

8. ES 8: Use at industrial sites; Industrial use of cobalt in the production of diamond tools

8.1. Title section

Product category: Base metals and alloys (PC 7), Metal surface treatment products (PC 14)

Sector of use: Manufacture of fabricated metal products, except machinery and equipment (SU 15)

Environment	
1: Industrial use of cobalt in the production of diamond tools ES1 STP Discharge	ERC 5
2: Industrial use of cobalt in the production of diamond tools ES2 Direct Discharge	ERC 5
3: Industrial use of cobalt in the production of diamond tools ES3 Marine Discharge	ERC 5
Worker	
4: Raw material handling	PROC 26, PROC 9, PROC 8b
5: Wet process	PROC 5, PROC 4
6: Hot (metallurgical) processes	PROC 25, PROC 14, PROC 22
7: Mechanical finishing processes	PROC 24, PROC 21
8: Packaging	PROC 21
9: Cleaning & Maintenance	PROC 28
Subsequent service life exposure scenario(s)	
ES 13: Service life (professional worker); Various articles; Service life of cobalt-containing tools in professional settings	
ES 16: Service life (consumers); Various articles; diamond tools and other cobalt-containing tools other than hard metal	

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: Industrial use of cobalt in the production of diamond tools ES1 STP Discharge (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.216 tonnes/day
Annual amount per site <= 51 tonnes/year
Emission days >= 236 days/year
Technical and organisational conditions and measures
Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange
Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber
Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day

Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
No discharge to marine water assumed
Local freshwater dilution factor 100

8.2.2. Control of environmental exposure: Industrial use of cobalt in the production of diamond tools ES2 Direct Discharge (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.216 tonnes/day
Annual amount per site ≤ 51 tonnes/year
Emission days ≥ 236 days/year
Technical and organisational conditions and measures
Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber
Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Assumed effluent discharge flow from site $\geq 2E3$ m ³ /day
No discharge to marine water assumed
Local freshwater dilution factor 200

8.2.3. Control of environmental exposure: Industrial use of cobalt in the production of diamond tools ES3 Marine Discharge (ERC 5)

Amount used, frequency and duration of use (or from service life)
Daily amount per site ≤ 0.216 tonnes/day
Annual amount per site ≤ 51 tonnes/year
Emission days ≥ 236 days/year
Technical and organisational conditions and measures
Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber
Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Assumed effluent discharge flow from site $\geq 2E3$ m ³ /day
No discharge to freshwater assumed
Local marine water dilution factor 100

8.2.4. Control of worker exposure: Raw material handling

(PROC 26, PROC 9, PROC 8b)

Product (article) characteristics
Maximum emission potential covered in this ES: Medium.
Concentration of the substance in mixture is not restricted.
Physical form covered in this ES: Solid, powder / dust.
Physical form covered in this ES: Solid, granulate.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Level of automation should be semi-automated.
Use of an integrated local exhaust ventilation with an efficiency of at least 90% is required.
Process is carried out at ambient temperature.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
APF of RPE = 20 (95% respiratory protection).
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

8.2.5. Control of worker exposure: Wet process (PROC 5, PROC 4)

Product (article) characteristics
Maximum emission potential covered in this ES: Very low.
Concentration of the substance in mixture is not restricted.
Physical form covered in this ES: Aqueous solution.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Process is carried out at ambient temperature.
Use of a local exhaust ventilation with an efficiency of at least 78% is required.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Wear respiratory protection providing a minimum assigned protection factor of 10 (a minimum efficiency of 90%) unless inhalation exposure to the substance can be excluded. For further specification, refer to section 8 of the SDS.

8.2.6. Control of worker exposure: Hot (metallurgical) processes (PROC 25, PROC 14, PROC 22)

Product (article) characteristics
Maximum emission potential covered in this ES: Low (temperature based).
Concentration of the substance in mixture is not restricted.
Physical form covered in this ES: Massive object.
Amount used (or contained in articles), frequency and duration of use/exposure

Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Limit the process temperature to 1.2E3 °C.
Ensure enclosure of furnace operation.
Use of an integrated local exhaust ventilation with an efficiency of at least 90% is required.
Limit the process pressure to 1.5E6kPa.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
APF of RPE = 10 (90% respiratory protection).

8.2.7. Control of worker exposure: Mechanical finishing processes (PROC 24, PROC 21)

Product (article) characteristics
Maximum emission potential covered in this ES: Medium (abrasion based).
Concentration of the substance in mixture is not restricted.
Physical form covered in this ES: Bound in article.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Process is carried out at ambient temperature.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Wear respiratory protection providing a minimum assigned protection factor of 10 (a minimum efficiency of 90%) unless inhalation exposure to the substance can be excluded. For further specification, refer to section 8 of the SDS.

8.2.8. Control of worker exposure: Packaging (PROC 21)

Product (article) characteristics
Maximum emission potential covered in this ES: Very low.
Concentration of the substance in mixture is not restricted.
Physical form covered in this ES: Bound in article.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Process is carried out at ambient temperature.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
Wear respiratory protection providing a minimum assigned protection factor of 10 (a minimum efficiency of 90%) unless inhalation exposure to the substance can be excluded. For further specification, refer to section 8 of the SDS.

8.2.9. Control of worker exposure: Cleaning & Maintenance

(PROC 28)

Product (article) characteristics
Maximum emission potential covered in this ES: High.
Physical form covered in this ES: Solid, powder / dust.
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of exposure: Not restricted.
Technical and organisational conditions and measures
Process is carried out at ambient temperature.
Process is carried out at ambient pressure.
Maintenance and repair work only at facilities which are not in operation. Minor cleaning tasks may be conducted under operation.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.; For further specification, refer to section 8 of the SDS.
APF of RPE = 40 (97.5% respiratory protection).
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

8.3. Exposure estimation and reference to its source**8.3.1. Environmental release and exposure: Industrial use of cobalt in the production of diamond tools ES1 STP Discharge (ERC 5)**

Release route	Release rate	Release estimation method
Water	0.043 kg/day	Estimated release factor
Air	6.48E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	1.82E-4 mg/L (EUSES 2.1.2)	0.293
Sediment (freshwater)	7.41 mg/kg dw (PEC sediment calculation method for metals)	0.138
Sewage Treatment Plant	0.013 mg/L (EUSES 2.1.2)	0.035
Agricultural soil	0.603 mg/kg dw (EUSES 2.1.2)	0.055
Man via environment - Inhalation	1.17E-6 mg/m ³ (EUSES 2.1.2)	< 0.01

8.3.2. Environmental release and exposure: Industrial use of cobalt in the production of diamond tools ES2 Direct Discharge (ERC 5)

Release route	Release rate	Release estimation method
Water	0.043 kg/day	Estimated release factor
Air	6.48E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
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Protection target	Exposure estimate	RCR
Fresh water	1.68E-4 mg/L (EUSES 2.1.2)	0.271
Sediment (freshwater)	6.88 mg/kg dw (PEC sediment calculation method for metals)	0.128
Agricultural soil	0.239 mg/kg dw (EUSES 2.1.2)	0.022
Man via environment - Inhalation	1.17E-6 mg/m ³ (EUSES 2.1.2)	< 0.01

8.3.3. Environmental release and exposure: Industrial use of cobalt in the production of diamond tools ES3 Marine Discharge (ERC 5)

Release route	Release rate	Release estimation method
Water	0.043 kg/day	Estimated release factor
Air	6.48E-3 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Marine water	0.109 µg/L (Clocal calculation with Kp susp. matter marine)	0.046
Sediment (marine water)	22.76 mg/kg dw (PEC sediment calculation method for metals)	0.326
Agricultural soil	0.239 mg/kg dw (EUSES 2.1.2)	0.022
Man via environment - Inhalation	1.17E-6 mg/m ³ (EUSES 2.1.2)	< 0.01

8.3.4. Worker exposure: Raw material handling (PROC 26, PROC 9, PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	33.5 µg/m ³ (Measured data)	0.838

8.3.5. Worker exposure: Wet process (PROC 5, PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	11 µg/m ³ (MEASE)	0.275

8.3.6. Worker exposure: Hot (metallurgical) processes (PROC 25, PROC 14, PROC 22)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	18.1 µg/m ³ (Measured data)	0.453

8.3.7. Worker exposure: Mechanical finishing processes (PROC 24, PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	23.6 µg/m ³ (Measured data)	0.59

8.3.8. Worker exposure: Packaging (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	8.6 µg/m ³ (Measured data)	0.215

8.3.9. Worker exposure: Cleaning & Maintenance (PROC 28)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	20.2 µg/m ³ (Measured data)	0.505

8.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Guidance: Please refer to Section 0.3 of this “ES for Communication”.