SAFETY DATA SHEET

Date Printed: March 6, 2018
Version : 8
Revision date: March 6, 2018
Regulation: In accordance with Commission Regulation (EU) CLP 1272/2008

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1 Product identifier
Product name: PA
EC No.: 201-607-5
REACH Registration No.: 01-2119457017-41-0000
CAS No.: 85-44-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Identified Uses
- Used in production of phthalein, phthalate, benzoic acid, synthetic indigo and artificial resin

1.2.2. Recommended use
- Used in production of phthalein, phthalate, benzoic acid, synthetic indigo and artificial resin

1.2.3. Restrictions on use
- Do not use for purposes other than those recommended.

1.3 Details of the supplier of the safety data sheet

1.3.1 Manufacturer
Company name: Hanwha Chemical Co, Ltd.
Address: Ulsan plant, Hanwha Chemical Co, Ltd., 22, Yongyeon-ro 230beon-gil, Nam-gu, Ulsan, Korea
Prepared by: Plasticizer Production Team
Contact Telephone +82-52-279-1021

1.3.2 Supplier & Distributor
Company name: Hanwha Chemical Co, Ltd.
Address: Hanwha Bldg., Janggyo-dong, Jung-gu, Seoul, Korea
Prepared by: PLS Sales Team
Contact Telephone: +82-2-729-3340
Email Address: wonik.lee@hanwha.com

1.4. Emergency telephone number

Emergency Telephone: +82-52-279-1021

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No. 1272/2008 (CLP)

Physical / Chemical Hazards: Not classified

Health Hazards:
Acute toxicity (oral): Category 4
Serious eye damage /eye irritation: Category 1
Respiratory sensitization: Category 1
Skin sensitization: Category 1
Specific target organ toxicity (single exposure): Category 3 (respiratory tract irritation)

Environmental Hazards: Not classified

2.2 Label elements

Hazard pictograms:

Signal word: Danger

Hazard statement:

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

Precautionary statements

- **Precaution**:

P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P264: Wash your body 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 gloves/protective clothing/eye protection/face protection.
P284: [In case of inadequate ventilation] wear respiratory protection.

- **Treatment**:

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 person to fresh air and keep 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.
P312: Call a poison center or doctor/physician you feel unwell.
P321: Specific treatment (see Section 8 on this label).
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.
P362+P364: Take off contaminated clothing and wash it before reuse.

- **Storage**:

P403+P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.

- **Disposal**:

P501: Dispose the contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards

- **Additional precautionary statements:**

EUH070: 'Toxic by eye contact'
Tactile warning: danger

- **National Fire Protection Association(NFPA)**

Health: 3
Flammability: 1
Reactivity: -

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No.	EC No.	Conc. / %	Classification according to 1272/2008/EEC	(Pre) Registration No.
Phthalic anhydride	85-44-9	201-607-5	≥99.8	Acute Tox. 4 * STOT SE 3 Skin Irrit. 2 Eye Dam. 1 Resp. Sens. 1 Skin Sens. 1	01-2119457017-41-0000
Ortho xylene	95-47-6	202-422-2	≤0.2	Flam. Liq. 3 Acute Tox. 4 * Acute Tox. 4 * Skin Irrit. 2	-
Maleic anhydride	108-31-6	203-571-6		Acute Tox. 4 * Skin Corr. 1B Resp. Sens. 1 Skin Sens. 1	-

4. FIRST AID MEASURES

4.1 Description of first aid measures

4.1.1. General information: Remove soiled or soaked clothing immediately, do not allow to dry.
Adhere to personal protective measures when giving first aid.
Clean body thoroughly (Bad, shower).

4.1.2. Following inhalation: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
Immediately call a poison center or doctor/physician.
If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop

4.1.3. Following skin contact: If skin irritation or rash occurs: Get medical advice/ attention.
Wash contaminated clothing before reuse.
For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat.
Call emergency medical service.
Remove and isolate contaminated clothing and shoes.
In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
For minor skin contact, avoid spreading material on unaffected skin.

4.1.4. Following eye contact: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Call emergency medical service.

4.1.5. Following ingestion: If swallowed: Call a poison center or doctor/physician if you feel unwell.
Rinse mouth.
Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

4.1.6. Self-protection of the first aider: First aider: Pay attention to self-protection!

4.2 Most important symptoms and effects, both acute and delay Acute effects:

- Symptoms and effects: None known

4.3 Indication of immediate medical attention and notes for physician

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

- Suitable extinguisher: CO2, alcohol foam, dry sand, dry chemical powder
- Unsuitable extinguisher:
  Most of foam will produce a corrosive toxic gas reacts with the substance.
  Straight streams

5.2 Special hazards arising from the substance or mixture

- Thermal decomposition products: Irritating, corrosive or toxic gases
- Some of these materials may burn, but none ignite readily.
- Substance reacts with water (some violently), then releases corrosive and/or toxic gases and runoff.
- May cause vapor explosion and poison hazard indoors, outdoors or in sewers.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas.
- Vapors may move to source of ignition and flame.
- Contact with metals may evolve flammable hydrogen gas.
- Containers can be exploded if exposed to heat (fire) or water.

5.3 Advice for firefighters

- Wear self-contained breathing apparatus (SCBA) and adaptive chemical protective clothing.
- The fire suppression is not fully protectable from the hazard.
- Evacuate area and fight fire from a safe distance.
- Substance may be transported in a molten form.
- Dike fire-control water for later disposal; do not scatter the material.
- Move containers from fire area if you can do it without risk.
- Fire involving Tanks; Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Fire involving Tanks; Cool containers with flooding quantities of water until well after fire is out.
- Fire involving Tanks; Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Fire involving Tanks; Always stay away from tanks engulfed in fire.
- Fire involving Tanks; For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Clean up spills immediately, observing precautions in Protective Equipment section.
- Eliminate all ignition sources.
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Cover with plastic sheet to prevent spreading.

6.2 Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

6.3 The methods of purification and removal

- Use clean non-sparking tools to collect absorbed material.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
- Powder Spill; Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry.
- Small Spill; Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

- Wash your hands thoroughly after handling.
- Do not eat, drink or smoke when using this product
- Use only outdoors or in a well-ventilated area.
- Contaminated work clothing should not be allowed out of the workplace.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Loosen closure cautiously before opening.
- Please note that there are materials and conditions to avoid.
- Please work with reference to engineering controls and personal protective equipment.

7.2 Conditions for safe storage, including any incompatibilities

- Store in a well-ventilated place. Keep container tightly closed.
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioning, or properly disposed of.
- Keep away from food and drinking water.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Occupational Exposure limits

o EU regulation:

Phthalic anhydride
- Austria: TWA=1mg/m^3 [TMW] (inhalable fraction)
- Belgium: TWA=1ppm(6.2mg/m^3)
- Denmark: TWA=1mg/m^3

o-xylene
- Belgium: TWA=1ppm(6.2mg/m^3)
- Bulgaria: TWA=50ppm(221mg/m^3)
- Croatia: TWA=50ppm(221mg/m^3), STEL=100ppm(442mg/m^3)

Maleic anhydride
- Denmark: TWA=0.01ppm(0.4mg/m^3)
- Estonia: TWA=0.3ppm(1.2mg/m^3), STEL=0.6ppm(2.5mg/m^3)
- Finland: TWA=0.1ppm(0.41mg/m^3), STEL=0.2ppm(0.81mg/m^3), Ceiling=0.2ppm(0.81mg/m^3)

o U.S regulation:

- NIOSH:
  Phthalic anhydride: TWA=1ppm (6mg/m^3)
  o-xylene: TWA=100ppm(436mg/m^3), STEL=150ppm(655mg/m^3)
  Maleic anhydride: TWA=0.25ppm(1mg/m^3)
- OSHA:
  Phthalic anhydride: Final PELs TWA= 2ppm (12mg/m^3), Vacated PELs TWA= 1ppm (6mg/m^3)
  Maleic anhydride: Final PELs TWA= 0.25ppm (1mg/m^3), Vacated PELs TWA= 0.25ppm (1mg/m^3)

o ACGIH:

Phthalic anhydride: TWA=1ppm
o-xylene: TWA=100ppm, STEL=150ppm
Maleic anhydride: TWA=0.01mg/m^3 (inhalable fraction and vapor)

o Biological exposure index:
o-xylene: 1.5g/g

o Others:
Phthalic anhydride
- Argentina: TWA=1ppm [CMP]
- Australia: TWA=1ppm (6.1mg/m^3)
- Bahrain: TWA=1ppm (6.1mg/m^3)

o-xylene
- Argentina: TWA=100ppm [CMP]
- Australia: TWA=80ppm (350mg/m^3)
- Canada: TWA=100ppm, STEL=150ppm

Maleic anhydride
- Australia: TWA=0.25ppm (1mg/m^3)
- Columbia: TWA=0.01mg/m^3
- China: TWA=1mg/m^3, STEL=2mg/m^3

o DNELs, PNECs: Not available

8.2 Exposure controls

Appropriate engineering controls:
- Good general ventilation (typically 10 air changes per hour) should be used.
- Ventilation rates should be matched to conditions.
- If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.
- It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen-deficient environment.
- Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).
- Use only appropriately classified electrical equipment and powered industrial trucks.

Individual protection measures, such as personal protective equipment:

Respiratory protection:
- Follow the European Standard EN149. Use a European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
- Wear respirator if there is dust formation.
- In case exposured to gaseous/liquid material, the respiratory protective equipment as follow are recommended. escape full facepiece gas mask (for organic compounds) or escape half facepiece gas mask (for organic compounds) or direct full facepiece gas mask (for organic compounds) or half facepiece gas mask (for organic compounds) or powered air-purifying gas mask.
- In lack of oxygen(< 19.5%), wear the supplied-air respiratior or self-contained breathing apparatus oxygen.

Eye protection:
- Wear enclosed safety goggles to protect from gaseous state organic material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.
- Do not get this material in contact with eyes.
- Wear chemical goggles.

Hand protection:
- Wear appropriate protective gloves by considering physical and chemical properties of chemicals. (nitrile rubber)
- Contact health and safety professional or manufacturer for specific information.
- Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.
- Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product.
- Gloves must be inspected prior to use

Body protection:
- Wear appropriate protective clothing by considering physical and chemical properties of chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	
Description :	Solid powder (Debris or crystals)
Color :	White
Odor :	Characteristic odor
Odor threshold :	Not available
pH :	Not available
Melting point/freezing point :	131.6°C
Initial boiling point and boiling range :	284.5°C
Flash point :	152 ℃
Evaporation rate :	Not applicable
Flammability (solid, gas) :	Non-flammability
Upper/lower flammability or explosive limits :	UEL: 10.4%, LEL: 1.7%
Vapor pressure :	0.0006 hPa (26.6 ˚C)
Vapor density :	6.6 (air=1)
Relative density:	Not available
Solubility(ies):	16,400 mg/L
Partition coefficient: n-octanol/water :	Log Pow=1.6
Auto-ignition temperature :	580 °C
Decomposition temperature :	Not available
Viscosity :	Not available
Explosive properties :	Not available
Oxidizing properties :	Not available
Molecular weight :	148.12

10. STABILITY AND REACTIVITY

10.1 Reactivity/Chemical stability/Possibility of hazardous reactions
- Stable at normal temperature and pressure.
- Hazardous polymerization does not occur.

10.2 Conditions to avoid
- Heat, flames, sparks and other source of ignitions
- Prevent entry into waterways, sewers, basements or confined areas.
- Containers may rupture or explode if exposed to heat.

10.3 Incompatible materials
- Amines, bases, metal oxides, a metals, oxidizing agents, combustible materials

10.4 Hazardous decomposition products:
- Carbon oxides

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects	
(a) Acute toxicity	

Oral	Category 4 (ATE_{mix}=1,538.5mg/kg bw)
	Phthalic anhydride: Rat(male), LD_{50}=1,530 mg/kg bw o-xylene: Rat(male), LD_{50}=3,523 mg/kg bw Maleic anhydride: Rat, LD_{50}=1,090 mg/kg bw
Dermal	Not classified(ATE_{mix}>5,000mg/kg bw)
	Phthalic anhydride: Rabbit, LD_{50}>3,160 mg/kg bw o-xylene: Rabbit, LD_{50}=12,126 mg/kg bw Maleic anhydride: Rabbit, LD_{50}=2,620mg/kg bw
Inhalation	Not classified(ATE_{mix}>25,713mg/L bw)
	Phthalic anhydride: Rat, LD_{50}>2.14mg/L·4h (OECD TG 403, GLP) o-xylene: Rat(male), LD_{50}=25,713mg/m^3·4h (GLP) Maleic anhydride: Rat, LD_{50}>2.175mg/L·4h
(b) Skin Corrosion/ Irritation	Not classified
	- Phthalic anhydride In rabbits, phthalic anhydride was slightly irritating to the skin. (OECD TG 404) - o-xylene o-xylene was moderately irritating and not corrosive to rabbit skin. (PDII: 1.83) - Maleic anhydride Maleic anhydride (0.5 g) was applied to two intact skin locations on the backs of six rabbits for four hours. Severe skin irritation was present in both treated areas of most rabbits for the entire 7-day observation period.
(c) Serious Eye Damage/ Irritation	Category 1
	- Phthalic anhydride In humans, effects on the eye after occupational exposure are described (including conjunctivitis, lacrimation, corneal ulceration, necrosis, and photophobia) - o-xylene Based on mild eye and respiratory tract effects reported in humans; equivalent to STEL=442 mg/m^3 - Maleic anhydride Maleic anhydride and maleic acid have been reported to be severely irritating to the eyes of rabbits. (Irreversible) (cornea scores=3.8, iris score=2, conjunctivae=2.5, chemosis scores=4.0)
(d) Respiratory sensitization	Category 1
	- Phthalic anhydride Evidence that phthalic anhydride has respiratory sensitization potential has been demonstrated in an experimental guinea pig model. - Maleic anhydride Maleic anhydride has been shown to be a possible respiratory sensitizer to rats.
(e) Skin Sensitization	Category 1
	- Phthalic anhydride Phthalic anhydride demonstrated skin sensitizing properties in animals, with positive results being observed in guinea pig tests (OECD TG 406) and local lymph node assays similar (OECD TG 429) - o-xylene

	Maleic anhydride has not been shown to be a skin sensitizer to mouse. (OECD TG 429) - Maleic anhydride Maleic anhydride has been shown to be a skin sensitizer to mouse. (OECD TG 429)
(f) Carcinogenicity	Not classified
	- Phthalic anhydride · ACGIH: A4 (Not Classifiable as a Human Carcinogen) · IARC, NTP, OSHA, EU CLP 1272/2008, US EPA : Not listed - o-xylene · ACGIH: A4 (Not Classifiable as a Human Carcinogen) · IARC: Group 3 (Not Classifiable) · NTP, OSHA, EU CLP 1272/2008, US EPA : Not listed - Maleic anhydride · ACGIH: A4 (Not Classifiable as a Human Carcinogen) · IARC, NTP, OSHA, EU CLP 1272/2008, US EPA : Not listed
(g) Mutagenicity	Not classified
	- Phthalic anhydride · *In vitro*: Mammalian Cell Gene Mutation Test (*Chinese hamster lung fibroblasts (V79)*) (with or without metabolic activation): negative (OECD TG 476, GLP) Sister chromatid exchange assay in mammalian cells(*Chinese hamster Ovary*) (with or without metabolic activation): negative (GLP) · *In vivo*: Not available - o-xylene · *In vitro*: Bacterial reverse mutation assay (e.g. Ames test) (*S. t yphimurium TA 98, TA 100, TA 1535, TA 1537*) (with or without metabolic activation): negative (OECD TG 471) Sister chromatid exchange assay in mammalian cells (*Chinese hamster Ovary (CHO) cell*) (with or without metabolic activation): negative · *In vivo*: Dominant lethal assay (*rat*) (with or without metabolic activation): Negative (OECD TG 474) Bone marrow polychromatic erythrocytes (*Mouse*) (with or Without metabolic activation): negative (OECD TG 478) - Maleic anhydride · *In vitro*: Bacterial reverse mutation assay (e.g. Ames test) (*S. typhimurium TA 98, TA 100, TA 1535, TA 1537*) (with or without metabolic activation): negative (OECD TG 471) Mammalian Cell Gene Mutation Test (*Chinese hamster lung fibroblasts (V79)*) (with or without metabolic activation): negative (OECD TG 476, GLP) (read-across) · *In vivo*: Mammalian Bone Marrow Chromosome Aberration Test (*rat*): Negative (OECD TG 475)
(h) Reproductive toxicity	Not classified
	- Phthalic anhydride The NOAEL = 3,570 mg/kg bw/day (mouse, male), and NOAEL=1,785 mg/kg bw/day (mouse, female); for each sex the NOAEL was the highest applied dose from weak 32 to week 104; the pathological examination revealed no difference between the dosed and control groups. - o-xylene

	500 ppm mixed xylene (administered for 6 hours per day for 131 days prior to mating, during mating and continuing through gestation and lactation) is a NOAEC for systemic and reproductive toxicity. No effect on number of pups born live, survival, clinical condition, body weight, acquisition of developmental landmarks. (NOAEC≥500ppm) - Maleic anhydride · In a two-generation reproductive toxicity study, with the exception of a few cases of respiratory rales, the clinical appearance and behaviour of all treated animals were not remarkably different from the controls. (NOAEL=55mg/kg/day) (OECD TG 416, GLP) · Respiratory involvement and red nasal discharge were observed in all dosage groups. The incidence of these was higher in the treated groups, though not in a dose-related pattern. (NOAEL≥140mg/kg bw/day) (OECD TG 414, GLP)
(i) Specific target organ toxicity (single exposure)	Category 3 (respiratory tract irritation)
	- Phthalic anhydride For humans, phthalic anhydride in the form of vapor, fumes, or dust is a primary irritant to mucous membranes and the upper respiratory tract. - o-xylene · In a single-administration study, groups of five B6C3F1 mice of each sex received 500, 1,000, 2,000, 4,000, or 6,000 mg/kg. Administration of mixed xylenes caused deaths at 6,000 mg/kg.Tremors, prone position, and slowed breathing were recorded on day 3, but all mice appeared normal by the end of the 2-week observation period. The oral LD50 was 5627 and 5251 mg/kg/bw for males and females respectively. no effect on number of pups born live, survival, clinical condition, body weight, acquisition of developmental landmarks. · The critical health effects in human underpinning the IOELV for xylene isomers were mild irritation of the eye and upper respiratory tract and mild CNS effects noted in some individuals exposed to 100 ppm (442 mg/m^3). - Maleic anhydride Signs of toxicity included sedation, increased diuresis, diarrhea and poor general condition. Rats in the 0.8 g/kg dose group showed no signs of toxicity and all animals survived. (OECD TG 401)
(j) Specific target organ toxicity (repeat exposure)	Not classified
	- Phthalic anhydride F344 rats (50/sex/group) were fed diets containting 7500 or 15,000 ppm phthalic anhydride for 105 weeks (approx. 500 and 1,000 mg/kg bw/day). The mean body weights of the high-dose males were lower than the controls from week 13 to the end of the study, but the decrease was never more than 10%. And severe chronic inflammatory, degenerative, or proliferative lesions frequently seen in aged rats occurred with approx. equal frequency and severity in the dosed and control groups of animals. (NOAEL=500mg/kg bw) - o-xylene Treatment-related alterations following sub-chronic oral treatment with mixed xylenes were mild and limited to decreased body weight gain and increased relative organ weights (affecting primarily the liver and kidney; no histopathological involvement). (LOAEL=150mg/kg bw/day) - Maleic anhydride The high dose group appeared to be gaining weight at a rate slightly less than that of the control group during the last 2 months of the study (LOAEL=250 mg/kg bw/day) (OECD TG 408, GLP)
(k) Aspiration Hazard	Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity	
Acute toxicity	Not classified
	Phthalic anhydride Fish: 7d LC_{50} (*Brachydanio rerio*)=560 mg/L (OECD TG 210) 96 hr LC_{50} (*Oryzias latipes*) >99 mg/L (OECD TG 203) Invertebrate: 48 hr EC_{50} (*Daphnia magna*)=71 mg/L (OECD TG 202) Algae: 72 hr EC_{50} (*Selenastrum capricornutum*)=68 mg/L (OECD TG 201) o-xylene Fish: 96 hr LC_{50} (*Salmo gairdneri*)=2.6 mg/L (OECD TG 203) Invertebrate: 48 hr EC_{50} (*Daphnia magna*)=3.82 mg/L (OECD TG 202) Algae: 72 hr EC_{50} (*Selenastrum capricornutum*) = 4.9 mg/L (OECD TG 201) Maleic anhydride Invertebrate: 21 d EC_{50} (*Daphnia magna*) = 77 mg/L Algae: 72 hr EC_{50} (*Pseudokirchnerella subcapitata*) = 74.35 mg/L (OECD TG 201)
Chronic toxicity	Not classified
	Phthalic anhydride Fish: 60 d NOEC (*Salmo gairdneri*)=10 mg/L (OECD TG 210) Invertebrate: 21 d NOEC (*Daphnia magna*)=16mg/L (OECD TG 211) Algae: 72 hr NOEC (*Selenastrum capricornutum*)=32 mg/L (OECD TG 201) o-xylene Fish: 56 d NOEC (*Salmo gairdneri*)>1.3 mg/L Invertebrate: 7 d NOEC (*Ceriodaphnia dubia*)=1.17 mg/L (OECD TG 201) Algae: 72 hr EC_{50} (*Selenastrum capricornutum*)=4.9 mg/L (OECD TG 201) Maleic anhydride Invertebrate: 21 d NOEC(*Daphnia magna*)=10mg/L
12.2Persistence and degradability	Phthalic anhydride Persistence: Low persistency (log Kow is less than 4 estimated.) (Log Kow = 1.6) Degradability: In the atmosphere phthalic anhydride is degraded by photochemically produced OH radicals. The half-life is calculated to be about 21 days. For phthalic acid a half-life of 13 days is stimated. o-xylene Persistence: Low persistency (log Kow is less than 4 estimated.) (Log Kow = 3.12, 20 °C, pH 7) Degradability: The estimated half life of m-xylene is 23.2 hours based on a recommended reaction rate with hydroxyl radicals Maleic anhydride Persistence: Low persistency (log Kow is less than 4 estimated.) (Log Kow = -2.61) Degradability: The half-life of the hydrolysis of maleic anhydride to maleic acid in water at 25°C has been determined to be approximately 22 seconds.
12.3Bioaccumulative potential	Phthalic anhydride Bioaccumulation: Bioaccumulation is expected to be low according to the BCF < 500 (BCF =3.4L/kg) Biodegradation: As well-biodegraded, it is expected to have low accumulation potential in living organisms (74% biodegradation was observed after 30 days) o-xylene

	Bioaccumulation: Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 50L/kg) Biodegradation: As well-biodegraded, it is expected to have low accumulation potential in living organisms (69.67% biodegradation was observed after 28days) Maleic anhydride Bioaccumulation: Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 5.433L/kg) Biodegradation: As well-biodegraded, it is expected to have low accumulation potential in living organisms (90 ~ 100% biodegradation was observed after 25days)
12.4 Mobility in soil	Phthalic anhydride No potency of mobility to soil. (Koc = 31) o-xylene No potency of mobility to soil. (Koc = 2.73) Maleic anhydride No potency of mobility to soil. (Koc = 42)
12.5 Results of PBT and vPvB assessment	The substance is not PBT / vPvB
12.6 Other adverse effects	Not available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Waste disposal according to directive 2008/98/EC, covering waste and dangerous waste.

13.1.1 Product/Packaging disposal:
- No waste key number as per the European Waste Types List can be assigned to this product, since such classification is based on the (as yet undetermined) use to which the product is put by the consumer.
- The waste key number must be determined as per the European Waste Types List (decision on EU Waste Types List 2000/532/EC) in cooperation with the disposal firm/producing firm/official authority.

13.1.2 Waste treatment-relevant information:
Waste must be disposed of in accordance with directive 2008/98/EC.

13.1.3 Sewage disposal-relevant information:
Release to the environment or sewage system is prohibited. Must be treated as hazardous waste.

13.1.4 Other disposal recommendations: Not available

14. TRANSPORT INFORMATION

14.1 UN No.: 2214

14.2 UN Proper shipping name: PHTHALIC ANHYDRIDE with more than 0.05% of maleic anhydride

14.3 Transport Hazard class:
ADR: 8
IMDG: 8
ICAO/IATA: 8
RID: 8
14.4 Packing group: III

14.5 Environmental hazards: Not applicable

14.6 Special precautions for user
in case of fire: F-A
in case of leakage: S-B

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulation/legislation specific for mixture
<Phthalic anhydride>
EU Regulatory Information
EU classification
EU 1272/2008(CLP)
Classification: Acute Tox. 4*, STOT SE 3, Skin Irrit. 2, Eye Dam. 1, Resp. Sens. 1, Skin Sens. 1
Risk phrases: H302, H335, H315, H318, H334, H317
Safety phrases: P271, P272, P280, P284, P261, P270, P264, P342+P311, P305+P351+P338, P302+P352, P362+P364, P333+P313, P301+P312, P310, P321, P330, P403+P233, P405, P501
EU SVHC list: Not regulated
EU Authorization list: Not regulated
EU Restriction list: Not regulated
Waste Framework Directive 2008/98/EC: Regulated
<o-xylene>
EU Regulatory Information
EU classification
EU 1272/2008(CLP)
Classification: Flam. Liq. 3, Acute Tox. 4*, Acute Tox. 4*, Skin Irrit. 2
Risk phrases: H226, H332, H312, H315
Safety phrases: P233, P210, P240, P241, P242, P243, P271, P280, P261, P264, P304+P340, P312, P302+P352, P312, P302+P352, P303+P361+P353, P362+P364, P332+P313, P321, P370+P378, P403+P235, P501
EU SVHC list: Not regulated
EU Authorization list: Not regulated
EU Restriction list: Not regulated
Waste Framework Directive 2008/98/EC: Regulated
<Maleic anhydride>
EU Regulatory Information
EU classification
EU 1272/2008(CLP)
Classification: Acute Tox. 4*, Skin Corr. 1B, Resp. Sens. 1, Skin Sens. 1
Risk phrases: H302, H314, H334, H317
Safety phrases: P302, P314, P334, P317, P272, P284, P260, P264, P270, P304+P340, P342+P311, P305+P351+P338, P302+P352, P310, P303+P361+P353 P362+P364, P333+P313, P301+P312, P301+330+P331, P321, P330, P501
EU SVHC list: Not regulated
EU Authorization list: Not regulated
EU Restriction list: Not regulated
Waste Framework Directive 2008/98/EC: Regulated

Foreign Inventory Status
<Phthalic anhydride>
- Korea management information: Existing Chemical Substance (KE-21147)
- Canada Domestic Substances List (DSL): Present
- China management information: Inventory of Existing Chemical Substances (IECSC): Present (22170)
- Japan management information: Existing and New Chemical Substances (ENCS): Present ((3)-1344)
- Australia management information: Inventory of Chemical Substances (AICS): Present
- Mexico - National Inventory of Chemical Substances (INSQ): Present

- New Zealand management information: Inventory of Chemicals (NZIoC): HSNO Approval: HSR003066
- Taiwan management information: Taiwan Chemical Substances Inventory (TCSI): Present
- Philippines management information: Inventory of Chemicals and Chemical Substances (PICCS): Present
<o-xylene>
- Korea management information: Existing Chemical Substance (KE-35429),
Toxic chemical substance (97-1-275)
- Canada Domestic Substances List (DSL): Present
- China management information: Inventory of Existing Chemical Substances (IECSC): Present (22226)
- Japan management information: Existing and New Chemical Substances (ENCS): Present ((3)-60, (3)-3)
- Australia management information: Inventory of Chemical Substances (AICS): Present
- New Zealand management information: Inventory of Chemicals (NZIoC): HSNO Approval: HSR001237
- Taiwan management information: Taiwan Chemical Substances Inventory (TCSI): Present
- Philippines management information: Inventory of Chemicals and Chemical Substances (PICCS): Present
<Maleic anhydride>
- Korea management information: Existing Chemical Substance (KE-17314)
- Canada Domestic Substances List (DSL): Present
- China management information: Inventory of Existing Chemical Substances (IECSC): Present (32340)
- Japan management information: Existing and New Chemical Substances (ENCS): Present ((2)-1101)
- Australia management information: Inventory of Chemical Substances (AICS): Present
- New Zealand management information: Inventory of Chemicals (NZIoC): HSNO Approval: HSR003012
- Taiwan management information: Taiwan Chemical Substances Inventory (TCSI): Present
- Philippines management information: Inventory of Chemicals and Chemical Substances (PICCS): Present

15.2 Chemical safety assessment:

For this substance a chemical safety assessment has been carried out.

16. OTHER INFORMATION

Product safety data sheet for prepared in accordance with Regulation (EU) 1272/2008

16.1 Indication of changes:

Version: 8
Revision date: March 6, 2018

16.2 Key literature reference and sources for data:

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; http://monographs.iarc.fr
NIOSH (The National Institute for Occupational Safety and Health)
ACGIH (American Conference of Governmental Industrial Hygienists)
TOMES-LOLI®; http://www.rightanswerknowledge.com/loginRA.asp○ National Emergency Management Agency-Korea dangerous material inventory management system; http://www.nema.go.kr/hazmat/main/main.jsp
Waste Control Act enforcement regulation attached [1]
National chemicals information systems; http://ncis.nier.go.kr

16.3 Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008(CLP):

Classification according to Regulation (EC) 1272/2008 (CLP)	Classification procedure
Acute toxicity (oral): Category 4	Cut-off values/concentration limits (1%)
Serious eye damage /eye irritation: Category 1	
Respiratory sensitization: Category 1	Cut-off values/concentration limits (≥1%)
Skin sensitization: Category 1	
Specific target organ toxicity (single exposure): Category 3 (respiratory tract irritation)	Cut-off values/concentration limits (20%)

16.4 Abbreviations

EC_{50}: median effective concentration
LC_{50}: median lethal concentration

LD_{50}: median lethal dose
OEL: Occupational exposure limit
PBT: Persistent, bioaccumulative, toxic chemical
STEL: short-term exposure limit
TWA: time weighted average
vPvB: very persistent, very bioaccumulative chemical
EWC: the European Waste Code

16.5 Other

- Product should be handled, stored, and used in accordance with the generally accepted industrial hygiene practices and in conformity with all the applicable legal regulations.
- The information provided herein is based on the knowledge possessed at this present time from the view point of safety requirements.
- It should, therefore, not be construed as guaranteeing specific properties.