

PHTHALIC ANHYDRIDE

1 IDENTIFICATION OF THE PRODUCT AND THE COMPANY

1.1 IDENTIFICATION OF THE SUBSTANCE / PREPARATION:

Product Name: Phthalic Anhydride

1.3 IDENTIFICATION OF THE COMPANY:

RAR Resin & Chemical Industries JLT
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2 ADVISABLE USE AND RESTRICTION

Advisable use:

- plasticizer raw materials (DOP, DINP)
- resin manufacturing (Alkyl resins)
- Manufacture of dyes and paints

Restriction of product using:

- In humid environment, reacts with water and make harmful chemicals.

3 HAZARD IDENTIFICATION

3.1 Hazard Classification

Corrosive to Metals:	Category 1
Acute toxicity (oral):	Category 4
Acute toxicity (dermal):	Category 5
Acute Toxicity (inhalation: dust / mist):	Category 2
Skin corrosion / irritation:	Category 2
Eye Damage / Irritation:	Category 1
Skin sensitization:	Category 1
Respiratory sensitization:	Category 1
Target Organ Systematic Toxicity (single exposure):	Category 3 (respiratory irritation)
Target Organ Systematic Toxicity (repeated exposure):	Category 2

3.2 Allocation label elements

Pictogram and symbol



Signal word: Danger

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Hazard Statement

H290 May be corrosive to metals
H302 Harmful if swallowed
H313 Maybe harmful in contact with skin
H330 Fatal if inhaled
H315 Causes skin irritation
H318 Causes serious eye damage
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled
H317 May cause an allergic skin reaction
H335 May cause respiratory irritation
H373 May cause damage to organs through prolonged or repeated exposure

Precautionary Statements

Prevention:

P234: Keep away from flames and hot surfaces. - No smoking
P264: Wash thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P261 + P260: Avoid breath and do not breath dust / fume / gas / mist / vapours / spray.
P271: Use only outdoors or in a well-ventilated area.
P284 + 285: In case of inadequate ventilation wear respiratory protection.
P280: Wear protective gloves / protective clothing / eye protection / face protection.
P272: Contaminated work clothing should not be allowed out of the workplace

Response:

P390 Absorb spillage to prevent material damage.
P301 + P312: IF SWALLOWED: Call a POISON CENTER or doctor / physician if you feel unwell.
P330 Rinse mouth.
P304 + P340 + P341: If inhaled or if breathing is difficult: Removing victim to fresh air and keep at rest in a position comfortable for breathing.
P310: Immediately call a POISON CENTER or doctor / physician.
P320 + P321: Specific treatment urgent as reference to supplemental first aid instruction
P302 + 352: IF ON SKIN: Wash with plenty of soap and water.
P332 + P333 + P313: If skin irritation or a rash occurs: Get medical advice / attention.
P362 + P363: Take off contaminated clothing and wash before reuse. Wash contaminated clothing before reuse.
P305 + P351 + P338: In IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and wash to do. Continue rinsing.
P342 + P311: If experiencing respiratory symptoms Call a POISON CENTER or doctor/physician.
P314: Get medical advice / attention if you feel unwell.

Storage:

P406: Store in a corrosive resistant / container with a resistant inner liner
P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
P405: Store locked up.

Disposal:

P501: Dispose of contents / container to in accordance with local / regional / national / international regulations (to be specified).

3.3 Other hazard information not included in hazard classification

- NFPA Rating system: Health: 3, Flammability: 1, Reactivity: 0

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4 COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Common name Synonyms	CAS No.	Content (%)
Phthalic Anhydride	1, 3-Isobenzofurandione	85-44-9	99.8

5 FIRST-AID MEASURES

5.1 Eye Contact:

- In case of contact with chemicals, immediately flush eyes with running water for more than 15 minutes.
- Remove contact lenses if present and easy to do.
- Wash eyes immediately with large amounts of water.

5.2 Skin contact

- Take off and remove contaminated clothing and shoes.
- Wash off immediately with plenty of water and soap.
- In case of contact with chemicals, get immediate medical advice / attention.
- Wash and dry carefully contaminated clothing and shoes before reuse.

5.3 Inhalation

- Move victims immediately to place with fresh air and not contaminated area.
- Get medical attention immediately if inhaled.
- Get immediate medical advice / attention if irritating, pain occur.

5.4 Ingestion

- If swallowed, immediately call a POISON CENTER or doctor / physician.
- Do NOT induce vomiting.

5.5 Acute and delayed symptoms / effects

- **Inhalation:** May cause irritation of respiratory organs and bronchial.
- **Skin contact:** May cause skin irritation such as erythema and edema.
- **Eye contact:** May cause severe irritation and irreversible damage were observed.

5.6 Indication of immediate medical attention and notes for physician

- Move victim to fresh air.
- Give artificial respiration if victim is not breathing.
- 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.
- Administer oxygen if breathing is difficult.
- 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.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

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6 FIRE FIGHTING MEASURES

6.1 Suitable (and unsuitable) extinguishing media

suitable extinguishing media:

- **Small fire:** Dry chemical, CO₂, dry sand, alcohol - resistant foam.
- **Large fire:** water spray, fog or alcohol-resistant foam, AFFF alcohol-resistant medium expansion foam

unsuitable extinguishing media: Do not use straight streams

In case of major fire and large quantities:

- Move containers from fire area if you can do it without risk.

Tank / Trailer / Train Truck Fire:

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

6.2 Specific hazards arising from the chemical

Thermal decomposition products: irritating, corrosive and / or toxic gases, Carbon dioxides

Fires and an explosion

- Combustible material: may burn but does not ignite readily.
- Substance will react with water (some violently) releasing flammable, toxic or corrosive gases and runoff.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapors may travel to source of ignition and flash back.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.

6.3 Special protective equipment and precautions for fire-fighters wear positive pressure self-contained breathing apparatus (SCBA).

- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

7 ACCIDENTAL RELEASE MEASURES

7.1 Personal precautions, protective equipment and emergency procedures

- Stop leak if you can do it without risk.
- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Ventilate enclosed areas.
- Stay upwind.
- Keep out of low areas.
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.

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- Keep unauthorized personnel away.
- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

7.2 Environmental precautions and protective procedures

- Atmosphere: Provide local exhaust ventilation system.
- Land: Make an embankment for further processing.
- Underwater: Prevent entry into waterways, sewers, basements or confined areas.

7.3 The methods of purification and removal

Small spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

Large spill

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- A vapor suppressing foam may be used to reduce vapors.
- DO NOT GET WATER on spilled substance or inside containers.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Prevent entry into waterways, sewers, basements or confined areas.

8 HANDLING AND STORAGE

8.1 Precautions for safe handling

- DO NOT eat, drink or smoke in product area.
- Keep only in original container.
- Do not breathe gas / fumes / vapours / spray.
- Use certified protective equipment.
- After using chemicals to wash the body and cloths.
- Ventilate entire areas or by local ventilation system.

8.2 Conditions for safe storage

- Store locked up.
- Keep in well ventilated place.
- DO NOT eat, drink or smoke in product area.

9 EXPOSURE CONTROLS / PERSONAL PROTECTION

9.1 Occupational Exposure Limits

Regulation in Korean: TWA: 1 ppm (6 mg/m³)

US (NIOSH / OSHA ACGIH):

- NIOSH - TWA: 6 mg/m³ (1 ppm)
- OSHA - TWA: 12 mg/m³ (2 ppm)
- ACGIH - TLV: 1ppm (as TWA)

Biological Exposure Index: Not available

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9.2 Appropriate engineering controls

- Provide local exhaust ventilation system or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit value.
- Check legal suitability of exposure level.

9.3 Personal protective equipment

Respiratory protection

- Up to 30 mg/m³ :
(APF = 5) Any quarter - mask respirator.
- Up to 60 mg/m³ :
(APF = 10) Any particulate respirator equipped with an N95, R95 or P95 filter (including N95, R95, and P95 filtering facepieces) except quarter-mask respirators.
(APF = 10) Any air-purifying full-facepiece respirator equipped with an N95, R95, or P95 filter.
(APF = 25) Any powered, air purifying respirator with a high-efficiency particulate filter.
(APF = 10) Any supplied-air respirator
(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:

- (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure demand or other positive-pressure mode
- (APF = 10,000) Any supplied air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

- (APF = 50) Any air-purifying, full facepiece respirator with an N100, R100, or P100 filter.

Eye Protection

- Wear facepiece with goggles to protect from scattering dust or toxic liquid.
- An eye wash unit and safety shower station should be available nearby work place.

Hand Protection

- Wear appropriate chemical-resistant gloves that protect chemicals directly.

Body Protection

- Wear appropriate protective chemical-resistant clothing.

10 PHYSICAL AND CHEMICAL PROPERTIES

1) Appearance	Physical state: flakes or needles Color: White
2) Odor	Characteristic odor.
3) Threshold of odor	Not available
4) pH	Not available
5) Melting point / freezing point	131.6 °C

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6) Initial boiling point and boiling range	284.5 °C
7) Flash point	152 °C
8) Evaporation rate	Not available
9) Flammability (solid, gas)	Not available
10) Upper / lower flammability or explosive limits	Lower: 1.7% Upper: 10.4%
11) Vapour Pressure	0.0006 hPa at 26.6°C
12) Solubility (ies)	16400 mg/l (25°C)
13) Vapour density	6.6 (AIR = 1)
14) Specific Gravity	1.53 g/cm ³
15) n-octanol / water partition coefficient	log Kow = 1.6
16) Auto ignition temperature	580°C
17) Degradation temperature	Not available
18) Viscosity	Not available
19) Molecular weight	148.12 g / mol

11 STABILITY AND REACTIVITY

11.1 Chemical stability

- Stable under normal temperatures and pressures

11.2 Possibility of hazardous reactions - This product is not reactive.

11.3 Conditions to avoid

- Avoid heat, sparks, open flames, or other sources of ignition.
- Put away from water supply and sewage
- Containers may explode when heated

11.4 Incompatible materials

- amines, base, metal oxide, metals, oxidants, combustible materials

11.5 Hazardous decomposition product

- Thermal decomposition product: irritating, corrosive and/or toxic gases, Carbon oxides

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12 TOXICOLOGICAL INFORMATION

12.1 Information on the likely routes of exposure

Inhalation: May cause irritation of respiratory organs and bronchial.

Skin contact: May cause skin irritation such as erythema and edema.

Eye contact: May cause severe irritation and irreversible damage were observed.

12.2 Symptoms related to the physical, chemical and toxicological characteristics

Corrosive to Metals: Category 1

Explosives, Water reactive substances, Self-reactive, Self-heating, Organic peroxides: Not applicable (no relevance to molecular structure)

Refer to "5) Acute and delayed symptoms / effects" of "5. First aid measures"

12.3 Delay by short term and long term exposures, acute and chronic effect

Acute toxicity

- **Oral:** Category 4, LD₅₀ = 1530 mg/kg bw (Rat)

- **Dermal:** Category 5, LD₅₀ > 3160 mg/kg bw (Rabbit)

- **Inhalation:** Category 2, LC₅₀ > 210 mg/m³ / 1hours (0.0525mg/L/4hr)(Rat)

Skin Corrosion / Irritation: Category 2

- Mild irritation was observed when 550 mg of 99.8% pure phthalic anhydride flakes were applied to the shaved dorsal area of the trunk of six rabbits for 4 hours (OECD TG 404)

Serious Eye Damage / Irritation: Category 1

- Rabbit / Severe irritation, and irreversible damage were observed. Also severe and permanent congestion and corneal vascularization were found.

Respiratory sensitizer: Category 1

- There are numerous studies available of respiratory allergy caused by phthalic anhydride.

Bronchial asthma was diagnosed in ca. 14-18% of factory workers, and rhinitis or conjunctivitis in ca. 70%. In some patients with bronchial asthma, the level of specific IgE and IgG were significantly increased.

Skin Sensitization: Category 1

- 90 % of the tested guinea pigs were judged to be positive. (OECD TG 406)

Carcinogenicity: Not classified

- ACGIH - A4

- NTP, OSHA, Regulation 1272 / 2008, US EPA: Not listed

- When groups of 50 male, 50 female rats were fed 7500, 15000 ppm phthalic anhydride for 2 years, the males fed the highest dose developed rough hair coats, ulcerations, and corneal opacities; the rats also experienced reduced body weight gains. However The incidence of alveolar / bronchiolar adenomas or carcinomas and of lymphomas were either not significant or were within the range recorded for the historical controls.

Mutagenicity: Not classified

In vitro

- **Bacterial ames test (S. typhimurium):** Negative

- **Sister chromatid exchange assay (Chinese Hamster Ovary Cells):** Negative

- **Chromosomal aberrations test (Chinese Hamster Ovary Cells):** Positive

- **Mouse lymphoma assay (L5178Y-cells):** Positive

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In vivo

- Not available

Reproductive toxicity: Not classified

- Rat/0, 1000, 1700, 3000 mg/kg bw/day/oral days, NOAEL maternal tox = 1000 mg/kg bw, NOAEL teratogen = 1700 ml/kg bw: Maternal toxicity occurred in the 2.5 and 5.0% groups as can be seen by significant decreases in the maternal body weight gain and food consumption during the administration period. Significant decreases in the weight of male fetuses and number of ossification center of the caudal vertebrae were found in the 5.0% group. Morphological examinations of fetuses revealed no evidence of teratogenesis.

Reproductive toxicity: Not classified

- Rat/0, 1000, 1700, 3000 mg/kg bw/day/oral days, NOAEL maternal tox = 1000 mg/kg bw, NOAEL teratogen = 1700 ml/kg bw: Maternal toxicity occurred in the 2.5 and 5.0% groups as can be seen by significant decreases in the maternal body weight gain and food consumption during the administration period. Significant decreases in the weight of male fetuses and number of ossification center of the caudal vertebrae were found in the 5.0% group. Morphological examinations of fetuses revealed no evidence of teratogenesis.

Specific target organ toxicity (single exposure): Category 3 (Respiratory irritation)

- Based on the human evidence: In a case of inadvertent inhalation exposure, the patient exhibited burning sensation in the eye and throat, coughing, dyspnea and vomiting immediately after inhalation of fumes. Gasping and rale occurred next morning. The patient was diagnosed with bronchial asthma. Also based on the evidence from animal studies: some deaths from bronchial pneumonia were observed in inhalation studies. Oral administration caused hemorrhage of the liver and lung, inflammation of the gastrointestinal tract (dermal)

Specific target organ toxicity (repeat exposure): Category 2

- Rat / period: 9 week / dose: 20 mg/kg bw/day-4800 mg/kg bw/day, ulceration of the stomach epithelium, necrosis of the kidney tubules, liver without finding spleen, heart, lung hyperemic.

Aspiration hazard: Not available

13 ECOLOGICAL INFORMATION

13.1 Aquatic Ecotoxicity

- **Acute toxicity:** Not

classified - **Chronic toxicity:**

Not classified

Fish: 96hr-LC₅₀(Leuciscus idus) =

313 mg/l 60d - NOEC (Salmo gairdneri) = 10 mg/L

Crustacea: 48hr - EC50 (Daphnia magna) > 640 mg / l

Algae: 96 hr - EC₅₀ (Selenastrum capricornutum) = 4.14 mg / l

13.2 Persistence and degradability

Persistence: Low persistency (logKow = 0.16)

Degradability

- **Hydrolysis:** Rapidly hydrolyzed in water

- **Photolysis:** half-life = 21 days (estimated)

13.3 Bioaccumulative potential: Based on an estimated log Kow and calculated BCF values, a potential for Bio-accumulation to be expected.

Biodegradation: readily biodegradation, 85.2% biodegradation after 14 days

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(OECD 301C, Modified MITI Test (I))

Bioaccumulation: BCF = 3.4 (estimated), logKow = 0.16

13.4 Mobility in soil

- low potency of mobility to soil (Koc = 36L / kg)

14 DISPOSAL CONSIDERATIONS

14.1 Disposal method

- Public Controlled Waste landfill facility managed waterproof facility the material soils and leachate treatment facilities do not result in compromising the performance has the landfill.

14.2 Disposal precaution

- Consider the require attentions in accordance with waste treatment management regulation.

15 TRANSPORT INFORMATION

15.1 UN Number: UN 2214

15.2 UN Proper shipping name: Phthalic Anhydride

15.3 Transport Hazard class: Class 8

15.4 Packing group: III

15.5 Marine pollutant: Not applicable

15.6 Special safety response for transportation or transportation measure

Emergency schedule for fire: F-A

Emergency schedule for spillage: S-B