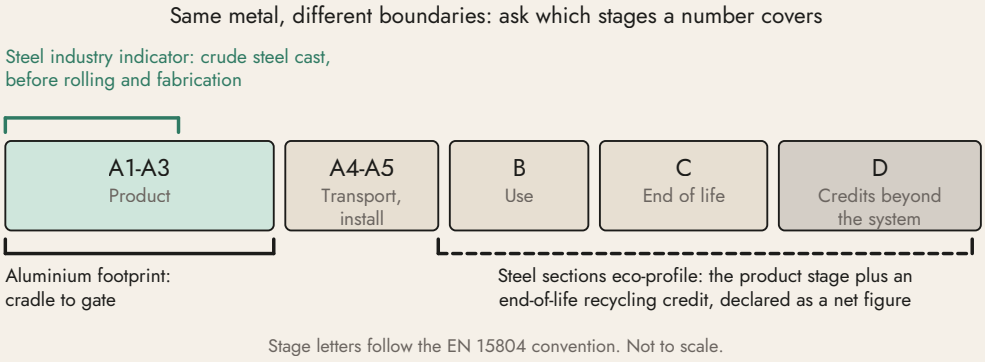
Embodied carbon and *EPDs* for metals

What the steel, stainless, aluminium and copper bodies publish on carbon, what each number covers and leaves out, and what to ask a supplier for. General guidance: no figure here is a figure for a fabricated piece.

AT A GLANCE

Metal	What is published	Source	What it does not tell you
Steel, by route	Per tonne of crude steel cast, all scopes, 2022: blast furnace route 2.33 t CO_2; scrap-based electric arc 0.68; direct-reduced-iron electric arc 1.37; global average 1.91.	worldsteel, Sustainability Indicators 2023 report	It is crude steel, before rolling and fabrication. It does not say which route made your section.
Steel, product data	A published eco-profile for 1 tonne of sections: cradle to gate plus an end-of-life recycling credit, Asia average, June 2023.	worldsteel eco-profile page	A regional average, and a net figure that includes a credit. Not a figure for your supplier.
Stainless steel	Two production systems: scrap-based, and nickel pig iron for nickel. At least 95 % recycled at end of life. Detailed emissions data are for members only.	worldstainless	No figure is quoted on this sheet. Ask the mill for its own figure and recycled content.
Aluminium	Most cradle-to-gate footprints for primary aluminium fall between 4.5 and 22 t CO_2e per tonne. 4 or less is the lowest achievable at commercial scale (2023). Electricity is the main variable.	IAI specifiers' guide, Sept 2023	The spread is nearly five-fold. A scrap share needs its method and its pre- and post-consumer split.
Copper	Recycling needs 85 % less energy than primary production. 32 % of global copper demand is met with recycled copper; 40 % is recycled at product end of life.	ICA, Circular Economy page	Industry-body statements for copper, not a footprint, and not for brass or bronze.
Brass and bronze	No primary document was read.	none	Ask the supplier for a declaration. Do not quote a figure.

CO_2 and CO_2e are tonnes of carbon dioxide, or carbon dioxide equivalent, per tonne of metal. The rows use different boundaries and years and must not be compared with each other.



Which stages of the life cycle each published figure covers. Stage letters follow the EN 15804 convention. Original drawing by Make Bespoke Studio; not to scale.

SPECIFICATION WORDING

METAL DECLARATION

For [metal and grade], the supplier to state in writing: the production route [primary / scrap-based electric arc / other], the recycled content as separate pre-consumer and post-consumer shares with the method used, and any carbon figure with its boundary [cradle to gate unless stated], year and data source. A figure without its boundary will not be accepted.

PRODUCT EPD

Where a product-specific environmental product declaration exists, to be supplied with its registration number, programme, declared unit, modules declared and valid-to date, verified by a named independent third party, to BS EN 15804+A2 [edition]. Where none exists, the supplier to say so in writing.

CLIENT STATEMENT

Embodied carbon of the [metalwork] [has not been calculated] [is estimated at [ ] kg CO_2e for modules [A1 to A3], from [source, edition, year], for [quantity] of [metal]. This is an estimate from generic data, not a product declaration].

TERMS USED

Cradle to gate

The carbon footprint of a product from raw material extraction until it leaves the factory, including direct and indirect emissions (IAI).

Crude steel cast

Steel as first cast from the furnace, before rolling, forming or fabrication. The steel industry reports its CO_2 intensity per tonne of it (worldsteel).

Scope 1, 2 and 3

Direct emissions from owned sources (1), indirect emissions from purchased energy (2), and other indirect emissions up and down the chain (3), as in corporate greenhouse gas accounting.

Pre- and post-consumer scrap

Pre-consumer scrap is generated during production and manufacturing. Post-consumer scrap comes from products at the end of their life. A recycled-content claim should split them.

Declared unit

What an EPD's numbers are per: one tonne, one square metre, one piece.

STANDARDS AND SOURCES

- World Steel Association, Sustainability Indicators 2023 report (November 2023): 2022 data; read in full.
- International Aluminium Institute, Specifiers' Guide to IAI's Carbon Footprint Methodology (September 2023): read in full.
- worldstainless, Stainless Steels and CO2; ICA, Circular Economy: web pages read 7 Nov 2026.
- BS EN 15804:2012+A2:2019: BSI listing: Current, Under Review; not read.

Full guide: https://makebespoke.com/trade/technical/embodied-carbon-and-epds-for-metals. Make Bespoke Studio coordinates manufacture through its partner workshops. Figures are guidance only and your specification governs; some may be superseded, so contact the studio to verify.