

10. ES 10: Service life (worker at industrial site); Service life of cobalt containing alloys, steels and tools in industrial settings

10.1. Title section

Article category: Vehicles (AC 1), Machinery, mechanical appliances, electrical/electronic articles (AC 2), Metal articles (AC 7)

| Environment | |
|--|---------|
| 1: Service life of cobalt containing alloys, steels and tools in industrial settings | ERC 12a |
| Worker | |
| 2: Handling and mechanical treatment of metal or hard coated tools, metals and/or alloys – low kinetic energy | PROC 21 |
| 3: Use and mechanical treatment of metal or hard coated tools, metals and/or alloys – high kinetic energy | PROC 24 |
| 4: Use of cobalt alloy in laser surface treatment | PROC 25 |
| Exposure scenario of the uses leading to the inclusion of the substance into the article | |
| ES 7: Use at industrial sites; Various products; Various sectors; Production and industrial use of cobalt containing alloys, steels and tools | |
| ES 9: Use at industrial sites; Base metals and alloys; Manufacture of basic metals, including alloys; Industrial use of cobalt metal in additive manufacturing (3D-printing) | |

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: Service life of cobalt containing alloys, steels and tools in industrial settings (ERC 12a)

| Amount used, frequency and duration of use (or from service life) |
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| Daily amount per site <= 50 tonnes/day |
| Annual amount per site <= 5E3 tonnes/year |
| 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. |

10.2.2. Control of worker exposure: Handling and mechanical treatment of metal or hard coated tools, metals and/or alloys – low kinetic energy (PROC 21)

| Product (article) characteristics |
|--|
| Maximum emission potential covered in this ES: Low (abrasion 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. |

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| 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. |

10.2.3. Control of worker exposure: Use and mechanical treatment of metal or hard coated tools, metals and/or alloys – high kinetic energy (PROC 24)

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| Product (article) characteristics |
| Maximum emission potential covered in this ES: High (abrasion 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 |
| 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 = 10 (90% respiratory protection). |

10.2.4. Control of worker exposure: Use of cobalt alloy in laser surface treatment (PROC 25)

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| Product (article) characteristics |
| Physical form covered in this ES: Massive object. |
| Technical and organisational conditions and measures |
| Ensure full containment of the process. |
| 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 = 10 (90% respiratory protection). |

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure: Service life of cobalt containing alloys, steels and tools in industrial settings (ERC 12a)

| Release route | Release rate | Release estimation method |
|---------------|--------------|---------------------------|
| Water | 0 kg/day | Estimated release factor |
| Air | 0 kg/day | Estimated release factor |
| Soil | 0 kg/day | Estimated release factor |

10.3.2. Worker exposure: Handling and mechanical treatment of metal or hard coated tools, metals and/or alloys – low kinetic energy (PROC 21)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--------------------------------------|------|
| Inhalation, local, long term | 10 µg/m ³ (Measured data) | 0.25 |

10.3.3. Worker exposure: Use and mechanical treatment of metal or hard coated tools, metals and/or alloys – high kinetic energy (PROC 24)

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

10.3.4. Worker exposure: Use of cobalt alloy in laser surface treatment (PROC 25)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|-----------------------------|-------|
| Inhalation, local, long term | 1 µg/m ³ (MEASE) | 0.025 |

10.4. 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”.