

## 33. ES 33: Use at industrial sites; Production of sintered hardmetal articles

### 33.1. Title section

Product category: Base metals and alloys (PC 7)

<b>Environment</b>	
1: Production of sintered hardmetal articles ES1 STP Discharge	ERC 6a
2: Production of sintered hardmetal articles ES2 Marine Discharge	ERC 6a
<b>Worker</b>	
3: Transfer to mixer	PROC 8b
4: Mixing	PROC 3
5: Press charging	PROC 8b
6: Pressing	PROC 14
7: Shaping	PROC 21
8: Sintering	PROC 22
9: Grinding and/or turning	PROC 24
10: Edge rounding	PROC 24
11: Coating	PROC 1
12: Brazing or welding	PROC 25
13: Marking	PROC 21
14: Packaging	PROC 21
15: Cleaning & Maintenance	PROC 28
<b>Subsequent service life exposure scenario(s)</b>	
ES 35: Service life (worker at industrial site); Machinery, mechanical appliances, electrical/electronic articles; Service life of hardmetal articles in industrial settings	
ES 36: Service life (professional worker); Machinery, mechanical appliances, electrical/electronic articles; Service life of hardmetal articles in professional settings	
ES 37: Service life (consumers); Machinery, mechanical appliances, electrical/electronic articles; hard metal articles	

### 33.2. Conditions of use affecting exposure

#### 33.2.1. Control of environmental exposure: Production of sintered hardmetal articles ES1 STP Discharge (ERC 6a)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site <= 0.654 tonnes/day
Annual amount per site <= 170 tonnes/year
Emission days >= 260 days/year
<b>Technical and organisational conditions and measures</b>
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
<b>Conditions and measures related to biological sewage treatment plant</b>

Municipal sewage treatment plant is assumed.
Assumed domestic sewage treatment plant flow $\geq 2E3$ m <sup>3</sup> /day
<b>Conditions and measures related to external treatment of waste (including article waste)</b>
Dispose of waste product or used containers according to local regulations.
<b>Other conditions affecting environmental exposure</b>
No discharge to marine water assumed
Local freshwater dilution factor 100

### 33.2.2. Control of environmental exposure: Production of sintered hardmetal articles ES2 Marine Discharge (ERC 6a)

<b>Amount used, frequency and duration of use (or from service life)</b>
Daily amount per site $\leq 0.654$ tonnes/day
Annual amount per site $\leq 170$ tonnes/year
Emission days $\geq 260$ days/year
<b>Technical and organisational conditions and measures</b>
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
<b>Conditions and measures related to external treatment of waste (including article waste)</b>
Dispose of waste product or used containers according to local regulations.
<b>Other conditions affecting environmental exposure</b>
Assumed effluent discharge flow from site $\geq 2E3$ m <sup>3</sup> /day
Local marine water dilution factor 100

### 33.2.3. Control of worker exposure: Transfer to mixer (PROC 8b)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Medium.
Physical form covered in this ES: Solid, powder / dust.
Limit the concentration of the substance in mixture to $\leq 25$ %.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Limit the duration of exposure $\leq 60$ min.
<b>Technical and organisational conditions and measures</b>
Standard efficiency of at least 84% for a point ventilation is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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.
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.4. Control of worker exposure: Mixing (PROC 3)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Medium.
Physical form covered in this ES: Solid, powder / dust.
Limit the concentration of the substance in mixture to <= 25 %.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Ensure full containment of the process.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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).
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.5. Control of worker exposure: Press charging (PROC 8b)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Medium.
Physical form covered in this ES: Solid, powder / dust.
Limit the concentration of the substance in mixture to <= 25 %.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Use of a local exhaust ventilation with an efficiency of at least 78% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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).
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.6. Control of worker exposure: Pressing (PROC 14)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Medium.
Physical form covered in this ES: Solid, powder / dust.
Limit the concentration of the substance in mixture to <= 25 %.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Use of a local exhaust ventilation with an efficiency of at least 78% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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).

Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.7. Control of worker exposure: Shaping (PROC 21)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Medium (abrasion based).
Physical form covered in this ES: Solid, powder / dust.
Limit the concentration of the substance in mixture to <= 25 %.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Use of a local exhaust ventilation with an efficiency of at least 78% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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.
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.8. Control of worker exposure: Sintering (PROC 22)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Low (temperature based).
Physical form covered in this ES: Solid, powder / dust.
Limit the concentration of the substance in mixture to <= 25 %.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Limit the process temperature to 1.49E3 °C.
Ensure full containment of the process.
Use of an integrated local exhaust ventilation with an efficiency of at least 84% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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.
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.9. Control of worker exposure: Grinding and/or turning (PROC 24)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: High (abrasion based).
Limit the concentration of the substance in mixture to <= 25 %.

Physical form covered in this ES: Bound in article.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Use of a local exhaust ventilation with an efficiency of at least 78% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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.
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.10. Control of worker exposure: Edge rounding (PROC 24)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: High (abrasion based).
Limit the concentration of the substance in mixture to <= 25 %.
Physical form covered in this ES: Bound in article.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Ensure full containment of the process.
Use of a local exhaust ventilation with an efficiency of at least 78% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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.
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.11. Control of worker exposure: Coating (PROC 1)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Very low.
Limit the concentration of the substance in mixture to <= 25 %.
Physical form covered in this ES: Bound in article.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Ensure full containment of the process.
Use of an integrated local exhaust ventilation with an efficiency of at least 84% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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).
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.12. Control of worker exposure: Brazing or welding (PROC 25)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: High (temperature based).
Limit the concentration of the substance in mixture to <= 25 %.
Physical form covered in this ES: Molten.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Covers use at temperatures below melting point / degradation temperature.
Use of a local exhaust ventilation with an efficiency of at least 78% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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.
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.13. Control of worker exposure: Marking (PROC 21)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Very low.
Physical form covered in this ES: Bound in article.
Limit the concentration of the substance in mixture to <= 25 %.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Use of an integrated local exhaust ventilation with an efficiency of at least 84% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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.
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.14. Control of worker exposure: Packaging (PROC 21)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Very low.

Physical form covered in this ES: Bound in article.
Limit the concentration of the substance in mixture to <= 25 %.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Use of an integrated local exhaust ventilation with an efficiency of at least 84% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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.
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

### 33.2.15. Control of worker exposure: Cleaning & Maintenance (PROC 28)

<b>Product (article) characteristics</b>
Maximum emission potential covered in this ES: Medium.
Physical form covered in this ES: Solid, powder / dust.
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration of exposure: Not restricted.
<b>Technical and organisational conditions and measures</b>
Process is carried out at ambient pressure.
Process is carried out at ambient temperature.
Use of a local exhaust ventilation with an efficiency of at least 78% is required.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
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.
Wear protective suit conforming to EN 13982 in cases where direct contact with the substance cannot be avoided.

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

#### 33.3.1. Environmental release and exposure: Production of sintered hardmetal articles ES1 STP Discharge (ERC 6a)

Release route	Release rate	Release estimation method
Water	0.065 kg/day	Estimated release factor
Air	0.196 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	2.24E-4 mg/L (EUSES 2.1.2)	0.361

Protection target	Exposure estimate	RCR
Sediment (freshwater)	9.02 mg/kg dw (PEC sediment calculation method for metals)	0.168
Sewage Treatment Plant	0.02 mg/L (EUSES 2.1.2)	0.053
Agricultural soil	0.791 mg/kg dw (EUSES 2.1.2)	0.073
Man via environment - Inhalation	3.88E-5 mg/m <sup>3</sup> (EUSES 2.1.2)	< 0.01

### 33.3.2. Environmental release and exposure: Production of sintered hardmetal articles ES2 Marine Discharge (ERC 6a)

Release route	Release rate	Release estimation method
Water	0.065 kg/day	Estimated release factor
Air	0.196 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Marine water	0.157 µg/L (Clocal calculation with Kp susp. matter marine)	0.067
Sediment (marine water)	26.9 mg/kg dw (PEC sediment calculation method for metals)	0.385
Agricultural soil	0.24 mg/kg dw (EUSES 2.1.2)	0.022
Man via environment - Inhalation	3.88E-5 mg/m <sup>3</sup> (EUSES 2.1.2)	< 0.01

### 33.3.3. Worker exposure: Transfer to mixer (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	0.5 µg/m <sup>3</sup> (Measured data)	0.013

### 33.3.4. Worker exposure: Mixing (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	4 µg/m <sup>3</sup> (Measured data)	0.1

### 33.3.5. Worker exposure: Press charging (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	17.6 µg/m <sup>3</sup> (Measured data)	0.44

### 33.3.6. Worker exposure: Pressing (PROC 14)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	17.6 µg/m <sup>3</sup> (Measured data)	0.44

### 33.3.7. Worker exposure: Shaping (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	15 µg/m <sup>3</sup> (Measured data)	0.375

### 33.3.8. Worker exposure: Sintering (PROC 22)



Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	6 µg/m <sup>3</sup> (Measured data)	0.15

### 33.3.9. Worker exposure: Grinding and/or turning (PROC 24)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	18 µg/m <sup>3</sup> (Measured data)	0.45

### 33.3.10. Worker exposure: Edge rounding (PROC 24)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	3 µg/m <sup>3</sup> (Measured data)	0.075

### 33.3.11. Worker exposure: Coating (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	7.4 µg/m <sup>3</sup> (Measured data)	0.185

### 33.3.12. Worker exposure: Brazing or welding (PROC 25)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	24 µg/m <sup>3</sup> (Measured data)	0.6

### 33.3.13. Worker exposure: Marking (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	24 µg/m <sup>3</sup> (Measured data)	0.6

### 33.3.14. Worker exposure: Packaging (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	4.5 µg/m <sup>3</sup> (Measured data)	0.112

### 33.3.15. Worker exposure: Cleaning & Maintenance (PROC 28)

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

## 33.4. 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”.