



**Höganäs** 

## **Cobalt Exposure Scenario**

**Version 1, October 2017**

## ES17: Production of sintered hardmetal articles

### 17.1. Title section

<b>Structured Short Title</b>	: Production of sintered hardmetal articles; Base metals and alloys (PC7); Industrial uses (SU3).
<b>Substance</b>	: Cobalt EC-No.: 231-158-0

Environment		
CS1	Freshwater discharge to STP.	ERC6a
CS2	Direct discharge: Marine	ERC6a
Worker		
CS3	Material transfers	PROC8b
CS4	Mixing operations	PROC3
CS5	Press charging	PROC8b
CS6	Pressing	PROC14
CS7	Shaping	PROC21
CS8	Sintering	PROC22
CS9	Milling, grinding and similar activities	PROC24
CS10	Edge rounding	PROC24
CS11	Coating.	PROC0
CS12	Brazing or welding	PROC25
CS13	Marking	PROC21
CS14	Product packaging	PROC0
CS15	Cleaning and maintenance	PROC8b

### 17.2. Conditions of use affecting exposure

#### 17.2.1. Control of environmental exposure: Use of intermediate (ERC6a)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.

<b>Amount used, frequency and duration of use (or from service life)</b>	
Daily amount per site	: <= 567 kg
Annual amount per site	: <= 170 ton
Minimum limit value	
<b>Technical and organisational conditions and measures</b>	
Suitable technique(s) to limit releases to water: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange	
Suitable technique(s) to limit releases to air: Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber	
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Municipal Sewage Treatment Plant
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2.000 m3/d
Minimum limit value	
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: External treatment and disposal of waste should comply with applicable local and/or national regulations. This material and its container must be disposed of as hazardous. Incineration, disposal or recycling at specific offsite provider Do not dispose of waste into sewer. Users of the substance have to favour the recycling channels of the end of life products.
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 198.000 m3/d
Local freshwater dilution factor	: 100
Minimum limit value	

#### 17.2.2. Control of environmental exposure: Use of intermediate (ERC6a)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 100 %.
<b>Amount used, frequency and duration of use (or from service life)</b>

Daily amount per site	:	<= 567 kg
Annual amount per site	:	<= 170 ton
Minimum limit value		
<b>Technical and organisational conditions and measures</b>		
Suitable technique(s) to limit releases to water: Chemical precipitation or sedimentation or filtration or electrolysis or reverse osmosis or ion exchange		
Suitable technique(s) to limit releases to air: Electrostatic precipitator or wet electrostatic precipitator or cyclones or fabric/bag filter or ceramic/metal mesh filter or wet scrubber		
<b>Conditions and measures related to sewage treatment plant</b>		
STP type	:	none
<b>Conditions and measures related to treatment of waste (including article waste)</b>		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations. This material and its container must be disposed of as hazardous. Incineration, disposal or recycling at specific offsite provider Do not dispose of waste into sewer. Users of the substance have to favour the recycling channels of the end of life products.
<b>Other conditions affecting environmental exposure</b>		
Receiving surface water flow	:	198.000 m3/d
Local freshwater dilution factor	:	100
Minimum limit value		

### 17.2.3. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	Solid, medium dustiness Powdered substance
<b>Amount used, frequency and duration of use (or from service life)</b>		
Duration	:	Exposure duration > 240 min
Use frequency	:	not restricted

<b>Technical and organisational conditions and measures</b>
Local exhaust ventilation Inhalation - minimum efficiency of 78 %
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.
Inhalation - minimum efficiency of 90 %
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)
Use eye protection according to EN 166.
Assumes a good basic standard of occupational hygiene is implemented
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor or outdoor use
Professional or industrial settings : Industrial use
Temperature : Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.

**17.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)**

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 100 %.
Physical form of product : Solid, medium dustiness Powdered substance
<b>Amount used, frequency and duration of use (or from service life)</b>
Duration : Exposure duration > 240 min

Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Closed systems	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

#### 17.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Solid, medium dustiness Powdered substance
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min

Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

#### 17.2.6. Control of worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Solid, medium dustiness Powdered substance
<b>Amount used, frequency and duration of use (or from service life)</b>	

Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

#### 17.2.7. Control of worker exposure: Low energy manipulation and handling of substances bound in/on materials and/or articles (PROC21)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Solid, medium dustiness Powdered substance



<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

#### **17.2.8. Control of worker exposure: Manufacturing and processing of minerals and/or metals at substantially elevated temperature (PROC22)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Powdered substance

Solid, low dustiness	
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Use of an integrated local exhaust ventilation is required. Inhalation - minimum efficiency of 84 %	
Closed systems	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Elevated temperature 1.490 °C
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

### 17.2.9. Control of worker exposure: High (mechanical) energy work-up of substances bound in/on materials and/or articles (PROC24)

<b>Product (article) characteristics</b>
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Covers percentage substance in the product up to 25 %.	
Physical form of product	: Substance containing articles Solid, high dustiness
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

**17.2.10. Control of worker exposure: High (mechanical) energy work-up of substances bound in/on materials and/or articles (PROC24)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Substance containing articles Solid, high dustiness
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

#### 17.2.11. Control of worker exposure: Other (PROC0)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Substance containing articles
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Closed systems Inhalation - minimum efficiency of 78 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

#### 17.2.12. Control of worker exposure: Other hot work operation with metals (PROC25)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Molten form
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Elevated temperature
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

**17.2.13. Control of worker exposure: Low energy manipulation and handling of substances bound in/on materials and/or articles (PROC21)**

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Substance containing articles
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Use of an integrated local exhaust ventilation is required. Inhalation - minimum efficiency of 84 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

#### 17.2.14. Control of worker exposure: Other (PROC0)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Substance containing articles
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Use of an integrated local exhaust ventilation is required. Inhalation - minimum efficiency of 84 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

**17.2.15. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)**



<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Solid, medium dustiness Powdered substance
<b>Amount used, frequency and duration of use (or from service life)</b>	
Duration	: Exposure duration > 240 min
Use frequency	: not restricted
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure operatives are trained to minimise exposures. Do not create a powder cloud by using a brush or compressed air.	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Specification of respiratory protective equipment (RPE): Air-assisted filtering visor, mask or hood with P2 filter element (Protection/APF = 10, based on use of powered respirator meeting EN 140, EN 1827, EN 136 or EN 149 requirement or equivalent suitable protection of level P2) are required for all activities.	
Inhalation - minimum efficiency of 90 %	
Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.	
Wear suitable coveralls to prevent exposure to the skin. Use of protective suit conforming to EN13982-1 Type 5 Safety shoes (EN 20346)	
Use eye protection according to EN 166.	
Assumes a good basic standard of occupational hygiene is implemented	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor or outdoor use
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Keep good industrial hygiene. Regular training in work hygiene practices and proper use of PPE where needed.	

### 17.3. Exposure estimation and reference to its source

#### 17.3.1. Environmental release and exposure: Use of intermediate (ERC6a)

Release route	Release rate	Release estimation method
Water	0,028 kg/day	Eurometaux spERC 1.1 v2.1
Air	0,028 kg/day	Eurometaux spERC 1.1 v2.1
Soil	0 kg/day	
Waste	0,1 %	

Compartment	Exposure level	RCR
Freshwater	0,15 µg/L	0,25
Freshwater sediment	6,35 mg/kg dry weight	0,67
Sewage treatment plant.	0,01 mg/L	0,02
Soil	0,28 mg/kg dry weight	0,03
Air	0,000006 mg/m <sup>3</sup> (Not relevant)	
Human via the environment	0,000006 mg/m <sup>3</sup>	< 0,01
Human via the environment	0,000322 mg/kg bw/day	0,011

#### 17.3.2. Environmental release and exposure: Use of intermediate (ERC6a)

Release route	Release rate	Release estimation method
Water	0,028 kg/day	Eurometaux spERC 1.1 v2.1
Air	0,028 kg/day	Eurometaux spERC 1.1 v2.1
Soil	0 kg/day	
Waste	0,1 %	

Compartment	Exposure level	RCR
Marine water	0,05 µg/L	0,25
Marine sediment	3,86 mg/kg dry weight	0,67
Soil	0,28 mg/kg dry weight	0,03
Air	0,000006 mg/m <sup>3</sup> (Not relevant)	
Human via the environment	0,000006 mg/m <sup>3</sup>	< 0,01
Human via the environment	0,000322 mg/kg bw/day	0,011

#### 17.3.3. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

**17.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

**17.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup>	0,29

			(measured data)	
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

**17.3.6. Worker exposure: Tableting, compression, extrusion, pelettisation, granulation (PROC14)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

**17.3.7. Worker exposure: Low energy manipulation and handling of substances bound in/on materials and/or articles (PROC21)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	

inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

**17.3.8. Worker exposure: Manufacturing and processing of minerals and/or metals at substantially elevated temperature (PROC22)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

**17.3.9. Worker exposure: High (mechanical) energy work-up of substances bound in/on materials and/or articles (PROC24)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard	

			(Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

**17.3.10. Worker exposure: High (mechanical) energy work-up of substances bound in/on materials and/or articles (PROC24)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

**17.3.11. Worker exposure: Other (PROC0)**

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	

Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

#### 17.3.12. Worker exposure: Other hot work operation with metals (PROC25)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

#### 17.3.13. Worker exposure: Low energy manipulation and handling of substances bound in/on materials and/or articles (PROC21)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

#### 17.3.14. Worker exposure: Other (PROC0)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

#### 17.3.15. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	local	long-term	0,012 mg/m <sup>3</sup> (measured data)	0,29
inhalative	local	short-term	High hazard (Qualitative assessment)	
inhalative	systemic	long-term	Not relevant	
inhalative	systemic	short-term	Not relevant	
Dermal	local	long-term	Medium hazard (Qualitative assessment)	
Dermal	local	short-term	Medium hazard (Qualitative assessment)	
Dermal	systemic	short-term	Not relevant	
Dermal	systemic	long-term	Not relevant	

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

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational



conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE ([www.ebrc.de/mease.html](http://www.ebrc.de/mease.html)) to estimate the associated exposure.

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the environmental exposure to a level below the respective PNEC as given in the SDS. If measured data are not available, the DU may make use of an appropriate scaling tool such as MetalEUSES (free download: <http://www.arche-consulting.be/Metal-CSA-toolbox/duscaling-tool>) to estimate the associated exposure.