

2.C.7.a - Copper Production

Short description

Within this NFR subcategory, SO₂, PM_{2.5}, PM₁₀, TSP, PCDD/F, HCB, As, Cd, Cu, Hg, and Pb emissions from the production of copper are reported.

Category Code	Method					AD					EF				
2.C.7.a	T1					AS					D, CS				
	NO _x	NM VOC	SO ₂	NH ₃	PM _{2.5}	PM ₁₀	TSP	BC	CO	Pb	Cd	Hg	Diox	PAH	HCB
Key Category:	-	-	-/-	-	-/-	-/-	-/-	-	-	-/-	L/-	-/-	-/-	-	L/-

Method

Activity data

The yearly production figures were taken from the annual statistical report of the German association for non-ferrous metals [\[Lit. 1\]](#). For 2021 the production figure for primary copper was directly taken from the producer whereas for secondary copper no updating was possible.

Emission factors

The emission factors are either default values according to the 2019 EMEP/EEA air pollutant emission inventory guidebook [\[Lit. 2\]](#) or determined in several research projects or from companies environmental reports [\[Lit. 3\]](#).

Table 1: Tier 1 emission factors applied for entire time series (primary and secondary copper production)

	EF	Unit	Source
HCB	1	mg/t	Emission guidebook 2019 [Lit. 2]
PCDD/F	2.9	µg/t	Emission guidebook 2019 [Lit. 2]

Table 2: Emission factors applied for primary copper production in 2021

	EF	Unit	Source
TSP	0.09	kg/t	Aurubis [Lit. 4]
PM ₁₀	0.0765	kg/t	Calculated from Aurubis [Lit. 4]
PM _{2.5}	0.063	kg/t	Calculated from Aurubis [Lit. 4]
SO ₂	3.6	kg/t	Aurubis [Lit. 4]
As	0.8	g/t	Aurubis [Lit. 4]
Cd	15	g/t	Emission guidebook 2019 [Lit. 2]
Cu	13.8	g/t	Aurubis [Lit. 4]
Hg	0.031	g/t	Emission guidebook 2019 [Lit. 2]
Pb	3.1	g/t	Aurubis [Lit. 4]

Table 3: Emission factors applied for secondary copper production in 2021

	EF	Unit	Source
TSP	0.100	kg/t	PAREST [Lit. 5]
PM ₁₀	0.085	kg/t	PAREST [Lit. 5]
PM _{2.5}	0.07	kg/t	PAREST [Lit. 5]
SO ₂	3.0	kg/t	Emission guidebook 2019 [Lit. 2]
As	2	g/t	Emission guidebook 2019 [Lit. 2]
Cd	486.428	mg/t	NE-G-K [Lit. 3]

	EF	Unit	Source
Cu	46,088.62	mg/t	NE-G-K [Lit. 3]
Hg	2.644	mg/t	NE-G-K [Lit. 3]
Pb	21,977.15	mg/t	NE-G-K [Lit. 3]

Recalculations

With activity data and emission factors remaining unrevised, no recalculations were carried out compared to Submission 2022.



For pollutant-specific **information on recalculated emission estimates for Base Year and 2020**, please see the pollutant specific recalculation tables following [chapter 8.1 - Recalculations](#).

Planned improvements

No category specific improvements are planned.

Bibliography

Lit. 1: German association for non-ferrous metals (WirtschaftsVereinigung Metalle): Annual statistical report:
<https://www.wvmetalle.de>

Lit. 2: EMEP/EEA air pollutant emission inventory guidebook 2019,
<https://www.eea.europa.eu/publications/emep-eea-guidebook-2019>

Lit. 3: Ökopool, IER, IZT, IfG: Bereitstellung einer qualitätsgesicherten Datengrundlage für die Emissionsberichterstattung zur Umsetzung von internationalen Luftreinhalte- und Klimaschutzvereinbarungen für ausgewählte Industriebranchen
 \\Teilvorhaben 2: NE-Metallindustrie, Kalkindustrie, Gießereien.

Lit. 4: Aurubis, Umwelterklärung 2020. 2020, Aurubis AG,
<https://www.aurubis.com/verantwortung/kennzahlen-und-berichterstattung>

Lit. 5: PAREST, UBA Texte | 48/2013,
<https://www.umweltbundesamt.de/publikationen/beschreibung-minderungsmaßnahmen-im-projekt-parest>