Metal Forming

Material efficiency in sheet metal forming is highly dependent on nesting strategies and component geometry. Fraunhofer IWU (2020) (Resource Efficiency in Sheet Metal Working. Fraunhofer Institute for Machine Tools and Forming Technology.) reports that for complex automotive structural parts, the material utilization rate often fluctuates between 60% and 75%, resulting in a scrap rate of 25% to 40%.

Process Scrap: The remaining "skeleton" from blanking operations constitutes the largest loss.

Rejection Rate: Modern automated press shops maintain a technical rejection rate (defect parts) of less than 2% (VDI 5600).

Sheet Metal Forming makes 56% of the European Sales Value in 2023 [7]. From above information (staying on the lower end of the bandwidths) we take into account 27% of material loss, leading to a material content of 137% in the downstream product. All input materials are CBAM goods.

Powder Metallurgy

As there was no value for the material efficiency of sintering and other powder metallurgy processes was available, an efficiency of 100% was assumed.

Powder Metallurgy makes 4% of the European Sales Value in 2023 [7].]

- Emission intensity

Emission intensity = 9% x 2,21 + 6% x 2,37 + 25% x 2,21 +
56% x 2,28 + 4% x 2,07 = 2,25

The Emission intensity of NACE 2550 finished goods (CN-code 7326) is 2,98 kg CO2eq / kg (see above). The basic materials have a lower emission intensity, as some emissions occur in the processing (heating, forming, stamping, heat treatment; sintering, …) of the materials.

[For the calculation of the Emission intensity of PRODCOM 2550.xxxx the following CN-codes have been identified as basic materials and multiplied by their emission factors [5, p. 139-147, Product CN Code 7326, weighted average primary]:

Open-Die & Closed-Die Forging

These processes primarily use heavy semi-finished steel products as input material.

Semi-finished Steel (Billets/Blooms): 7207 11 00 (Rectangular cross-section, < 0.25% carbon) or 7207 20 11 (Alloy steel semi-finished products)
Steel Bars (Hot-rolled): 7214 20 00 (Forging quality bars with deformations)

Cold Forging

Cold extrusion requires high-quality wire rods or bars with specific surface treatments.

Steel Wire Rod: 7213 91 10 (Of a type used for concrete reinforcement/forging) or 7213 91 41 (Specific cold-heading/cold-extrusion steel)
Drawn Steel Wire: 7217 10 31 (Non-coated, low carbon content)

Sheet Metal Forming

The primary inputs are flat-rolled products, typically delivered in coils or sheets.

Hot-rolled Steel (Coils/Sheets): 7208 39 00 (Thickness < 3 mm), 7208 51 20 (Heavy plates, thickness > 10 mm)
Cold-rolled Steel (Coils/Sheets): 7209 16 90 (Thickness 1 mm to 3 mm), 7209 17 90 (Thickness 0.5 mm to 1 mm)

Powder Metallurgy

The main input materials are granules and powder of iron and steel, reflected by the following CN-codes:

7205 10 00 (Granules), 7205 21 00 (Powders of alloy steel), 7205 29 00 (Powders of non-alloy steel)]

Based on the above layed out information the Embedded emissions for 2550.xxxx PRODCOM codes are derived by converting Sold production value to tonnage and applying the above values:

For this the PRODCOM specific weight / value ratio from the German production statistics [6] was used to convert sold production values [7] into sold production volumes in tons, which resulted in 15.647 mt.

The volumes were then reduced by the export share, increased by the material content ratio and then multiplied by the Emission intensity factor on PRODCOM 8-digit level.

The result shows that **20 out of 26 PRODCOM 8-digit codes meet the >150kt requirement (2/2 Open die forging, 2/7 cold forging, 9/9 closed die forging, 6/6 sheet metal forming, 1/2 powder metallurgy)**. A clear majority of forged and sheet metal formed goods therefore qualify for a consideration on the EU CBAM list.

5. Mapping PRODCOM with CN codes

The final analytical step is establishing a mapping from PRODCOM to CN codes at 8-digit level for PRODCOM 2550.xxxx.

As EUROFORGE is representing the forging industry we will focus on mapping Open and Closed die forged goods as well as Cold forged / extruded goods (PRODCOM 2550.11xx and 2550.12xx) in this analysis. A mapping of sheet metal processed goods (PRODCOM 2550.13xx) can be executed separately if the inclusion of these goods in CBAM should be seeked by this sector, using the present base analysis (chapter 1-4).

For mapping PRODCOM with CN-codes two different approaches have been taken:

- Identify CN-codes, which are explicitly marked as forged (“open-die forged”, “close-die forged”, “of open-die forged steel”, “of close-die forged steel”) and assign to the corresponding PRODCOM codes.
- Identify CN-codes, which are not explicitly marked as “forged” in the text, as they are describing goods, that can be forged but also be produced by using other manufacturing technologies like casting, sintering or others. As these CN-codes are in practice used for duty declaration of forged products, using the TARIC-extensions 10 (close-die forged), 20 (cold extruded) or 91 (open-die forged), they are also mapped with the corresponding PRODCOM codes.

By using these approaches 67 CN-codes have been identified, matching the PRODCOM codes 2550.11xx and 2550.12xx. 26 of these are explicitly marked as “forged”, 41 do – amongst others - describe forged products when additionally using the TARIC-extensions 10, 20 or 91 [10].

Only 15 of the identified 67 codes are currently considered in the CBAM-scope of the EU Commissions proposal [9].

6. Summary and Conclusion

The EU Commission Proposal determines trade intensity, cost push, and emissions thresholds as core selection criteria for CBAM scope extension.

The EUROFORGE analysis at hand shows that a vast majority of PRODCOM codes under NACE 2550 meet the defined thresholds:

- Trade intensity NACE 2550 is between 21,3% and 38,7% and therefore above the 10% threshold defined by the EU Commission.
- Cost Push NACE 2550 is 13,4%, which lays significantly above the required 5% threshold.
- Embedded Emissions for 20 out of 26 PRODCOM 8-digit codes 2550.xxxx meet the >150kt requirement (2/2 Open die forging, 2/7 cold forging, 9/9 closed die forging, 6/6 sheet metal forming, 1/2 powder metallurgy).

Despite the clear result of this analysis, only a limited number of forging-, sheet metal- and powder metallurgy-related CN codes are currently included in the proposed CBAM scope.

This is probably due to the fact that the necessary data for calculating the key figures are not easily available in EUROSTAT. For many of the required information some “workarounds” need to be found and some assumptions have to be taken to derive at a plausible result (“gap filling”).

The approaches chosen and the assumptions taken in this analysis are set out in detail in the chapters above. As all derived selection criteria clearly meet the defined thresholds, the result of this analysis is considered solid and reliable with some room for deviation.

The consistent application of the methodology proposed by the EU Commission therefore requires the inclusion of NACE 2550 products in the CBAM scope.

Annexes

[1] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) 2023/956 as regards the extension of its scope to downstream goods and anti-circumvention measures (COM(2025) 989 final), European Commission 17.12.2025

[2] COMMISSION STAFF WORKING DOCUMENT / IMPACT ASSESSMENT REPORT – part 1, EU Commission, 17.12.2025

[3] COMMISSION STAFF WORKING DOCUMENT / IMPACT ASSESSMENT REPORT – part 2, EU Commission, 17.12.2025

[4] Expert opinion on the eligibility of an additional subsectors to receive compensation for indirect emission costs, pwc, 2026

[5] JRC Technical Report: Greenhouse gas emission intensities of the steel, fertilizers, aluminium and cement industries in the EU and its main trading partners, 2023

[6] Destatis production statistics 2023, PRODCOM 2550.xxxx

[7] EUROSTAT ds-059358, 2023, PRODCOM 2550.xxxx

[8] EUROSTAT sbs_ovw_act, 2023, NACE 2550

[9] ANNEXES to the Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) 2023/956 as regards the extension of its scope to downstream goods and anti-circumvention measures, European Commission 17.12.2025

[10] Mapping PRODCOM-CN 2550.11+12, EUROFORGE 31.03.2025