

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/-	-/-	-/-	-	-/-

Method

Activity data

The yearly production figures were taken from the annual statistical report of the German association for non-ferrous metals [\[Lit. 1\]](#).

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)

Pollutant	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 2019

Pollutant	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 2019

Pollutant	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]
Cu	46,088.62	mg/t	NE-G-K [Lit. 3]

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

Recalculations



For pollutant-specific **information on recalculated emission estimates for Base Year and 2019**, 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: Ökopöl, 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>