# Material Safety Data Sheet

according to REG (EU) no. 453/2010

Product identification: Phthalic anhydride – flakes printing date: 07.03.2016

## 1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY

**1.1 Product identification:** Phthalic anhydride – index no. 607-009-00-4
*(REG (EC) no. 1272/2008, annex VI, part 3)*

1.1.1. Trade name: Phthalic anhydride – flakes, PA - flakes

1.1.2. Registration number: 01-2119457017-41-0019

1.1.3. Identified Uses: Main user groups SU 3 / 8 / 9 / 10 / 21 / 22
*detailed explanation of SU und other categories of use see section 16*

1.1.4. Uses not advised to: none

**1.2 Company / supplier:** ATMOSA Petrochemie GmbH
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A-2320 Schwechat
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Advisory person of the company:
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**1.3 Emergency telephone:** Tel. Control center PA production plant:
+43 1 706 28 49 – 31
Tel. Intoxication information center:
+43 1 406 43 43

## 2. HAZARDS IDENTIFICATION

### 2.1 Classification of the substance / preparation

2.1.1. Classification according to regulation (EC) no. 1272/2008, annex VI

| | |
|---|---|
| Acute toxicity (oral), haz. cat. 4 | H302 |
| Skin corrosion/irritation, haz. cat. 2 | H315 |
| Serious eye damage/eye irritation, haz. cat. 1 | H318 |
| Sensitisation - skin, haz. cat. 1 | H317 |
| Respiratory sensitisation, haz. cat. 1 | H334 |
| Specific target organ toxicity (single exp.): resp. syst., haz. cat. 3 | H335 |

2.1.2. Classification according to dir. 67/548/EEC and dir. 1999/45/EC

Xn – harmful R22
Xi – irritating R37/38-41 – R42/43

### 2.2 Labelling elements according to regulation (EC) 1272/2008

*pictograms:*

*GHS05 - corrosion*

*GHS07 – exclamation mark*

*GHS08 – chronic health hazard*

*signal word:*

**DANGER**

### 2.3 Other hazards

2.3.1. PBT and vPvB assessment

The substance / preparation is not to be classified, neither as PBT (**P**ersistent, **B**ioaccumulative, **T**oxic), nor as vPvB (**v**ery **P**ersistent, **v**ery **B**ioaccumulative); for further details see section 12.3.

2.3.2 Hazard and precautionary statements

| | |
|---|---|
| H302 | Harmful if swallowed |
| H318 | Causes serious eye damage |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled |
| H335 | May cause respiratory irritation |
| H315 | Causes skin irritation |
| H317 | May cause an allergic skin reaction |

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| | |
|---|---|
| P232 | Protect product from moisture. |
| P261 | Avoid breathing dust/mist/vapours/spray. |
| P264 | Wash hands thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P271 | Use only outdoors or in a well-ventilated area. |
| P272 | Contaminated work clothing should not be allowed out of the workplace. |
| P280 | Wear protective clothing and eye protection / face protection. |
| P285 | In case of inadequate ventilation wear respiratory protection. |
| P301+P312 | IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. |
| P302+P352 | IF ON SKIN: Wash with plenty of soap and water. |
| P304+P340 | IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. |
| P305+P351+P338 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| P310 | Immediately call a POISON CENTER or doctor/physician. |
| P330 | Rinse mouth. |
| P333+P313 | If skin irritation or rash occurs: Get medical advice / attention. |
| P342+P311 | If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. |
| P337+P313 | If eye irritation persists: Get medical advice / attention. |
| P362 | Take off contaminated clothing and wash before reuse. |
| P403+P233 | Store in a well-ventilated place. Keep container tightly closed. |
| P405 | Store locked up. |
| P501 | Dispose of contents / container in accordance with local regulations. |

## 3. COMPOSITION / INFORMATION ON INGREDIENTS

| | | | | classification acc. to reg. (EC) no. 1272/2008 | | |
|---|---|---|---|---|---|---|
| **substance** | **EINECS / CAS no.** | **index no.** | **contents** | **hazard classes and categories** | **pictograms signal word** | **hazard statements** |
| Phthalic anhydride | 201-607-5<br>85-44-9 | 607-009-00-4 | > 99,80 % (w/w) | Acute toxicity (oral), haz. cat. 4<br>Skin corrosion / irritation, haz. cat. 2<br>Serious eye damage / eye irritation, haz. cat. 1<br>Sensitisation - skin, haz. cat. 1<br>Respiratory sensitisation, haz. cat. 1<br>Specific target organ toxicity (single exp.): resp. syst., haz. cat. 3 | GHS05<br>GHS07<br>GHS08<br>  <br>  <br>  <br>Danger | H302<br>H315<br>H318<br>H317<br>H334<br>H335 |

| **classification and labelling acc. to dir. 67/548/EEC and dir. 1999/45/EC** | | |
|---|---|---|
| **classification** | **symbol** | **risk phrases** |
| Xn – harmful<br>Xi – irritating |  | R22<br>R37/38-41<br>R42/43 |

## 4. FIRST AID MEASURES

- **General measures:** Take off with product contaminated clothing immediately; in case of any health disorder get medical advice / attention.
- **Inhalation:** Remove to fresh air; if breathing is difficult, give oxygen, if possible; if victim is unconscious bedding and transport only in recovery position, if indicated apply artificial respiration; get medical advice / attention in case of physical troubles / disorders; in case of irritation of the respiratory system seek medical help / attention.
- **Skin contact:** Wash immediately with plenty of water and soap; in case of persistent skin irritation get medical advice / attention.
- **Eyes contact:** Remove contact lenses; flush eyes immediately with excess water for at least 15 minutes, lifting lower and upper eyelids occasionally; get medical advice / attention by an eye specialist afterwards immediately.
- **Ingestion:** Rinse mouth with cold water and drink much water in many little drafts (dilution effect); avoid vomiting; get medical advice / attention.

## 5. FIRE-FIGHTING MEASURES

- **Suitable extingushing media:** Water spray, carbon dioxide ($CO_2$), foam, dry (extinguishing) powder.
- **Unsuitable extingushing media:** Full water jet.
- **Special exposure hazards arising from the substance / preparation itself, combustion products or resulting gases:** In case of fire / combustion dangerous vapours / gases may occur: carbon monoxide (CO), carbon dioxide ($CO_2$); heavy smoke emission.
- **Special protective measures and equipment for fire-fighters:** Staying in hazard area / fire-fighting only with full turn-out gear and self contained breathing apparatus; cool endangered containers with water spray from out of harm's way; defeat evolving vapours with water; keep quench water away from drains, surface- and ground-water and soil; avoid skin contact by wearing suitable protective clothing and keeping safe distance.
- **Additional information:** With water formation of phthalic acid; quench water may cause corrosion to iron and low-alloy steel; melts above 130°C.

## 6. ACCIDENTAL RELEASE MEASURES

- **Personal precautions, protective equipment and emergency measures:** Remove ignition sources; avoid dust formation; avoid contact with skin, eyes and clothing; provide adequate ventilation; warn persons sojourning in endangered areas; observe protective measures in sections 7 and 8.
- **Environmental precautions:** Prevent product and large quantities of contaminated washing water from invading surface waters and soil; cover drains to prevent product from entering canalisation.
- **Methods and materials for cleaning up:** Contain escaped (leaking) material mechanically, e.g. with a clean shovel, and collect it in dedicated, marked, clean and dry vessels for disposal.

## 7. HANDLING AND STORAGE

- **Precautions for safe handling:** Filling only with devices possessing exhausting systems; adhere to minimal standards according to TGS 500 – which include common hygiene measures such as:
  - ✓ no eating, drinking and smoking in working areas;
  - ✓ wash hands after use;
  - ✓ take off contaminated clothing and protective equipment before entering eating areas.
- **Fire and explosion protection:** Avoid static electricity, e.g. by grounding; keep implicitly away from ignition sources.
- **Special design for storage rooms and vessels/containers:** Store in a cool and well-ventilated room; protect material from humidity; keep always in containers adequate to the genuine storage container; keep containers tightly closed; store apart from pharmaceuticals, food and feeding stuff.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### 8.1 Exposure limit values :

Occupational Exposure Limit Values: TLV 1 mg/m$^3$ (TRGS 900)
Peak limit cat. 1
Pregnancy group D

### 8.2 DNEL and PNEC values

| | water | sediment | soil | sewage treatment plant |
|---|---|---|---|---|
| PNEC | 5,6 mg/l | 0,0826 mg/kg | 0,153 mg/kg | 10 mg/l |
| | | | | |
| DNEL | dermal | inhalative | oral | |
| workers | 10 mg/kg a. d | 32,2 mg/kg a. d | | |
| general population | 5 mg/kg a. d | 8,6 mg/kg u. d | 5 mg/kg a. d | |

### 8.3 Exposure controls:

Technical measures and the design of appropriate work processes go before the use of personal protective equipment; apply adequate ventilation – either by local exhausting equipment or by collective drawing-off air. A dust collecting system has to be provided in any case; exhaust air must be treated by a separator / stripper or lead over filters before being released to the environment – in doing so make sure for an uninterruptible equipotential bonding (protective multiple earthing). Wash hands before breaks and after end of work; take off contaminated clothing immediately.

- Respiratory protection: use a fine dust mask at short-term or low exposure; adequate filters e.g. on a full or half mask for long-term or heavy / elevated exposure: composite filter ABEK2-P3.
- Hand protection: wear protective gloves resistant against solvents and acids according to EN 374: nitrile rubber, thickness ≥ 0,40 mm, breakthrough time > 120 min.
- Eye protection: use safety glasses according to EN 166:2001 (e.g. densely closing frame glasses with side protection); keep an eyewash bottle ready.
- Skin and body protection: protective clothing – the means for body protection have to be chosen depending on specific concentration and quantity of the dangerous substance / preparation at workplace; chemical resistance of protective equipment has to be clarified with the supplier. Workwear and safety shoes should be made of flame resistant and antistatic material (no synthetic fibre).

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| **Appearance** | solid | | |
| **Colour** | white | | |
| **Odour** | aromatic / irritant | threshold n.a. | |
| **pH** | 2,0 | 20°C (6 g/l $H_2O$) | tested |
| **Boiling point / range** | 284,5°C | at 1013 hPa | tested |
| **Melting point** | 131,0°C | | tested |
| **Flash point** | 152°C | acc. to DIN 51758 | tested |

| | | | |
|---|---|---|---|
| **Vapour pressure** | 9,3 mbar | at 135°C | literature |
| | 107,3 mbar | at 200°C | literature |
| **Autoignition temperature** | 580°C | acc. to DIN 51794 | tested |
| **Decomposition temperature** | no decomposition | | |
| **Explosion limits:** | | | |
| **lower:** | 1,7 % | | literature |
| **upper:** | 10,5 % | | literature |
| **Density** | 1,197 g/cm$^3$ | at 150°C | tested |
| | 1,150 g/cm$^3$ | at 200°C | tested |
| **Bulk density** | appr. 400 kg/m$^3$ | | |
| **Viscosity** | n.a. | | |
| **Water solubility** | 6 g/l | at 20°C | tested |
| **Alcohol solubility** | very good | at 20°C monoester formation | tested |
| **Partition coefficient (n-octanol/water - log $P_{ow}$)** | 0,73 (Phthalic acid) | 20°C | literature |

## 10. STABILITY AND REACTIVITY

- **Conditions to avoid:** Protect against extreme heat and extreme low temperatures; when hot intense hydrolysis reaction with water
- **Materials to avoid:** oxidising agents (substances)
- **Thermal decomposition:** can be distilled / fractionated at standard (ambient) pressure without decomposition
- **Hazardous decomposition products:** none

## 11. TOXICOLOGICAL INFORMATION

Toxicological classification of the preparation was done based on results of the overall computational procedure for classification in regulation (EC) no. 1272/2008. Operating experience of the manufacturer shows that no hazards beyond current classification can be expected.

### 11.1 Acute toxicity

oral $LD_{50}$ = 1530 mg/kg (rat)
dermal $LD_{50}$ = > 3160 mg/kg (rabbit)
inhalative LC50 = > 210 mg/m$^3$ air 1 h (rat)

### 11.2 Specific target organ toxicity

| single exposure | effects | target organ | remarks |
|---|---|---|---|
| acute toxicity, inhalative | corrosion / irritation | respiratory system | in case of inhalation of dust / mist / aerosols |

### 11.3 Corrosive / irritating effects

| | exposure period | species | evaluation | methods | remarks |
|---|---|---|---|---|---|
| primary corrosive effects on skin | 24 h | rabbit | haz. cat. 2 – causes skin irritation; corrosive effects on mucosa | similar to OECD 404 | |
| eye irritation | | rabbit | haz. cat. 1 – causes serious eye irritation | similar to OECD 405 | |

## 12. ECOLOGICAL INFORMATION

### 12.1 Ecotoxicity

| | dose rate | exposure period | | species |
|---|---|---|---|---|
| acute fish toxicity | $LC_{50}$ | 60 h | 4,4 – 48,3 mg/l | onchorhynchus mykiss |
| acute daphnia toxicity | $EC_{10}$ | | | daphnia |
| acute algae toxicity | $EC_{50}$ | 96 h | 60 – 350 mg/l | selenastrum capricornutum resp. |
| BOD | | 5 d | 44 – 78 % | |

### 12.2 Persistence and degradability – bioaccumulation potential, mobility in soil

- log $P_{ow}$ = 0,73 (Phthalic acid at 20°C)
- BCF < 100
- Readily biodegradable

### 12.3 Results of PBT and vPvB assessment according to annex XIII of REACH regulation

| **PBT** | | **evaluation** |
|---|---|---|
| Persistence | half-life of phthalic anhydride in all compartments (water, soil, air) < 40 days | not enough persistence for classification |
| Bioaccumulation | BCF of phthalic anhydride < 2000 | not enough bioaccumulation for classification |
| Toxicity | acute oral toxicity of the substance: haz. cat. 4 | substance is not classified toxic |

| **vPvB** | | |
|---|---|---|
| very strong Persistence | half-life of phthalic anhydride in all compartments (water, soil, air) < 60 days | not enough strong persistence for classification |
| very strong Bioaccumulation | BCF of phthalic anhydride < 5000 | not enough strong bioaccumulation for classification |

***Conclusion:***
The substance / preparation is not to be classified, neither as PBT (**P**ersistent, **B**ioaccumulative, **T**oxic), nor as vPvB (**v**ery **P**ersistent, **v**ery **B**ioaccumulative).

## 13. DISPOSAL CONSIDERATIONS

- Dangerous waste according to „Abfallverzeichnisverordnung“ (AVV) BGBl. II Nr. 570/2003 i.d.g.F.; if recovery and recycling is not possible waste has to be disposed only under consideration of local legal regulations.
- Recommendation: waste code number 07 01 08 (AVV).
- Not allowed to be disposed together with residential / municipal waste; must not attain to drains and canalisation.
- Contaminated package, i.e. discharged, not dry or dry packaging has to be considered as containers with harmful contents which have to be disposed according to local legal regulations.
- Purged, not contaminated packaging can be recycled; recommended cleaning agent: water.

## 14. TRANSPORT INFORMATION

The product is no dangerous good in terms of the ADR/RID according to EU regulations or directives and the Austrian „Gefahrgutbeförderungsgesetz”. Contents of maleic acid below 0,05 % (w/w).

## 15. REGULATORY INFORMATION

### 15.1 Regulations on safety, health and environmental protection – specific legal regulations for the substance / preparation:

- EU regulations:
  - Labelling and classification: according to regulation (EC) no. 1272/2008 and regulation (EC) no. 790/2009
  - Regulation (EC) no. 1907/2006
- National regulations:
  - Chemikaliengesetz 1996, BGBl. I Nr. 53/1997 i.d.g.F.
  - Chemikalienverordnung 1999, BGBl. II 81/2000 i.d.g.F.
  - Gesetz zur Durchführung der REACH-VO, BGBl. I 88/2009 i.d.g.F.

### 15.2 Chemical Safety Assessment:

The substance was subject to a Chemical Safety Assessment according to article 18 of the REACH regulation. Relevant chapters of the resulting Chemical Safety Report (CSR) – exposure scenarios and risk management measures – are listed in the annex to this safety data sheet.

## 16. OTHER INFORMATION

### 16.1 Identified uses

### Main User Groups

| | |
|---|---|
| **SU 3** | Industrial uses: Uses of substances as such or in mixtures at industrial sites |
| **SU 8** | Manufacture of chemicals at a bulk, large scale (including petroleum products) |
| **SU 9** | Manufacture of fine chemicals |
| **SU 10** | Formulation (mixing) of preparations and/or re-packaging |
| **SU 21** | Consumer uses |
| **SU 22** | Professional uses |

### Sectors of End-use

| | |
|---|---|
| **SU 5** | Manufacture of textiles, leather, fur |
| **SU 7** | Printing and reproduction of recorded media |
| **SU 11** | Manufacture of rubber products |
| **SU 12** | Manufacture of plastics products, including compounding and conversion |
| **SU 19** | Building and construction work |

### 16.2 Register of H and P statements / Risk phrases

| | |
|---|---|
| Hazard statements | H302, H315, H318, H317, H334, H335 |
| Precautionary statements | P232, P261, P264, P270, P271, P272, P280, P285, P301+312, P302+352, P304+340, P305+351+338, P310, P330, P333+313, P342+311, P337+313, P362, P403+233, P405, P501 |
| Risk phrases | R22, R37/38-41, R42/43 |

### 16.3 Literature, data sources and legend

- Biographical reference and data sources
  - CLP REG (regulation) (EC) no. 1272/2008, last modification by regulation (EC) no. 790/2009
  - DIR 67/548/EWG, last modification by DIR 2009/2/EC
  - REG (EC) no. 1907/2006, last modification by REG (EC) Nr. 453/2009
  - Handbook of Chemistry and Physics, 64$^{th}$ edition, R.C. Weast, M.J. Astle, W. H. Beyer (editors), CRC Press, Inc., Boca Raton, Florida (USA), 1984
  - Handbook of Environmental Data on Organic Chemicals, 4$^{th}$ edition, K. Verschueren (editor), John Wiley & Sons, Weinheim, New York, 2001
- Internet
  - http://www.baua.de
  - http://ecb.jrc.ec.europa.eu/esis/
  - http://www.dguv.de/ifa/de/gestis/stoffdb/index.jsp
  - http://www.chemlin.de/chemie/trgs.htm
  - http://logkow.cisti.nrc.ca
- Legend
  - BCF = **B**io**C**oncentration **F**actor
  - DNEL = **D**erived **N**o **E**ffect **L**evel
  - PNEC = **P**redicted **N**o **E**ffect **C**oncentration

- TLV = **T**hreshhold **L**imit **V**alue
- TRGS = **T**echnische **R**egeln für **G**efahr**S**toffe
- ACGIH = **A**merican **C**onference of **G**overnmental **I**ndustrial **H**ygienists
- n.a. = **n**ot **a**pplicable
- EN = **E**uropäische **N**orm
- EC = **E**uropea **C**ommunity
- REACH = **R**egistration, **E**valuation and **A**uthorisation of **C**hemicals
- CLP = **C**lassification, **L**abelling and **P**ackaging
- LD = **L**etale **D**osis
- LC = **L**ethal **C**oncentration
- EC = **E**ffective **C**oncentration
- BOD = **B**iological **O**xygen **D**emand
- OECD = **O**rganization for **E**conomic **C**o-operation and **D**evelopment
- QSAR = **Q**uantitative **S**tructure-**A**ctivity **R**elationship
- GHS = **G**lobally **H**armonised **S**ystem
- UN = **U**nited **N**ations

## Annex

Register of relevant Exposure Scenarios (ES) and Risk Management Measures (RMM) out of the CSR – the detailed Chemical Safety Report can be provided on request only.

### Overview on exposure scenarios and coverage of substance life cycle

| ES number | Manufacture | Identified uses | | | Resulting life cycle stage | | Sector of Use (SU) | Preparation Category (PC) | Process category (PROC) | Article category (AC) | Environ-mental Release Category |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Formulation | End use | Consumer use | Service life (for articles) | Waste stage | | | | | |
| ES 1 Production | Y | n/a | n/a | n/a | n/a | n/a | n.a. | n/a | PROC 1, PROC 2 PROC 8b PROC 9 | n/a | ERC 1 |
| ES 2 Intermediate | N | N | Y | N | n/a | n/a | SU 3 SU 8 SU 9 | PC 19 | PROC 1, PROC 2, PROC 3, PROC 4 PROC 8b, PROC 9 | n/a | ERC 6a |
| ES 3 Monomer | N | N | Y | N | n/a | n/a | SU 3 SU 10 SU 11 SU 12 | PC 32 | PROC 1, PROC , PROC 3, PROC 4, PROC 8b, PROC 9 | n/a | ERC 6c, 6d |
| ES 4 Formulation, mixture, refilling and loading | N | Y | N | N | n/a | n/a | SU 3 SU 10 | n/a | PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8b, PROC 9 | n/a | ERC 2 |
| ES 5 Laboratory chemical | N | N | Y | N | n/a | n/a | SU 22 | PC 21 | PROC 15 | n/a | ERC 8A, 8B |

## ES 1: Production of phthalic anhydride – CSR 9.1

Process Categories:

PROC01: Use in closed process, no likelihood of exposure
PROC02: Use in closed, continuous process with occasional controlled exposure
PROC08b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC09: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Environmental Release Category:

ERC01: Production of chemicals

**RMMs and measured values for ES 1 tier 2 assessment.**

| Description of RMM | Details | Effect taken into account in EUSES | Comments |
|---|---|---|---|
| Measured loss to waste water | 20 mg/L | Lowering of concentration in STP effluent to 2.53 mg/L | Worst case measured emission value which covers all facilities over all ESs for phthalic anhydride. |
| Emission and production days | 360 emission/production days per year | Increase emission days by 20%. | Continuous production |
| Sludge removal | Sludge removed to landfill or incinerated. | Concentration in soil due to sludge spreading set to 0. | No contamination of grassland or agricultural soil. |
| Measured stack gas emissions | Atmospheric losses of 1.8kg/hour. | Emission to the air of 43.2 kg/day. | Worst case emissions prior to scrubbing or incineration. Thus actual emissions to the environment will be even lower. |

## ES 2: Use of phthalic anhydride as an intermediate – CSR 9.2

Sectors of Use:

SU3: INDUSTRIAL USES: USES OF SUBSTANCES AS SUCH OR IN PREPARATION AT INDUSTRIAL SITES
SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
SU9: Manufacture of fine chemicals

Product Category:

PC19: Intermediate

Process Categories:

PROC01: Use in closed process, no likelihood of exposure
PROC02: Use in closed, continuous process with occasional controlled exposure
PROC03: Use in closed batch process (synthesis or formulation)
PROC04: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC08b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC09: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Environmental Release Category:

ERC6A: Industrial use resulting in manufacture of another substance (use of intermediates)

**RMMs for industrial site**

| Information type | Data field | Explanation |
|---|---|---|
| **Containment and local exhaust ventilation** | | |
| Containment plus good work practice required | Effectiveness: Unknown | Handling of molten phthalic anhydride involves high temperatures, and high integrity contained systems with little or no potential for exposure. Pipelines and vessels are sealed and insulated. Workers involved in production work in a control room, with no direct contact to the installations housing the material. |
| Local exhaust ventilation is not required is not required to demonstrate a safe use but may be present depending on the design of the premises | Effectiveness : Unknown | Handling of molten phthalic anhydride involves high temperatures, and high integrity contained systems with little or no potential for exposure. Pipelines and vessels are sealed and insulated. Workers involved in production work in a control room, with no direct contact to the installations housing the material. |
| | | |
| **Personal protective equipment (PPE)** | | |
| Type of PPE (gloves, respirator, face-shield etc) | Effectiveness: Unknown | Handling of molten phthalic anhydride involves high temperatures, and high integrity contained systems with little or no potential for exposure. Pipelines and vessels are sealed and insulated. Workers involved in production work in a control room, with no direct contact to the installations housing the |

| Information type | Data field | Explanation |
|---|---|---|
| | | material. Workers involved in sampling and transfer of materials to road tankers are trained in the procedures and protective equipment is intended to cope with the worst case scenario, in order to minimise exposure and risks. |
| **Other risk management measures related to workers** | | |
| No further risk management measures required | | |
| **Risk management measures related to environmental emissions from industrial sites** | | |
| Onsite pre-treatment of waste water | Chemical pre-treatment or onsite STP. | Waste waters are generally treated on site by chemical and/or biological methods before release to the municipal STP or to the environment. |
| Resulting fraction of initially applied amount in waste water released from site to the external sewage system | Varies depending on system. Estimated concentration in the STP effluent is between 2 and 3mg/L based on worst case measured emissions. | Worst case measured releases for the phthalic anhydride life cycle are considered below and have been determined to be safe for the environment. |
| Air emission abatement | Effectiveness: Adequate measures in place | Exhaust gases absorbed in wet scrubbers or removed by incineration. Worst case measured emission values are considered below and are found to be safe for the environment. The emission to air is therefore considered to be negligible. |
| Resulting fraction of applied amount in waste gas released to environment | 43.2 kg/d | Worst case measured values before scrubbing. This value has been inputted into the environmental risk assessment and is determined to be safe for the environment. As such the actual release levels after scrubbing or incineration will pose no threat to the environment. |

## RMMs and measured values for ES 2 tier 2 assessment – see also ES 1

| Description of RMM | Details | Effect taken into account in EUSES | Comments |
|---|---|---|---|
| Measured loss to waste water | 20 mg/L | Lowering of concentration in STP effluent to 2.53 mg/L | Worst case measured emission value which covers all facilities over all ESs for phthalic anhydride. |
| Emission and production days | 360 emission days per year | Increase emission days by 20%. | Continuous intermediate use |
| Sludge removal | Sludge removed to landfill or incinerated. | Concentration in soil due to sludge spreading set to 0. | No contamination of grassland or agricultural soil. |
| Measured stack gas emissions | Atmospheric losses of 1.8kg/hour. | Emission to the air of 43.2 kg/day. | Worst case emissions prior to scrubbing or incineration. Thus actual emissions to the environment will be even lower. This emission value covers all facilities over all ESs for phthalic anhydride as it is worst case for all facilities considered. |

## ES 3: Use of phthalic anhydride as a monomer – CSR 9.3

Sectors of Use:

SU3: Industrial uses: Uses of substances as such or in preparation at industrial sites
SU10: Formulation [mixing] of preparation and/or re-packaging (excluding alloys)
SU12: Manufacture of plastics products, including compounding and conversion

Product Category:

PC32: Polymer preparations and compounds

Process Categories:

PROC01: Use in closed process, no likelihood of exposure
PROC02: Use in closed, continuous process with occasional controlled exposure
PROC03: Use in closed batch process (synthesis or formulation)
PROC04: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC08b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC09: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Environmental Release Category:

ERC6C: Industrial use of monomers in the production of plastics (polymers).
ERC6D: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers.

**RMMs for industrial site – see ES 2**

**RMMs and measured values for ES 3 tier 2 assessment – see ES 2**

## ES 4: Formulation, mixture, refilling and reloading of phthalic anhydride – CSR 9.4

Sector of Use:

SU3: Industrial uses: Uses of substances as such or in preparation at industrial sites
SU10: Formulation [mixing] of preparation and/or re-packaging (excluding alloys)

Process Categories:

PROC01: Use in closed process, no likelihood of exposure
PROC02: Use in closed, continuous process with occasional controlled exposure
PROC03: Use in closed batch process (synthesis or formulation)
PROC04: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC05: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC08b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC09: Transfer of substance or preparation into small containers (dedicated filling line, including weighing

Environmental Release Category:

ERC02: Formulation of preparations

**RMMs for industrial site – see ES 2**

**RMMs and measured values for ES 3 tier 2 assessment – see ES 2**

## ES 5: Use of phthalic anhydride as a laboratory chemical - CSR 9.5

Sector of Use:

SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process Categories:

PROC15: Use as laboratory reagent
Product Categories:
PC21: Laboratory chemicals

Environmental Release Category:

ERC8A: Wide dispersive indoor use of processing aids in open systems
ERC8B: Wide dispersive indoor use of reactive substances in open systems

**RMMs for industrial site – see ES 2**

**RMMs and measured values for ES 3 tier 2 assessment – see ES 2**