

Industrial use of cobalt as catalyst		
Systematic title based on use descriptor	SU3 (Industrial use), SU8, SU9, SU10 PC19, PC20, PC21, ERC1, ERC4, ERC6a, ERC6b (appropriate PROCs are given in Section 2 below)	
2. Operational conditions and risk management measures		
Workplace	Involved task	Involved PROCs
Use of catalyst	Loading/unloading, reaction	1, 2, 3, 4, 8a, 8b, 9, 22
Use of catalyst for the production of other catalysts containing cobalt compounds	Storage, delivery, transfer, conveying, loading, drying, mixing, screening, reduction, impregnation, calcination, stabilisation, coating, filling, unloading, forming, sulfiding, cleaning, maintenance, packaging	1, 2, 3, 4, 8a, 8b, 9, 14, 22
2.1 Control of workers exposure		
Product characteristics		
Workplace	Use in preparation and content in preparation	Physical form of the product
Use of catalyst	No restriction	Powder, Shaped
Use of catalyst for the production of other catalysts containing cobalt compounds	No restriction	Various (Powder, Shaped)
Amounts used		
No restriction.		
Frequency and duration of use/exposure		
No restriction.		
Human factors not influenced by risk management		
The shift breathing volume 10 m ³ /8 h (full shift).		
Other given operational conditions affecting workers exposure		
Room volume >1,000 m ³ , process temperature < 160°C (for closed process < 600°C), process pressure no restriction for all workplaces. Use of catalyst - Indoor and outdoor use, other workplaces - Indoor use.		
Technical conditions and measures at process level (source) to prevent release		
Workplace	Level of containment	Level of segregation
Use of catalyst	Automation and complete enclosure of powder processing and transfer, handling and filling operations are not likely to give rise to significant exposures to inhalable cobalt-containing powder or dust.	No measures required
Use of catalyst for the production of other catalysts containing cobalt compounds		
Technical conditions and measures to control dispersion from source towards the worker		
Localised controls (LC) are required for all workplaces (Local exhaust recommended, efficiency up to 90 %). Level of separation if required see frequency and duration of exposure section. Installation of ventilated (positive pressure) control rooms can also reduce exposure. Additional information: Any localised controls have to be applied considering the emission potential of the material handled as well as the release potential resulting from the containment and level of automation (i.e. semi- and fully automated) of the conducted processes.		
Organisational measures to prevent/limit releases, dispersion and exposure		
Additional information See Section: 7, 8, 11 (SDS).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Specification of respiratory protective equipment (RPE) are recommended for all workplaces - FFP3 mask conforming to EN143 or EN149 during operations where exposure to dust cannot be excluded with APF = 20. In cases where direct contact with cobalt cannot be avoided, a protective suit conforming to EN13982-1 type 5 and suitable chemical resistant gloves (EN 374) providing protection for the duration of activity (e.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), butyl rubber (0.7 mm) should be worn. As a general requirement for the conducted processes: standard working clothes (long-sleeve overall), safety shoes and use of goggles.		

2.2 Control of environmental exposure				
Amounts used				
20 - 75 tonnes Co/annum/site				
Frequency and duration of use/exposure				
Continuous use, release of cobalt to wastewater or air is negligible.				
Environment factors not influenced by risk management				
Not applicable.				
Other given operational conditions affecting environmental exposure				
Not applicable.				
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil				
No emissions are expected which may enter the environment.				
Organisational measures to prevent/limit release from site				
Please see section 8 SDS for more details.				
Conditions and measures related to municipal sewage treatment plant				
Not applicable				
Conditions and measures related to external treatment of waste for disposal				
<p>Suitable disposal: Wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately to hazardous waste incineration plants (Council Directive 2008/98/EC, Directive 2000/76/EC and BAT Reference Document 2006) or hazardous waste landfills as hazardous waste (Directive 1999/31/EC). Releases to the floor, water and soil are to be prevented. If the cobalt content of the waste is elevated enough, internal or external recovery/recycling might be considered. Fraction of daily/annual use expected in waste: 0.001 or 0.1%</p> <p>Appropriate waste codes: 01 03 07*; 11 02 07*; 06 05 02*; 15 01 10*; 10 08 04; 10 10 11*; 12 01 03; 12 01 04; 06 03 13*; 06 03 15*; 10 10 03; 10 10 05*; 10 10 07*; 16 06 05; 16 08 02* 16 08 03</p>				
3. Exposure estimation and reference to its source				
Occupational exposure				
The risk characterisation ratio (RCR) is the quotient of the exposure estimate and the respective Derived No Effect Level (DNEL) and has to be below 1 to demonstrate a safe use. For inhalation exposure, the RCR is based on a DNEL for cobalt of 40 µg/m ³ .				
Workplace	Method used for inhalation exposure assessment	Inhalation exposure estimate (RCR)	Method used for dermal exposure assessment	Dermal exposure estimate (RCR)
Use of catalyst	analogous data	19 µg/m ³ (0.48)	Since cobalt has sensitising properties, dermal exposure has to be minimised as far as technically feasible. A DNEL for dermal effects has not been derived. Thus, dermal exposure is not assessed in this exposure scenario.	
Use of catalyst for the production of other catalysts containing cobalt compounds	analogous data	19 µg/m ³ (0.48)		
Environmental emissions				
The risk characterisation ratio (RCR) is the quotient of the local Predicted Environmental Concentration (PEC) and the respective PNEC (Predicted No Effect Concentration) and has to be below 1 to demonstrate a safe use.				
4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES				
Occupational and Environmental 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. For human health, this has to be done by showing that they limit the inhalation exposure to a level below the 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) to estimate the associated exposure. For the environment, this has to be done by showing that they limit the PEC below the PNEC for the respective environmental compartment. If measured data are not available, the DU may make use of an appropriate scaling tool such as the DU-Scaling tool (http://www.arche-consulting.be/Metal-CSA-toolbox/duscaling-tool) to estimate PEC values.				