29. ES 29: Service life (worker at industrial site); Service life of cobalt-containing varistors and magnets in industrial settings

29.1. Title section

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

Environment	
1: Service life of cobalt-containing varistors and magnets in industrial settings	ERC 12a
Worker	
2: Handling of varistors	PROC 21
3: Handling of magnets	PROC 21
Exposure scenario of the uses leading to the inclusion of the substance into the article	
ES 27: Use at industrial sites; Semiconductors; Various sectors; Industrial use of cobalt in the production of varistors and magnets (calcination/sintering processes)	

29.2. Conditions of use affecting exposure

29.2.1. Control of environmental exposure: Service life of cobalt-containing varistors and magnets in industrial settings (ERC 12a)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.5 tonnes/day
Annual amount per site <= 10 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.

29.2.2. Control of worker exposure: Handling of varistors (PROC 21)

Product (article) characteristics
Maximum emission potential covered in this ES: Very low.
Limit the concentration of the substance in mixture to <= 5 %.
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.
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.

29.2.3. Control of worker exposure: Handling of magnets (PROC 21)

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

29.3. Exposure estimation and reference to its source

29.3.1. Environmental release and exposure: Service life of cobalt-containing varistors and magnets 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

29.3.2. Worker exposure: Handling of varistors (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	10 µg/m³ (MEASE)	0.25

29.3.3. Worker exposure: Handling of magnets (PROC 21)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long term	8.6 µg/m³ (Measured data)	0.215

29.4. 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”.