PHTHALIC ANHYDRIDE

№ 1 / Date of Issue: 01.03.2014 Revised edition: 11.05.2016 Version: 02

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

1.1. Identification of the substance / preparation

1.1.1. Substance

Trade name of substance	PHTHALIC ANHYDRIDE (flakes melt)
Chemical name of substance	PHTHALIC ANHYDRIDE
IUPAC name	2-benzofuran-1,3-dione
Index №	607-009-00-4
EC (EINECS) №	201-607-5
Registration number under REACH	01-2119457017-41-0022
CAS №	85-44-9

1.2. Identified uses of the substance or mixture that are of importance, and uses that are not recommended

Identified uses in the industrial sector
Use as transported intermediate product in the manufacture of other substances.
Use as a monomer.
Formulating, mixing, filling and loading.
Use as laboratory chemicals.

Identified uses in the professional sector
Formulating, mixing, filling and loading.
Use as laboratory chemicals.

1.3. Details of the MSDS's supplier

"RUSE CHEMICALS" AD
Republic of Bulgaria
7000 Ruse
133, Bulgaria Blvd.
Tel: +359 82 / 886-455
Fax: +359 82 / 886-455
E-mail address: rositsa.georgieva@orgachim.bg

1.4. Emergency Phone

Unified emergency number: 112

National Toxicology Information Center, Institute for Emergency Medical Care "Pirogov":
Director of the National Toxicology Information Center: Dr. Evgeniya Stankova
Director of the National Clinical Toxicology Center: Prof. Aneta Hubenova
Emergency telephone: +359 2 9154 409 / +359 9154 346
Fax: +359 2 9154 409

E-mail: poison_centre@mail.orbitel.bg
http://www.pirogov.net

2. HAZARDS

2.1. Classification of the substance or mixture

Classification under Regulation (EC) 1272/2008/EC (CLP)

Acute Tox. 4	H302
Skin Irrit. 2	H315
SkinSens. 1	H317
Eye Dam. 1	H318
Resp. Sens. 1	H334
STOT SE 3	H335

For the full text of H-phrases declared above, see Section 2.2. and Section 16.

2.2. Label elements

Product identifiers	Trade name: PHTHALIC ANHYDRIDE (flakes melt) Chemical name: PHTHALIC ANHYDRIDE Index №: 607-009-00-4

Hazard pictograms:

GHS07 (exclamation point) 

GHS08 (Health hazard) 

GHS05 (Corrosion) 

Signal word: Danger

Hazard Warnings:	
H302	Harmful if swallowed.
H335	May cause respiratory irritation.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H334	May cause allergic or asthmatic symptoms or breathing difficulties if inhaled

H317	May cause allergic skin reaction.
Safety precautions:	
P261	Avoid breathing dust.
P264	Wash thoroughly exposed parts of your body after use.
P305+P351+P338	EYE CONTACT: Rinse thoroughly with water for several minutes. Remove contact lenses, if any, as far as possible. Continue rinsing.
P280	Use protective gloves / protective clothing / goggles / protective face mask.
P333+P313	In case of skin irritation or skin rash: Seek medical advice / attention.
P342+P311	When symptoms of breathlessness: Contact the CENTER OF TOXICOLOGY, or a doctor.

2.3. Other hazards
Criteria for PBT or vPvB: The substance does not meet the criteria for PBT or vPvB**.**
Other dangers of substance that do not affect the classification:
In case of fire, can emit toxic or irritant gases that may pollute the air.
Dust can be explosive when exposed to heat or flame.

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1. Substances
3.1.1. Chemical identity of the substance: PHTHALIC ANHYDRIDE

Index №	607-009-00-4
EC (EINECS) №	201-607-5
Registration number under REACH	01-2119457017-41-0022
CAS №	85-44-9

3.1.2. Other dangerous ingredients in the composition of the substance

CAS №	EU №	Index №	% (mass)	Name	Classification (Regulation 1272/2008/CLP)
85-44-9	201-607-5	607-009-00-4	>99,80	Phthalic anhydride	Acute Tox. 4 (*); H302 STOT SE 3; H335 Skin Irrit. 2; H315 Eye Dam. 1; H318 Resp. Sens. 1; H334 Skin Sens. 1; H317
108-31-6	203-571-6	607-096-00-9	<0,05	Maleic anhydride	Acute Tox. 4 (*); H302 Skin Corr. 1B; H314 Resp. Sens. 1; H334 Skin Sens. 1; H317

3.2. Mixtures
Not applicable, the product is a substance.

3.3. Additional information
For the full text of R-and H-phrases stated herein above, see Section 16.
Occupational Exposure Limits, if any, are listed in Section 8.

4. FIRST AID MEASURES

4.1. Description of first aid measures

General Information
In case of inhalation, skin burns from molten product, eye contact, seek immediately medical attention.
If you experience health problems or if you suspect your health could be affected, consult a physician and provide it with information from this safety data sheet.
To maintain vital functions until medical help arrives, it is necessary to check the pulse of the sufferer, to do artificial respiration, heart massage. If the person has lost consciousness or if you consider he can lose consciousness, transport him to a hospital. In the case of first-degree burns (painful red spots) and second degree burns (painful blisters), cool the affected area in a stream of cold water. In the case of third degree burns (black dots, loose pale skin, usually painless), do not cool the affected area and cover it with a clean cloth. The sufferer must not lose their body heat.

After inhalation
Hard phthalic anhydride (flakes)
Remove to fresh air. In case of doubt, that there is still dust in the air from the product, the person providing first aid must wear appropriate mask or self-contained breathing apparatus. Keep the sufferer warm and at rest.
If breathing has stopped or is difficult, give artificial respiration by a trained person or put him a breathing apparatus. Breathing "mouth to mouth" may be dangerous for the first aid provider. Seek immediate medical attention.
If unconscious, place in recovery position, loosen any clothing (eg, collar, tie, belt) and seek immediate medical attention. Avoid further exposure.
Liquid phthalic anhydride (melt)
Remove people from the danger zone without endangering their safety. Remove the sufferer to fresh air. If breathing is difficult, put him a breathing apparatus, make him rest and keep warm. Seek medical attention.

After skin contact
Hard phthalic anhydride (flakes)
Remove clothing and footwear. Immediately wash skin thoroughly with soap and water for 10-15 minutes. If signs of irritation occur, seek medical attention. Before reuse, launder any contaminated clothing.
Liquid phthalic anhydride (melt)
Upon burning with liquid phthalic anhydride, cool with water and bandage with a sterile bandage. Do not remove the bark of the product, which probably formed on the skin either by force or by any solvents. Seek immediate medical attention.

After eye contact
If phthalic anhydride in some form contact eyes (even small amounts destruct the tissue), rinse immediately with large amounts of running water. Do not give the sufferer to rub eyes or keep them closed. Remove contact lenses. Start a

prolonged (at least 30 minutes) rinsing with clean water, pulling the eyelid with the thumb and forefinger and move eyes in all directions. Then bandage eyes and take the sufferer immediately to an ophthalmologist.

Ingestion
Rinse mouth thoroughly with water. Remove the sufferer to fresh air. Keep him warm and at rest. If the sufferer is conscious, give him drink small amounts of water. Stop if he starts vomiting. It can be dangerous.
Do not induce vomiting. If the sufferer starts to vomit, bend his head to avoid running the content in the lungs. Seek medical attention.
Never try to give anything by mouth to an unconscious person. If unconscious, place in recovery position, loosen any clothing (eg, collar, tie, belt) and seek immediate medical attention.

4.2. The most significant acute and onset after a period of time symptoms and effects
***Inhalation*:** Irritation of mucous membranes, cough. Irritation caused by inhalation of dust can cause asthma, especially in people who are predisposed or previously had asthma symptoms. Such persons or persons who are prone to allergies should not work in places where they may experience air pollution from dust or vapors of phthalic anhydride.
Skin contact: solid product causes irritation, redness. Melted product causes burns.
Eye contact: Irritation, redness, tearing, pain.
Ingestion: Not available.
A prolonged contact of the eyes, mucous tissues and wet skin with a hard phthalic anhydride, can cause surface burns. Repeated contact may lead to inflammation, chronic disturbances of vision, invasion of blood or abscess of the nasal mucosa.

4.3. Indications for the need of any urgent medical care and special treatment
Information for healthcare professionals
There is no specific antidote. Treatment of overexposure should be directed to control the symptoms and patient clinical treatment.
Upon ingestion it is recommended giving activated charcoal.
Upon inhalation it is recommended giving corticosteroids and saline solution with 5% Panthenol.

The following protection means should be available at the workplace:
Eye bath, sterile bandages.
Protective face masks, self-contained breathing apparatus and protective gloves.
Fire suits with with hoods for head and back glass for the hood.
Extinguishing blankets.
Stretcher.

5. ANTI-FIRE MEASURES

5.1. Extinguishing Media
Suitable extinguishing media
Small fires: Extinguish with a finely dispersed water mist, carbon dioxide, dry chemical powder or alcohol resistant film forming foam.
Large fires: Alcohol resistant film forming foam, water fog or water jet spray, inert gases (nitrogen, carbon dioxide). Fight fire from a safe distance.

Cool containers with abundant amounts of water to extinguish the fire. Beware of falling water inside containers.
Unsuitable extinguishing media
Thick water.

5.2. Specific hazards arising from the substance or mixture
Upon burning gases can be emitted containing carbon dioxide, carbon monoxide, dense black smoke. Other unknown organic compounds may be possibly released.
Carbon dioxide - a drug. Irritating to respiratory system, violates the activities of the central nervous and cardiovascular system. At high concentrations, difficult breathing.
Carbon monoxide - poison. Displaces oxygen from the blood oxyhaemoglobin forming carboxyhaemoglobin, which leads to oxygen deficiency.
Dust can be explosive when exposed to heat or flame.

5.3. Advises for firefighters
Wear self-contained breathing apparatus and protective fireman's clothing including boots, overalls, gloves.
Upon ignition of clothing, the sufferer should be covered with a blanket for fire choking the fire.

Additional information
Quickly isolate the area of the accident. Bring people away.
Remove all sources of fire: eg open fire, lit cigarettes, sparks from tools and equipment.
Both dust and vapor from phthalic anhydride form with air explosive mixtures. In sealed equipment, dust from phthalic anhydride may be pyrophoric and upon opening of the apparatus due to inflow of air, to self-ignite. By using an inert gas and by wetting the powder the danger of spontaneous combustion may be removed. Use an inert gas also in extinguishing fires in tanks containing molten phthalic anhydride.
Dispose contaminated extinguishing water in accordance with the statutory requirements. Do not empty into drains.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures
Isolate the place of accident.
Do not allow entry to unnecessary or unprotected personnel.
Do not eat, drink or smoke while cleaning up.

For non-emergency staff
- Wear appropriate personal protective equipment (including personal protective equipment specified in Section 8 of MSDS) to prevent contamination of skin, eyes and personal clothing. Avoid contact with skin and eyes.
- Remove sources of ignition, provide adequate ventilation.
- Avoid dust formation. Provide access to fresh air indoors.
- In case that an emergency evacuation is needed from danger area or consultation with an expert.

For emergency staff
- Wear chemical resistant protective suit, chemical resistant gloves made of nitrile rubber, PVC or rubber gloves.

6.2. Environment protection
Do not allow any product to drain in water sewage, surface water and groundwater and soil.
Take precautions for the safe collection, transportation and disposal.

6.3. Methods and materials to contain and clean

In the event of an accident and/or product spillage take measures to locate and limitat it. Collect spilled phthalic anhydride so as not to powder in the air. Do not return spilled material back into the original packaging. Provide ventilation. Scrape with non-sparking tools. Scrape up collected amount and temporarily store in special sealable and labeled containers, and then inform the competent persons / authorities.
Contaminated materials should be considered as waste as described in Section 13 of this safety data sheet.

6.4. Reference to other sections

See Section 8 and Section 13 of the MSDS.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

7.1.1. Recommendations

- Observe the usual precautions for handling chemicals. Ensure adequate ventilation. Do not exceed the concentration limits set forth in Section 8.
- When working in places where there may be both dust and vapor of phthalic anhydride wear self contained breathing apparatus.
- People with skin problems that are prone to allergies, and persons with recurrent respiratory diseases and asthma symptoms should not work in places where they may experience air pollution from dust or vapors of phthalic anhydride.
- Keep away from open flames, sparks and heat. Use only non-sparking tools and equipment. Ensure safe discharge of static electricity. This product can easily ignite from electrostatic discharge. Observe the fire prevention measures.
- Do not allow any release of the substance during loading and unloading. prevent any eventual spills or contamination in drains.

7.1.2. Tips for general work hygiene

- Do not smoke and eat and drink in the workplace.
- Remove contaminated clothing and protective equipment before entering the dining places.
- Wash hands and face before eating, drinking and smoking.
- Avoid direct contact with phthalic anhydride! Wash full after working therewith. Contaminated clothing or shoes should be immediately changed to avoid corrosion caused by phthalic acid.

7.2. Conditions for safe storage, including incompatibility

- Store in a covered and dry warehouses, away from direct sunlight.
- Take precautions for safe storage in tightly closed original containers, out of reach of children and other unauthorized persons.
- Packages should be marked with original manufacturer's label.
- Store only in sealed containers. Packages that have been opened must be carefully closed and kept upright to avoid leakage / spillage of product.
- Warehouses should be well ventilated. Wear appropriate respirator when ventilation is inadequate.
- Do not store with food, drink or feed.

Hard phthalic anhydride (flakes)

- Protect from moisture.

Liquid phthalic anhydride (melt)

- Store between the following temperatures: 150 ÷ 190°C.

7.3. Specific end use(s)

Not available.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters

Data on the limits of occupational exposure, according to Directive 98/24/EC, Directive 2006/15/EC and Directive 2004/37/EC have been introduced in the Republic of Bulgaria with Ordinance № 13 of the Ministry of Labour and Social Policy (MLSP) and the Ministry of Health (MoH).

8.1.1. Limits of chemical agents in air at the workplace, according to Ordinance № 13 of MLSP, MH

Agent's Name	EC №	CAS №	Limit values to occupational exposure		Specific Effects
			For 8 hours	For 15 minutes	
Phthalic anhydride	201-607-5	85-44-9	6,0 mg/m^3	-	
Maleic anhydride	203-571-6	108-31-6	1,0 mg/m^3	-	

8.1.1.1. Limit values of chemical agents in air at workplace, according to Directive 98/24/EO

Phthalic anhydride CAS № 85-44-9		
Country	**Limit values, mg/m^3**	**Specific Effects**
Bulgaria	6 mg/m^3 за 8 часа	Allergenic, Irritant
Belgium	6,1 mg/m^3	
Denmark	5 mg/m^3	
Finland	2 mg/m^3 3 mg/m^3 for short exposure	
France	6 mg/m^3 for short exposure	
Germany	1 mg/m^3	
Italy	4 mg/m^3 12 mg/m^3 for short exposure	
Hungary	1 mg/m^3 2 mg/m^3 for short exposure	
Poland	1 mg/m^3	
Ireland	6 mg/m^3 24 mg/m^3 for short exposure	Sensitizing
Netherlands	1 mg/m^3	

	2 mg/m^3 for short exposure	
Russia	1 mg/m^3 for short exposure	Irritant
Sweden	1 mg/m^3 2 mg/m^3 for short exposure	
Switzerland	5 mg/m^3 10 mg/m^3 for short exposure	
United Kingdom	4 mg/m^3 12 mg/m^3 for short exposure	Sensitizing
U.S.	6 mg/m^3	

8.1.2. PNEC & DNEL values: In Water, phthalic anhydride hydrolyzed to phthalic acid.

PNEC values

PNEC Water (fresh water) = 1 mg/l	PNEC water (seawater) = 0,1 mg/l
PNEC Water (regular release) = 5,6 mg/l	PNEC sediment (fresh water) = 3,8 mg/kg sediment
PNEC sediment (seawater) = 0,38 mg/kg sediment	PNEC soil (mg/kg.dw.) = 0,173 mg/kg wwt
PNEC STP = 10 mg/l	

DNEL values

DNEL for the workers	**DNEL for the population win whole**
10 mg/kg bw/day (dermal)	5 mg/kg bw/day (dermal)
32.2 mg/m³ (inhalation)	8.6 mg/m³ (inhalation)
	5 mg/kg bw/day (ingestion)

8.2. Exposure Control
Observe the usual precautions for handling chemicals.
Avoid generation and inhalation of dust.
Avoid contact with skin, eyes and clothing.
Wash hands before breaks and after work.
Consult doctor in case of malaise.

8.2.1. Appropriate engineering controls
Use only in closed systems.
Provide such an adequate ventilation in work areas that the concentration of vapors does not exceed the permissible limit of concentration.
Storage and use locations to be equipped with devices for washing / eye rinsing.
Scrubbers, filters or technical improvements of the working equipment are required in order to reduce emissions to acceptable levels.

8.2.2. Individual protection measures, such as personal protective equipment

- **Eye / face protection**

Avoid contact with eyes. Safety glasses and protective mask for full face protection.

- **Skin Protection**

Avoid contact with skin. Use clean antistatic protective clothing and shoes.

Hand Protection

Use chemical resistant, impervious gloves (EN 374). Recommended gloves of butyl rubber with a thickness exceeding 0,5 mm and a period of endurance > 480 minutes. Upon contamination, protective gloves should be replaced immediately.

Other

Consider the information from the manufacturer on the permeability and duration of endurance as well as on the specific work conditions (mechanical load and duration of contact).

- **Respiratory protection**

In poorly ventilated workplaces if the limit of exposure is exceeded, it is recommended a protective mask filter: color code - Brown, Type A / White, Type R.
In the case of hypersensitivity of the respiratory tract (asthma, chronic bronchitis) it is recommended to avoid using the product.

- **Thermal hazards**

If you use a fused product (melt), use heat protection.

8.2.3. Environment exposure controls

Do not allow any release to the environment.
Emissions from ventilation or work equipment must be checked for compliance with the legal provisions for environmental protection.

Standards for permissible concentrations (MAC) of harmful substances in ambient air of settlements, according to Ordinance № 14 of the Ministry of Health (MOH) and Ministry of Environment and Water (MEW):

MAC per clock of phthalic anhydride: 0,1 mg/m^3
MAC maximum single of phthalic anhydride: 0,1 mg/m^3 (30-minute short-term exposure)

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on the basic physical and chemical properties

INDEXES	VALUES
Physical state at 20ºC and 1013 hPa	Flakes, needle-like crystals
Physical state over 131.6ºC	Melt
Colour	Colorless
Odor	Sharp, irritating
Limit of Odor	No data
pH value	No data
Melting / freezing point	131.6ºC (Lorz, 2007)
Boiling point / boiling range	284.5°C at 1013 hPa (Beilstein, 2003)
Flash-point	152°C (Chemsafe, 2008)
Evaporation Rate	Not applicable

Flammability (solid, gas)	Flammability test according to UN N1 method: substance melts when presenting the flame. After removal of the flame, the process stops (Currenta 2009). Therefore, the phthalic anhydride can be classified as non-combustible solid. In contact with water, the substance is non-combustible and has not pyrophoric properties.
Lower / upper limit of flammability and explosion	Not applicable
Vapor pressure	0.0006 hPa at 26.6°C (Crooks,1946)
Vapour density	No data
Relative Density	1.527 g/cm³ at 20°C (Beilstein, 2003)
Solubility (s)	
• **In water**	Decomposes in water.
• **In organic solvents**	Soluble in formic acid: 470 g/l at 20°C (Beilstein, 2003). Soluble in carbon disulfide (Lewis, 1993).
Coefficient of distribution : n-octanol/water	log Pow = 1,6 (Hansch, 1995)
Self-Ignition temperature	580°C (Chemsafe, 2008)
Decomposition temperature	Decomposes in water.
Viscosity	1.19 mPa*s при 132°C (Kirk-Othmer, 2008) и 1.125 mPa*s при 155°C (Beilstein, 2003)
Explosive properties	In accordance with column 2 of Regulation REACH, Annex VII, no need to be tested because the substance does not contain substances with explosive properties.
Oxidizing properties	In accordance with column 2 of Regulation REACH, Annex VII, no need to be tested because the substance does not contain substances with oxidising properties.
Stability in organic solvents and identity-related degradation products	Phthalic anhydride is not stable in alcohol. Formed corresponding ester (Beyer, 2004).

9.2. Other information
Stated physical and chemical properties should not be construed as a guarantee of product quality.

10. STABILITY AND REACTIVITY

10.1. Reactivity
There is no danger of product reaction.

10.2. Chemical stability
The product is stable under normal conditions of handling and storage.

10.3. Possibility of hazardous reactions
See Sections: 10.4., 10.5., 10.6.

10.4. Conditions to Avoid
At high temperature explosive mixtures of vapors of the substance with air are formed.

Contact with open flames, hot surfaces and sparks, influence of increased temperature.

10.5. Incompatible materials
Concentrated strong acids, strong oxidizers.

10.6. Hazardous decomposition products
In case of fire toxic gases will be released.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects
Information of the safety report.

Type	Test	Exposure	Species	Result
Acute toxicity	LD 50	Oral	Rat	1530 mg/kg bw Loeser E (1978)
	LC 50	Inhalation	Rat	> 2.14 mg/l/4 hours Durando J (2010)
	LD 50	Dermal	Rabbit	> 3160 mg/kg bw Exxon (1996)
	LD 50	Other routes	Guinea pig	< 100 mg/kg bw Fassett DW (1963)
	LD 50	Other routes	Mouse	165 mg/kg bw Oettel H (1966)

Subchronic-chronic toxicity
NOAEL: 500 mg / kg bw / day (nominal) (men / women).

Corrosivity / irritation
Irritant.

Serious eye damage / eye irritation
Irritant.

Sensitization of respiratory tract or skin
Upon inhalation and skin contact it is possible a sensitization, which can cause asthma, rhinitis, dermatitis.

Germ cell mutagenicity
The substance is not a mutagen.

Carcinogenicity
The substance is not carcinogenic; NOAEL (carcinogenicity): 1000 mg / kg bw / day (men / women).

Reproductive toxicity
The substance is not toxic for reproduction:

Found NOAEL = 1000 mg / kg bw / day for maternity toxicity and NOAEL = 1700 mg / kg bw / day for teratogenicity.

STOT (specific target organ toxicity) - single exposure
See classification.

STOT (specific target organ toxicity) - repeated exposure
The substance is not classified.

Effects of tests on human
Upon prolonged contact, the substance may cause allergic reactions, eczema on the skin.
Upon accidental inhalation of high concentration of gaseous phthalic anhydride for about 10 minutes, the patient immediately feels burning of the upper respiratory tract, coughing. Three months later complaining of wheezing, shortness of breath and chest tightness.

Information on the likely routes of exposure
Inhalation
As vapor or dust, the phthalic anhydride is mainly irritating to mucous tissue and upper respiratory tract. First it causes coughing, sneezing, burning feeling in the nose and throat and increased mucous secretions.
Possible occurrence of bronchial asthma.
Ingestion
May cause severe irritation and gastrointestinal disturbance.
Skin contact
More prolonged and intensive contact with skin can cause an appearance of red spots, wetting eczema, ulcers, blisters, as in II degree burns.
Eye contact
Occupational exposure causes conjunctivitis, tearing, inflammation, corneal necrosis and photophobia.

Toxicokinetics, metabolism, distribution
Phthalic anhydride undergoes rapid hydrolysis to phthalic acid in contact with water and a similar reaction is possibly to occur in biological systems. For this reason, more likely is the phthalic acid to be more important for product classification.
Test animals
In vitro study: No credible studies.
In vivo study: No credible studies.
Test people
In vitro study: No data available.
In vivo study: After contact with water, phthalic anhydride rapidly hydrolyses to phthalic acid. Phthalic acid can be found in the urine of people who were exposed to phthalic anhydride by inhalation and absorption demonstrated throughout the body.
Phthalic acid was detected in the urine of people, as a hydrolyzed product *in vivo*.

12. ECOLOGICAL INFORMATION
Information of the safety report.

12.1. Toxicity

Aquatic toxicity

	Test	Exposure	Species	Result
Short-term	LC 50	7 d	*Fish:* Danio rerio	560 mg/l (Van Leeuwe, 1990)
Long-term	NOEC	60 d	*Fish:* Oncorhynchus mykiss	10 mg/l (Van Leeuwe, 1990)
Short-term	EC 50	48 h	*Crustaceans:* Daphnia magna	> 640 mg/l (Adams, 1986)
	NOEC	72 h	*Algae and aquatic plants:* Desmodesmus subspicatus (algae)	> 100 mg/l
	LC 0	24 h	*Amphibian:* Tadpole of Bufo bufo japonicus SCHLEGEL	≥ 42 mg/l
Water micro-organisms	EC 50	3 h	Active living sludge	> 1000 mg/l Bayer AG (1984)
	EC 50	16 h	*Bacteria:* Pseudomonas putida	213 mg/l Sepic E, Bricelj M, Leskovsek H (2003)

12.2. Persistence and degradability

Biodegradability: Easy biodegradable (Decomposition of the test substance: 85.2% after 14 days (O_2 consumption). ***Hydrolysis in water***: Fast hydrolysis (half-life (DT 50): (pH 4) 0,7 min at 25°C.; (pH 7) 0,3 min at 25°C.; (pH 9) 0,02 min at 25°C.

12.3. Bioaccumulative ability
Bioconcentration factor (BCF) of 3.4 for fish.
For Daphnia is not known, because of the rapid hydrolysis.

12.4. Portability in the soil
Portability in the soil is high. Adsorption in soils and portability are important for the environment, due to the process of rapid development of hydrolysis in water.

12.5. Results of the assessment of PBT and vPvB
The substance is not persistent, bioaccumulative and toxic according to the above information.

12.6. Other adverse effects
The substance is considered hazardous to the environment. Prevent spillage into soil, groundwater and sewer systems.

13. WASTES DISPOSAL

13.1. Methods of waste treatment
Any residues of the substance, waste from its application and the packaging in which it was stored, to be collected in special sealable and labeled containers for temporary storage and then to be transferred to persons holding an authorization under Art. 37 the Law on Waste Management.
Transport and treat wastes in accordance with Directive 91/689/EEC on hazardous waste.
Do not dispose the substance with household waste.
Do not allow to enter the environment, water sources and / or drainage waters. Take care of spills and cleanesing water not to reach the city sewers and open waters.
Packaging
After emptying, submit the packaging to a station for waste collection.

Recommended classification of waste of substance and packaging in accordance with the Ordinance on waste classification (NCA) (SG, Issue 44 of 25.05.2004)

Waste of substance, code and name
07 01 99 - wastes not otherwise specified.
16 05 08* - Waste organic chemicals with high degree of purity, consisting of or containing dangerous substances.
Packaging code and name of the waste
15 01 10* - Packages containing residues of hazardous substances or contaminated with hazardous substances.

14. TRANSPORTATION INFORMATION

14.1. Land transport: ADR / RID
Phthalic anhydride in solid form, containing maleic anhydride, less than 0.05%, is not classified as dangerous product, according to the transport regulations.

14.2. Sea transport: IMDG
Phthalic anhydride in solid form, containing maleic anhydride, less than 0.05%, is not classified as dangerous product, according to the transport regulations.

14.3. Air transport: IATA / ICAO
Phthalic anhydride in solid form, containing maleic anhydride, less than 0.05%, is not classified as dangerous product, according to the transport regulations.

14.4. Special precautions for users

Phthalic anhydride in liquid state (melt)
UN 3256
Exact name of goods: Phthalic anhydride
Hazard Class Transportation: 3
Packing Group: III

Label
Liquid.

Flammable.
Flash point (closed cup): 152ºC..
Hot melt; risk of skin burns.
Sharp odor.
Keep separate from food products.
Hazard Identification №: 30
Limited quantity LQ0

14.5. Transport in bulk in accordance with Annex II of MARPOL 73/78 and the IBC Code
No data.

15. INFORMATION ON THE LEGAL FRAMEWORK

15.1. Specific substance or mixture regulation / legislation on safety, health and environment
The substance does not affect the ozone layer, according to Regulation (EC) 2037/2000.
The substance is not persistent organic pollutant under
Regulation (EC) 850/2004.
The substance is not hazardous chemicals under Regulation (EC) 689/2008.
The substance is not included in the categories of danger according to Directive Seveso II (96/82/EC).

15.2. Evaluation of safety of chemical substance or mixture
Conducted an evaluation of the safety of the substance.

16. OTHER INFORMATION

16.1. Full text of all H-phrases referred to in Sections 2 and 3

N302 - Harmful if swallowed.
H314 - Causes severe skin burns and serious eye damage.
N315 - Causes skin irritation.
N335 - May cause respiratory irritation.
N317 - Can cause allergic skin reaction.
N318 - Causes serious eye damage.
N334 - Can cause allergic or asthmatic symptoms or breathing difficulties if inhaled.

16.2. Data compared to the previous version:
Sections 2 and 3 of Material Safety Data Sheet are revised. This updated edition supersedes all previous versions of this Safety Data Sheet.

16.3. Abbreviations and acronyms used in the SDS:
CAS - Register of chemicals
EC - European Inventory of Existing Commercial Chemical Substances
LD 50 - Lethal dose 50%
LC 50 - Lethal concentration 50%
NOEC - No Observed Effect Concentration
NOAEL - No-observed-adverse-effect-level

DNEL - Safe levels of exposure
PNEC - Predicted No Effect Concentration
in vivo - Tests for mutagenicity on germ cells
in vitro - Tests for mutagenic effects in somatic cells
PBT - Persistent, bioaccumulative and toxic substance as defined in Annex XIII
vPvB - very persistent and very bioaccumulative substances as specified in Annex XIII
BCF - bioconcentration factor
IUPAC - International Union of Pure and Applied Chemistry

16.4. Material Safety Data Sheet has been prepared in accordance with Regulation 453/2010 (EU), the international rules for transport and the following documents introduced in European legislation:
Regulation (EC) 1907/2006/ES (REACH) on the Registration, Evaluation, Authorisation and Restriction of Chemicals
Regulation (EC) 1272/2008/ES (CLP) on classification, labeling and packaging of substances and mixtures
Directive 98/24/EC on the protection of health and safety of workers from risks related to chemical agents at work
Directive 2006/15/EC establishing a second list of indicative limit values for exposure of workers in the implementation of Directive 98/24/EC on the protection of health and safety of workers from risks related to chemical agents at work
Directive 2004/37/EC on the protection of workers from risks related to exposure to carcinogens or mutagens at work
Regulation (EC) 2037/2000 on substances that deplete the ozone layer
Regulation (EC) No 850/2004 on persistent organic pollutants
Directive 91/689/EEC on hazardous waste
Regulation (EC) 689/2008 concerning the export and import of dangerous chemicals
Directive Seveso II (96/82/EC) for the control of major accidents involving hazardous chemicals
MARPOL 73/78 - International Convention for the Prevention of Pollution from Ships
Code IBC - International Code of chemicals in bulk
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
RID - Regulations concerning the International Carriage of Dangerous Goods
ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
IMDG - International Code for the transport of dangerous goods by sea
ICAO - International Civil Aviation Organization

The information in this MSDS is intended to provide guidance for professional users to take necessary measures to protect human health and the environment, and ensure the health and safety in the workplace. It should not be construed as a warranty for technical characteristics or proper specific application.

End of MSDS

ANNEX: Scenarios of exposure (CE)

Brief description of exposure scenarios

Identified uses in the industrial sector	Category of the process (PROC)	Category of the chemical product (PC)	Sectors of use (SU)	Product Category (AC)	Category release into the environment (ERC)
CE 1 Production of the substance.	PROC 1, PROC 2 PROC 8b PROC 9	n/a	n/a	n/a	ERC 1
CE 2 v	PROC 1, PROC2, PROC 3, PROC 4, PROC 8b, PROC9	PC 19	SU 3 SU 8 SU 9	n/a	ERC 6a
CE 3 Use as a monomer	PROC1, PROC2, PROC 3, PROC4, PROC 8b PROC9	PC 32	SU 3 SU 10 SU 12 SU 11	n/a	ERC 6c, 6d
CE 4 Formulation (mixing) of the preparations and / or repackaging	PROC1, PROC2, PROC3, PROC4, PROC5, PROC 8b, PROC9	n/a	SU 3 SU 10	n/a	ERC 2
CE 5 Use as laboratory chemicals (for all uses)	PROC 15	PC21	SU 22	n/a	ERC 8A, 8B

Identified uses in the professional sector	Category of the process (PROC)	Category of the chemical product (PC)	Sectors of use (SU)	Product Category (AC)	Category release into the environment (ERC)
CE 4 Formulation (mixing) of the preparations and / or repackaging	PROC1, PROC2, PROC3, PROC4, PROC5, PROC 8b, PROC9	n/a	SU 3 SU 10	n/a	ERC 2
CE 5 Use as laboratory chemicals (for all uses)	PROC 15	PC21	SU 22	n/a	ERC 8A, 8B

CE 1: PRODUCTION OF PHTHALIC ANHYDRIDE

Processes and activities covered by the exposure scenario

Categories of the process (PROC)

PROC 1 - Use in closed process, no likelihood of exposure (industrial environment).

PROC 2 - Use in closed, continuous process controlled by accidental exposure (eg sampling) (industrial environment). PROC 8b - Transfer of the substance (charge / discharge) from / to vessels/large containers in the common facilities (industrial or other non-environment).

PROC 9 - Transfer of the substance in small containers (dedicated filling line, including weighing).

Category release into the environment (ERC)

ERC 1 - Production of chemicals.

Working conditions of use

Duration and frequency of use

Exposure to workers is considered negligible for the liquid form as it is in a hermetically sealed apparatus.

Exposure of workers to the impact of solid phthalic anhydride is considered negligible, since the substance is in a closed system.

Duration of use: 8 hours a day - a standard number of hours per working day.

Frequency of use: 220 days a year - a standard number of working days per year.

Condition and physical form of the substance

Phthalic anhydride can be sold as flakes or as a melt in an airtight container.

Concentration of substance: Phthalic anhydride is produced with purity:> 99.80%.

Measures for risk management

Measures of risk management related to human health (workers and consumers)

Production and handling of molten phthalic anhydride is carried out at high temperature in a system with little or no exposure potential. Piping and vessels are sealed and isolated.

Workers involved in production work in the control room without direct contact with any equipment and material.

Workers who take samples and those who cut the finished product are trained in safe handling and use of personal protective equipment, to minimize exposure and risk.

Measures of risk management, related to environment

Avoid release into the air, soil and water before harmful emissions are minimized. To reduce environmental emissions to legally established standards are used as scrubbing and incineration.

Phthalic anhydride is easyly biodegradable in the atmosphere, water and soil and not bioaccumulate. Removal in wastewater treatment plants is efficient and emissions to air are controlled by scrubbers and incinerators. Therefore, it is considered unlikely that people will be exposed to direct or indirect contact with air, water, soil or drinking water or exposure in the food chain.

Measures for waste management

Any residues of Phthalic anhydride, waste from its application and the packaging in which it has been stored, must be collected in separate, sealable and labeled containers for temporary storage. Waste to be transported and treated in accordance with Directive 91/689/EEC on hazardous waste.

Do not allow product falling into the environment, water sources and / or drainage, urban drainage and open waters.

Information on the estimated exposure and guidance for downstream users

According to Ordinance № 13 of MLSP, MH, the limit occupational exposure to phthalic anhydride for the Republic of Bulgaria for exposure of 8 hours is 6 mg/m^3.

Calculation of exposure

Long-term exposure of workers to the impact of molten phthalic anhydride

Exposure route	PROC	Estimated exposure concentration
Dermal exposure	PROC 1	0.343 mg/kg/ day
	PROC 2	0.137 mg/kg/ day
	PROC 8b	0.686 mg/kg/ day
	PROC 9	0.686 mg/kg/ day
Inhalation exposure	PROC 1	0.617 mg/m^3
	PROC 2	0.617 mg/m^3
	PROC 8b	0.617 mg/m^3
	PROC 9	0.617 mg/m^3

Long-term exposure of workers to the impact of in form of flakes

Exposure route	PROC	Estimated exposure concentration
Dermal exposure	PROC 1	0.0343 mg/kg/ day
	PROC 2	0.137 mg/kg/ day
	PROC 8b	0.686 mg/kg/ day
	PROC 9	0.686 mg/kg/ day
Inhalation exposure	PROC 1	0.01 mg/m^3
	PROC 2	0.001 mg/m^3
	PROC 8b	0.005 mg/m^3
	PROC 9	0.01 mg/m^3

Guidance for downstream users

Downstream users are not exposed to the impact of Phthalic anhydride during the manufacturing process, according to CE 1.

CE 2: USE OF PHTHALIC ANHYDRIDE AS TRANSPORTED INTERMEDIATES IN THE PRODUCTION OF OTHER SUBSTANCES

Processes and activities covered by the exposure

Sector of use

SU3 - Industrial production (the whole).

SU8 - Manufacture of bulk, large scale chemicals (including petroleum products).

SU9 - Manufacture of fine chemicals.

Product Category

RS19 - intermediates.

Categories process (PROC)

PROC 1 - Use in closed process, no likelihood of exposure (industrial environment).

PROC 2 - Use in closed, continuous process controlled by accidental exposure (eg sampling) (industrial environment).

PROC 3 - Use in closed batch process (synthesis or formulation) (industrial environment).

PROC 4 - Use in a periodical or other process (synthesis) where it appears the opportunity for exposure (industrial environment).

PROC 8b - Transfer of the substance (charge / discharge) from / to vessels / large containers in the common facilities (industrial or other non-environment).

PROC 9 - Transfer of a substance in small containers (dedicated filling line, including weighing).

Category release into the environment (ERC)

ERC 6A - Industrial use of intermediates

Working conditions of use

Duration and frequency of use

The working conditions of phthalic anhydride used as transported intermediates are the same as during its manufacturing, such as unloading, transfer to containers for storage, transport through pipelines, reactors for use in controlled conditions.

Exposure for workers in the use of phthalic anhydride as transported intermediates is considered negligible for the liquid form as it is in a hermetically sealed apparatus.

Exposure of workers to the impact of phthalic anhydride in the form of flakes as transported intermediates is considered negligible, since the substance is used in a closed system.

Processes are controlled by operators via the computer.

Duration of use: 8 hours a day - a standard number of hours per working day.

Frequency of use: 220 days a year - a standard number of working days per year.

Condition and physical form of the substance

Phthalic anhydride can be used as flakes or as a melt in an airtight container.

Concentration of substance: Phthalic anhydride is with a purity: > 99.80%.

Measures for risk management

Measures of risk management related to human health (workers and consumers)

The dominant use of phthalic anhydride is as an intermediate. Used in closed systems and exposure to emissions from use is the same as in production. Phthalic anhydride is used as an intermediate in the production of saturated and unsaturated polyester resins produced by phtalate esters used as plasticizers. Transport to the place of use, using local transport.

When working with phthalic anhydride, pipes and containers are hermetically sealed and isolated. Use takes place in a system with little or no potential for exposure.

Workers associated with the use of phthalic anhydride as an intermediate, work in control room, with no direct contact with equipment and material.

Workers who take samples and those who load reactors are trained in safe handling and use personal protective equipment to minimize exposure and risk. Bags containing phthalic anhydride flakes should be emptied in closed systems in order to prevent occurrence of dust emissions. If the dust can not be completely avoided, it is necessary to use effective masks with filters for face / eye / skin protection.

Measures of risk management, related to environment

Avoid release into the air, soil and water before emissions are minimized, both in production and using the product as an intermediate.

To reduce environmental emissions to legally established standards use filters and incineration.

Phthalic anhydride is readily biodegradable in the atmosphere, water and soil and does not bioaccumulate. Removal in wastewater treatment plants is efficient and emissions to air are controlled by scrubbers and incinerators. Therefore, it is considered unlikely that people will be exposed to direct or indirect contact with air, water, soil or drinking water or exposure in the food chain.

Measures for waste management

Any residues of phthalic anhydride, waste from its application and the packaging in which it has been stored, must be collected in separate, sealable and labeled containers for temporary storage. Waste to be transported and treated in accordance with Directive 91/689/EEC on hazardous waste.

Do not allow product falling to the environment, water sources and / or drainage, urban drainage and open waters.

Information on the estimated exposure and guidance for downstream users

According to Ordinance № 13 of MLSP, MH, the limit of occupational exposure to phthalic anhydride for the Republic of Bulgaria for exposure of 8 hours is 6 mg/m^3.

Calculation of exposure

Long-term exposure of workers to the impact of molten phthalic anhydride

Exposure route	PROC	Estimated exposure concentration
Dermal exposure	PROC 1	0.343 mg/kg/ day
	PROC 2	0.137 mg/kg/ day
	PROC 3	0.0343 mg/kg/ day
	PROC 4	0.686 mg/kg/ day
	PROC 8b	0.686 mg/kg/ day
	PROC 9	0.686 mg/kg/ day
Inhalation exposure	PROC 1	0.617 mg/m^3
	PROC 2	0.617 mg/m^3
	PROC 3	0.617 mg/m^3
	PROC 4	0.617 mg/m^3
	PROC 8b	0.617 mg/m^3
	PROC 9	0.617 mg/m^3

Long-term exposure of workers to the impact of phthalic anhydride in the form of flakes

Exposure route	PROC	Estimated exposure concentration

Dermal exposure	PROC 1	0.0343 mg/kg/ day
	PROC 2	0.137 mg/kg/ day
	PROC 3	0.0343 mg/kg/ day
	PROC 4	0.686 mg/kg/ day
	PROC 8b	0.686 mg/kg/ day
	PROC 9	0.686 mg/kg/ day
Inhalation exposure	PROC 1	0.01 mg/m^3
	PROC 2	0.001 mg/m^3
	PROC 3	0.01 mg/m^3
	PROC 4	0.05 mg/m^3
	PROC 8b	0.005 mg/m^3
	PROC 9	0.01 mg/m^3

Guidance for downstream users

Downstream users are not exposed to the impact of phthalic anhydride during the process, according to CE 2.

CE 3: USE OF PHTHALIC ANHYDRIDE AS MONOMERS

Processes and activities covered by the exposure scenario

Sector of use

SU3 - Industrial production (the whole).

SU10 - Formulation (mixing) of the preparations and / or repackaging.

SU12 - Manufacture of plastic products, including blending and conversion.

SU11 - Manufacture of rubber products.

Product Category

RS32 - Polymer preparations and compounds.

Categories of the process (PROC)

PROC 1 - Use in closed process, no likelihood of exposure (industrial environment).

PROC 2 - Use in closed, continuous process controlled by accidental exposure (eg sampling) (industrial environment).

PROC 3 - Use in closed batch process (synthesis or formulation) (industrial environment).

PROC 4 - Use in a periodical or other process (synthesis) where it appears the opportunity for exposure (industrial environment).

PROC 8b - Transfer of the substance (charge / discharge) from / to vessels / large containers in the common facilities (industrial or other non-environment).

PROC 9 - Transfer of the substance in small containers (dedicated filling line, including weighing).

Category release into the environment (ERC)

ERC 6A - Industrial use of intermediates

ERC 6D - Manufacture of resins / tires

Working conditions of use

Duration and frequency of use

Working conditions for the use of phthalic anhydride as a monomer are similar as for transported intermediates and its production, such as unloading, transfer to containers for storage, transport through pipelines, reactors for use in controlled conditions.

Exposure for workers in the use of phthalic anhydride as a monomer is considered to be negligible for the liquid form as it is in a hermetically sealed apparatus.

Exposure of workers to the impact of phthalic anhydride in the form of flakes as a monomer is considered negligible, since the substance is used in a closed system.

Processes are controlled by operators via the computer.

Duration of use: 8 hours a day - a standard number of hours per working day.

Frequency of use: 220 days a year - a standard number of working days per year.

Condition and physical form of the substance

Phthalic anhydride can be used as flakes or as a melt in an airtight container.

Concentration of substance: Phthalic anhydride is with a purity:> 99.80%.

Measures for risk management

Measures of risk management related to human health (workers and consumers)

Used in closed systems and exposure to emissions from use is the same as the production and use as an intermediate. Phthalic anhydride is used as a monomer in the manufacture of alkyd resins, polyester polyols. Transport to the place of use, using local transport.

When working with phthalic anhydride, pipes and containers are hermetically sealed and isolated. Use takes place in a system with little or no potential for exposure.

Workers associated with the use of phthalic anhydride as a monomer, work in control room, with no direct contact with equipment and material.

Workers who take samples and those loaded reactors are trained in safe handling and use personal protective equipment to minimize exposure and risk. Bags containing phthalic anhydride flakes should be emptied in closed systems in order to prevent occurrence of dust emissions. If the dust can not be completely avoided, it is necessary to use effective masks with filters for face / eye / skin protection.

Measures of risk management related to environment

Avoid release into the air, soil and water before they are minimized emissions, both in production and using the product as an intermediate.

To reduce environmental emissions to legally established standards are used filters and incineration. Thus removed over 99% of phthalic anhydride missed.

In contact with water, phthalic anhydride is converted into phthalic acid. Biodegradation and microbiological toxicity tests showed that phthalic anhydride (phthalic acid) is not toxic to microorganisms and is biodegradable.

Measures for waste management

Any residues of phthalic anhydride, waste from its application and the packaging in which it has been stored, must be collected in separate, sealable and labeled containers for temporary storage. Waste to be transported and treated in accordance with Directive 91/689/EEC on hazardous waste.

Do not allow product to the environment, water sources and / or drainage, urban drainage and open waters.

Information on the estimated exposure and guidance for downstream users

According to Ordinance № 13 of MLSP, MH, limit value of occupational exposure to phthalic anhydride for Republic of Bulgaria for exposure of 8 hours is 6 mg/m^3.

Calculation of exposure

Long-term exposure of workers to the impact of molten phthalic anhydride

Exposure route	PROC	Estimated exposure concentration
Dermal exposure	PROC 1	0.343 mg/kg/day
	PROC 2	0.137 mg/kg/ day
	PROC 3	0.0343 mg/kg/ day
	PROC 4	0.686 mg/kg/ day
	PROC 8b	0.686 mg/kg/ day
	PROC 9	0.686 mg/kg/ day
Inhalation exposure	PROC 1	0.617 mg/m^3
	PROC 2	0.617 mg/m^3
	PROC 3	0.617 mg/m^3
	PROC 4	0.617 mg/m^3
	PROC 8b	0.617 mg/m^3
	PROC 9	0.617 mg/m^3

Long-term exposure of workers to the impact of phthalic anhydride in the form of flakes

Exposure route	PROC	Estimated exposure concentration
Dermal exposure	PROC 1	0.0343 mg/kg/ day
	PROC 2	0.137 mg/kg/ day
	PROC 3	0.0343 mg/kg/ day
	PROC 4	0.686 mg/kg/ day
	PROC 8b	0.686 mg/kg/ day
	PROC 9	0.686 mg/kg/ day
Inhalation exposure	PROC 1	0.01 mg/m^3
	PROC 2	0.001 mg/m^3
	PROC 3	0.01 mg/m^3
	PROC 4	0.05 mg/m^3
	PROC 8b	0.005 mg/m^3
	PROC 9	0.01 mg/m^3

Guidance for downstream users

Downstream users are not exposed to phthalic anhydride in the process according to the CE 3.

CE 4: FORMULATING, MIXING, FILLING AND LOADING OF PHTHALIC ANHYDRIDE

Processes and activities covered by the exposure scenario

Sector of use

SU3 - Industrial production (the whole).

SU10 - Formulation (mixing) of the preparations and / or repackaging.

Categories of the process (PROC)

PROC 1 - Use in closed process, no likelihood of exposure (industrial environment).

PROC 2 - Use in closed, continuous process controlled by accidental exposure (eg sampling) (industrial environment).
PROC 3 - Use in closed batch process (synthesis or formulation) (industrial environment).

PROC 5 - Mixing or blending in batch process for the formation of preparations and articles (multistage and / or significant contact).

ROC 4 - Use in a periodical or other process (synthesis) where it appears the opportunity for exposure (industrial environment).

PROC 8b - Transfer of the substance (charge / discharge) from / to vessels / large containers in the common facilities (industrial or other non-environment).

PROC 9 - Transfer of the substance in small containers (dedicated filling line, including weighing).

Category release into the environment (ERC)

ERC 2 - Formulation of preparations.

Working conditions of use

Duration and frequency of use

The working conditions of phthalic anhydride used in the formulation, mixing, filling and loading are similar as in its production. These include unloading, transfer to containers for storage, transport through pipelines under controlled conditions.

Exposure for workers in the use of phthalic anhydride in the formulation, mixing, filling and loading is considered negligible for the liquid form as it is in a hermetically sealed apparatus.

Exposure of workers to the impact of phthalic anhydride in the form of flakes in the formulation, mixing, filling and loading is considered negligible, since the substance is used in a closed system.

Duration of use: 8 hours a day - a standard number of hours per working day.

Frequency of use: 220 days a year - a standard number of working days per year.

Condition and physical form of the substance

Phthalic anhydride can be used as flakes or as a melt in an airtight container.

Concentration of substance: Phthalic anhydride is with a purity: > 99.80%.

Measures for risk management

Measures of risk management related to human health (workers and consumers)

Used in closed systems and exposure to emissions from use is the same as in production.

When working with phthalic anhydride, pipes and containers are hermetically sealed and isolated. Use takes place in a system with little or no potential for exposure.

Workers associated with the use of phthalic anhydride, work in control room, with no direct contact with equipment and material.

Workers who take samples and those loaded reactors are trained in safe handling and use personal protective equipment to minimize exposure and risk. Bags containing phthalic anhydride flakes should be emptied in closed systems in order to prevent occurrence of dust emissions. If the dust can not be completely avoided, it is necessary to use effective masks with filters for face / eye / skin protection.

Measures of risk management, related to environment

Avoid release into the air, soil and water before they are minimized emissions, both in production and the use of the product formulation, mixing, filling and loading.

To reduce environmental emissions to legally established standards are used filters and incineration.

Phthalic anhydride is readily biodegradable in the atmosphere, water and soil and not bioaccumulate. Removal in wastewater treatment plants is efficient and emissions to air are controlled by scrubbers and incinerators. Therefore, it is considered unlikely that people will be exposed to direct or indirect contact with air, water, soil or drinking water or exposure in the food chain.

Measures for waste management

Any remainder of phthalic anhydride, waste from its application and the packaging in which it has been stored, must be collected in separate, sealable and labeled containers for temporary storage. Waste to be transported and treated in accordance with Directive 91/689/EEC on hazardous waste.

Do not allow product falling into the environment, water sources and / or drainage, urban drainage and open waters.

Information on the estimated exposure and guidance for downstream users

Ordinance № 13 of MLSP, MH, limit occupational exposure to phthalic anhydride HP Bulgaria exposure of 8 hours is 6 mg/m3.

Calculation of exposure

Long-term exposure of workers to the impact of molten phthalic anhydride

Exposure route	PROC	Estimated exposure concentration
Dermal exposure	PROC 1	0.343 mg/kg/ day
	PROC 2	0.137 mg/kg/ day
	PROC 3	0.0343 mg/kg/ day
	PROC 4	0.686 mg/kg/ day
	PROC 5	0.0686 mg/kg/ day
	PROC 8b	0.686 mg/kg/ day
	PROC 9	0.68 mg/kg/ day
Inhalation exposure	PROC 1	0.617 mg/m^3
	PROC 2	0.617 mg/m^3
	PROC 3	0.617 mg/m^3
	PROC 4	0.617 mg/m^3
	PROC 5	0.617 mg/m^3
	PROC 8b	0.617 mg/m^3
	PROC 9	0.617 mg/m^3

Long-term exposure of workers to the impact of phthalic anhydride in the form of flakes

Exposure route	PROC	Estimated exposure concentration
Dermal exposure	PROC 1	0.0343 mg/kg/ day
	PROC 2	0.137 mg/kg/ day
	PROC 3	0.0343 mg/kg/ day
	PROC 4	0.686 mg/kg/ day

	PROC 5	0.068 mg/kg/ day
	PROC 8b	0.686 mg/kg/ day
	PROC 9	0.686 mg/kg/ day
Inhalation exposure	PROC 1	0.01 mg/m^3
	PROC 2	0.001 mg/m^3
	PROC 3	0.01 mg/m^3
	PROC 4	0.05 mg/m^3
	PROC 5	0.05 mg/m^3
	PROC 8b	0.005 mg/m^3
	PROC 9	0.01 mg/m^3

Guidance for downstream users

Downstream users are not exposed to phthalic anhydride in the process according to the 4.

CE 5: USE OF PHTHALIC ANHYDRIDE AS LABORATORY CHEMICALS

*Processes and activities covered by the expo*sure scenario

Sector of use

SU22 - Public sector (administration, education, entertainment, services, craftsmen).

Product Category

RS21 - Laboratory chemicals.

Categories of the process (PROC)

PROC 15 - use as laboratory reagents.

Category release into the environment (ERC)

ERC 8A - wide dispersing internal use of auxiliary means in open systems.

ERC 8C - wide dispersing internal use of reactive substances in open systems.

Working conditions of use

Duration and frequency of use

In most laboratories, phthalic anhydride is used usually in the form of flakes. Amount used is usually very small, less than 1 kg. In some specialized laboratories using phthalic anhydride is for the same uses as described for intermediate and monomer.

Duration of use: 8 hours a day - a standard number of hours per working day.

Frequency of use: 220 days a year - a standard number of working days per year.

Condition and physical form of the substance

Phthalic anhydride can be used as scales. As melt is not normally used in laboratory conditions.

Concentration of substance: Phthalic anhydride is with a purity:> 99.80%.

Measures for risk management

Measures of risk management related to human health (workers and consumers)

Technicians are trained to work safely with phthalic anhydride and use personal protective equipment to minimize exposure and risk.

Measures of risk management, related to environment

Emissions release into the environment is minimal. To reduce environmental emissions to legally established norms during the reactions in laboratory conditions, exhaust gases are filtered and purified. Thus over 99% of phthalic anhydride missed are removed.

Phthalic anhydride is easily biodegradable in the atmosphere, water and soil and not bioaccumulate. Removal in wastewater treatment plants is efficient and emissions to air are controlled by scrubbers and incinerators. Therefore, it is considered unlikely that people will be exposed to direct or indirect contact with air, water, soil or drinking water or exposure in the food chain.

Measures for waste management

Any residues of phthalic anhydride, waste from its application and the packaging in which it has been stored, must be collected in separate, sealable and labeled containers for temporary storage. Waste to be transported and treated in accordance with Directive 91/689/EEC on hazardous waste.

Do not allow product falling to the environment, water sources and / or drainage, urban drainage and open waters.

Information on the estimated exposure and guidance for downstream users

According to Ordinance № 13 of MLSP, MH, limit value of occupational exposure to phthalic anhydride for Republic of Bulgaria for exposure of 8 hours is 6 mg/m^3.

Calculation of exposure

Long-term exposure of workers to the impact of molten phthalic anhydride

Exposure route	PROC	Estimated exposure concentration
Dermal exposure	PROC 15	0.0343 mg/kg/day
Inhalation exposure	PROC 15	0.617 mg/m^3

Long-term exposure of workers to the impact of phthalic anhydride in the form of flakes

Exposure route	PROC	Estimated exposure concentration mg/kg/ден
Dermal exposure	PROC 15	0.0343 mg/kg/ day
Inhalation exposure	PROC 15	0.01 mg/m^3

Guidance for downstream users

Downstream users are not exposed to phthalic anhydride during the process under CE 5.