

2. ES 2: Use at industrial sites; Use of nickel oxide-containing catalysts

2.1. Title section

Product category: Other (PC 0), Products such as ph-regulators, flocculants, precipitants, neutralization agents (PC 20), Laboratory Chemicals (PC 21)

Sector of use: Manufacture of bulk, large scale chemicals (including petroleum products) (SU 8), Manufacture of fine chemicals (SU 9)

| Environment | |
|---|---|
| 1: Use of nickel oxide-containing catalysts | ERC 4 |
| 2: Use of nickel oxide-containing catalysts | ERC 6b |
| Worker | |
| 3: Industrial use of powdered catalysts | PROC 8b, PROC 4, PROC 28, PROC 8a, PROC 2, PROC 3, PROC 9, PROC 1 |
| 4: Industrial use of shaped catalysts | PROC 8b, PROC 4, PROC 28, PROC 8a, PROC 2, PROC 3, PROC 9, PROC 1 |

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Use of nickel oxide-containing catalysts (ERC 4)

| Amount used, frequency and duration of use (or from service life) |
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| Daily amount per site <= 43 tonnes/day (All the amounts and concentrations are expressed as Ni as this is the driver for the environmental risk assessment.) |
| Annual amount per site <= 200 tonnes/year |
| Technical and organisational conditions and measures |
| The substance should not be released to air |
| The substance should not be released to water |
| Conditions and measures related to external treatment of waste (including article waste) |
| Dispose of waste product or used containers according to local regulations. |

2.2.2. Control of environmental exposure: Use of nickel oxide-containing catalysts (ERC 6b)

| Amount used, frequency and duration of use (or from service life) |
|--|
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| Annual amount per site <= 200 tonnes/year |
| Technical and organisational conditions and measures |
| The substance should not be released to air |
| The substance should not be released to water |
| Conditions and measures related to external treatment of waste (including article waste) |

| |
|---|
| Dispose of waste product or used containers according to local regulations. |
|---|

2.2.3. Control of worker exposure: Industrial use of powdered catalysts (PROC 8b, PROC 4, PROC 28, PROC 8a, PROC 2, PROC 3, PROC 9, PROC 1)

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| Product (article) characteristics |
| Physical form of product: Solid, powder / dust or suspension in an inert liquid (e.g. water, alcohols, hydrocarbons). |
| Limit the substance content in the product to 90 % |
| Amount used (or contained in articles), frequency and duration of use/exposure |
| Covers daily exposures up to 8 hours |
| Amounts used: 0.5-75 tonnes nickel/year (1-150 tonnes catalyst/year). |
| Technical and organisational conditions and measures |
| Use vacuum cleaner fitted with a HEPA filter to remove dusts and powders during cleaning. |
| During use nickel oxide-containing catalyst powder is required to be entirely contained within reaction vessels and associated pipework. The handling of powdered catalyst materials in open workspace is excluded. |
| Reduce dermal contact to a single event per day. |
| Charging and discharging of catalyst powder take place in semi-automated methods whereby the catalyst is transferred into hoppers and lifted up to the top of the reactor and transferred from the hopper to the reactor by manual assistance/control or enclosed transfer from container to reactor. |
| Conditions and measures related to personal protection, hygiene and health evaluation |
| Use of protective suit conforming to EN13982-1 Type 5 is required during operations where dermal contact is possible. Other protective equipment should be chosen based on activities being undertaken, potential for exposure to airborne substance-containing dust and other relevant workplace hazards may include protective suit (with hood) and safety shoes (e.g. according to EN 20346). |
| Use of RPE (Particle filter with high efficiency for solid and liquid particles (e.g. EN 143 or 149, Type P3 or FFPE)) is required during loading and unloading of reactor and for cleaning and maintenance operations and where exposure to nickel oxide-containing dust or powder is possible. Use of air fed RPE is required if entry to the reactor is required. |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. |

2.2.4. Control of worker exposure: Industrial use of shaped catalysts (PROC 8b, PROC 4, PROC 28, PROC 8a, PROC 2, PROC 3, PROC 9, PROC 1)

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| Product (article) characteristics |
| Limit the substance content in the product to 65 % |
| Physical form of product: Solid, shaped catalysts. |
| Amount used (or contained in articles), frequency and duration of use/exposure |
| Covers daily exposures up to 8 hours (loading/unloading: carried out by specialist catalyst loading companies). |
| Amounts used: 1.5-200 tonnes nickel/year (5-600 tonnes catalyst/year). |
| Technical and organisational conditions and measures |
| Use vacuum cleaner fitted with a HEPA filter to remove dusts and powders during cleaning. |
| Closed or semi-closed, semi-automated loading (closed use in reactors, closed or semi-closed, semi-automated discharge). |

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| Indoor and outdoor use is permitted. |
| Reduce dermal contact to a single event per day. |
| Conditions and measures related to personal protection, hygiene and health evaluation |
| Use of protective suit conforming to EN13982-1 Type 5 is required during operations where dermal contact is possible. Other protective equipment should be chosen based on activities being undertaken, potential for exposure to airborne substance-containing dust and other relevant workplace hazards may include protective suit (with hood) and safety shoes (e.g. according to EN 20346). |
| Use of RPE (Particle filter with high efficiency for solid and liquid particles (e.g. EN 143 or 149, Type P3 or FFPE)) is required during loading and unloading of reactor and for cleaning and maintenance operations where exposure to nickel oxide-containing dust or powder is possible; use of air fed RPE is required, if entry to the reactor is required. |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. |

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Use of nickel oxide-containing catalysts (ERC 4)

| 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 |

2.3.2. Environmental release and exposure: Use of nickel oxide-containing catalysts (ERC 6b)

| 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 |

2.3.3. Worker exposure: Industrial use of powdered catalysts (PROC 8b, PROC 4, PROC 28, PROC 8a, PROC 2, PROC 3, PROC 9, PROC 1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|---------------------------------------|--|--------|
| Inhalation, systemic, long term | 0.01 mg/m ³ (Measured data) | 0.2 |
| Inhalation, local, long term | 0.01 mg/m ³ (Measured data) | 0.2 |
| Inhalation, local, acute | 0.04 mg/m ³ (Measured data) | < 0.01 |
| Dermal, local, long term | 5E-4 mg/cm ² (MEASE, PROC 8b) | 0.042 |
| Combined, systemic, long term | | 0.2 |

2.3.4. Worker exposure: Industrial use of shaped catalysts (PROC 8b, PROC 4, PROC 28, PROC 8a, PROC 2, PROC 3, PROC 9, PROC 1)

| Route of exposure and type of effects | Exposure estimate | RCR |
|--|--|------------|
| Inhalation, systemic, long term | 0.02 mg/m ³ (Measured data) | 0.4 |
| Inhalation, local, long term | 0.02 mg/m ³ (Measured data) | 0.4 |
| Inhalation, local, acute | 0.06 mg/m ³ (Measured data) | < 0.01 |
| Dermal, local, long term | 5E-4 mg/cm ² (MEASE, PROC 8b) | 0.042 |
| Combined, systemic, long term | | 0.4 |

2.4. 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".