

ResponsibleSteel default embodied GHG values – Version 1.0

14 April 2023

	Unit	Original data source	Basis for default (see notes)	Default embodied GHG value (tCO ₂ e/unit)
Ferrous containing materials				
• Cold iron, charcoal based	t	CRU methodology for RS	a	2.350
• Cold iron, generic	t	CRU methodology for RS	a	2.623
• DRI, coal-based	t	CRU methodology for RS	a	2.623
• DRI, gas-based	t	CRU methodology for RS	a	1.219
• Granulated pig iron (GPI)	t	CRU methodology for RS	a	2.623
• Hot briquetted iron (HBI)	t	CRU methodology for RS	a	1.219
• Iron ore	t	worldsteel LCI 2020	a	0.024
• Pellets	t	CRU methodology for RS	a	0.235
• Scrap	t	NA	b	0.000
• Sinter	t	CRU methodology for RS	a	0.365
• Steel slab, BOF	t	ResponsibleSteel level 1 performance threshold value for the production of steel with 15% scrap content	a	2.920
• Steel slab, EAF	t	ResponsibleSteel level 1 performance threshold value for the production of steel with 95% scrap content	a	0.570
Alloys and metallic additives				
A replacement value equivalent to the ResponsibleSteel level 1 performance threshold value for the primary production of steel from iron ore shall be used for the determination of the upstream indirect (Scope 3) GHG emissions for all non-ferrous metal and ferro-alloy additives.				
• Non-ferrous metal and ferro-alloy additives replacement value	t	ResponsibleSteel level 1 performance threshold value for the primary production of steel	NA	2.800
PROVISIONAL VALUES FOR INFORMATION ONLY:				
• Aluminium	t	worldsteel LCI 2020	a	19.914
• Copper	t	worldsteel LCI 2020	a	4.772
• Ferro-chromium	t	ISSF LCI 2022	a	7.184
• Ferro-manganese	t	worldsteel LCI 2020	a	7.084
• Ferro-molybdenum	t	IMO A 2022	a	9.648
• Ferro-nickel	t	ISSF LCI 2022	a	10.411
• Ferro-silicon	t	worldsteel LCI 2020	a	13.722
• Ferro-vanadium	t	worldsteel LCI 2020	a	98.911
• Lead	t	worldsteel LCI 2020	a	2.111
• Magnesium	t	worldsteel LCI 2020	a	40.313
• Manganese	t	worldsteel LCI 2020	a	17.828

• Molybdenum oxide	t	IMO 2022	a	6.000
• Nickel metal	t	ISSF LCI 2022	a	16.295
• Nickel oxides	t	ISSF LCI 2022	a	24.335
• Nickel pig iron	t	worldsteel CO ₂ methodology	a	6.240
• Silico-manganese	t	worldsteel LCI 2020	a	7.084
• Silicon metal	t	worldsteel LCI 2020	a	5.504
• Tin metal	t	worldsteel LCI 2020	a	6.826
Auxiliary materials				
• Argon	kNm ₃	worldsteel LCI 2020	a	0.332
• Burnt dolomite	t	worldsteel LCI 2020	a	1.456
• Burnt lime	t	worldsteel LCI 2020	a	1.437
• Crude dolomite	dry t	worldsteel LCI 2020	a	0.006
• Limestone	dry t	worldsteel LCI 2020	a	0.006
• Nitrogen	kNm ₃	worldsteel CO ₂ methodology	a	0.124
• Oxygen	kNm ₃	worldsteel CO ₂ methodology	a	0.426
Solid fuels:				
• Materials of biological origin (e.g. charcoal, bio-coal, bio-coke)	dry t	NA	b	0.000
• Coal	dry t	worldsteel LCI 2020	c	0.470
• Coke	dry t	CRU methodology for RS	c	1.022
• Post-consumer materials (e.g. used plastic, tyres, reclaimed wood)	t	NA	b	0.000
Liquid fuels:				
• Heavy oil	m ³	worldsteel CO ₂ methodology	a	0.331
• Kerosene	m ³	worldsteel CO ₂ methodology	a	0.296
• Light oil	m ³	worldsteel CO ₂ methodology	a	0.296
• Liquefied petroleum gas (LPG)	t	worldsteel CO ₂ methodology	a	0.638
Gas fuels				
• Hydrogen	kg	worldsteel LCI 2020	a	12.971
• Natural gas	kNm ₃	worldsteel CO ₂ methodology	c	1.064
Other input materials for steelmaking	The embodied GHG emissions of other input materials not listed must be included in the site's assessment of its upstream indirect (Scope 3) GHG emissions if its evaluation indicates that they the material is likely to contribute more than 5% to the total upstream (Scope 3) GHG emissions of steelmaking at a site. Where this is the case the materials must be assigned a default embodied GHG value using primary data or data from a publicly accessible and referenced source.			



Table A1. ResponsibleSteel default embodied GHG values. The current table of emission factors as published by ResponsibleSteel at www.responsiblesteel.org must be used for the determination of the crude steel GHG emissions intensity performance of the site.

Notes to table: basis for default

- a: source data multiplied by default factor of 1.2
- b: ResponsibleSteel assignment
- c: source data multiplied by default factor of 1.6 to reflect known high variability

Notes to table: original data source

Values with the original data source 'worldsteel LCI 2020' are sourced from the GaBi database from Sphera, taken from the original data used in the [worldsteel LCI 2020 data release](#) and modified with the ResponsibleSteel uncertainty level.

NOTE

In the ResponsibleSteel International Standard V2.0, Principle 10 Greenhouse Gas Emissions and Climate Change refers to default embodied GHG value (tCO₂e / unit) for various ferrous materials, non-ferrous materials, alloys and metallic additives, solid fuels, liquid fuels, gaseous fuels, and other inputs used in steel making as listed in Annex 11 of the standard.

The validity of the default embodied GHG values in the table is earmarked for review during the 12-month test phase to September 2023, and emission factors will be updated as necessary, with the approval of the ResponsibleSteel CEO. Input materials that are identified as contributing more than 5% to the total upstream (Scope 3) GHG emissions of steelmaking at specific sites will be added to the list as required.

For further guidance on the approach taken to the use of default data and specific approaches for some input materials, please refer to Annex 11 of the [ResponsibleSteel International Standard Version 2.0](#).