Hanwha Solutions

SAFETY DATA SHEET

Date Printed: 15 March, 2023
Version: 4
Regulation: According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

1. Identification

1.1 Product identifier
1.1.1 Product of name: DINP
1.1.2 Other means of identification: Diisononyl phthalate

1.2 Recommended use of the chemical and restrictions on use
1.2.1 Recommended use: PVC, plastic, rubber, ink, adhesive, paint, lubricating oil additives
1.2.2. 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 Solutions Co, Ltd.
Address: Ulsan plant, Hanwha Solutions Co, Ltd., 22, Yongyeon-ro 230beon-gil, Nam-gu, Ulsan, Korea
Prepared by: Plasticizers Production Team
Contact Telephone: (Ulsan plant) +82-52-279-1024
1.3.2 Supplier & Distributor
Company name: Hanwha solutions Co, Ltd.
Address: Hanwha Building, 86, Cheonggyecheon-ro, Jongno-gu, Seoul, Korea
Prepared by: PSR/Plasticizer Sales Team
Contact Telephone: +82-2-729-5051, Fax: +82-2-729-5057

1.4 Emergency phone number
Emergency phone: +82-2-729-5051

2. Hazard(s) identification

2.1 Classification of the substance or mixture
According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

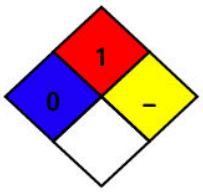
Physical / Chemical Hazards: Not classified

Health Hazards: Not classified

Environmental Hazards: Not classified

2.2 Label elements, including precautionary statements
- **Pictogram and symbol**: Not applicable
- **Signal word**: Not applicable
- **Hazard statements**: Not applicable
- **Precautionary statements:** Not applicable

2.3 Other hazard information not included in hazard classification
(National Fire Protection Association; NFPA)



- **Health:** 0
- **Flammability:** 1
- **Reactivity:** Not available

3. Composition/information on ingredients

Component	Common name and synonyms	CAS No.	Conc. / %
Diisononyl phthalate	1,2-Benzenedicarboxylic acid diisononyl ester	68515-48-0	100

4. First aid measures

4.1 Description of first aid measures

Eye contact

- In case of contact with substance, immediately flush eyes with running water at least 20 minutes.
- Get immediate medical advice/attention.

Skin contact

- In case of contact with substance, immediately flush skin with running water for at least 20 minutes.
- Remove and isolate contaminated clothing and shoes.
- Wash contaminated clothing and shoes before reuse.
- Get immediate medical advice/attention.

Inhalation

- Specific medical treatment is urgent.
- Move victim to fresh air.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.

Ingestion

- Do not let him/her eat anything, if unconscious.
- Get immediate medical advice/attention.

4.2 Most important symptoms and effects, both acute and delayed acute effects

- Not 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 extinguishing media:
  - Large fire : water spray/fog, regular foam
  - Small fire : Dry sand, dry chemical powder, alcohol-resistant foam, water spray, regular foam, CO_2
- Unsuitable extinguishing media: High pressure water streams

5.2 Specific hazards arising from the chemical

- May be ignited by heat, sparks or flames.
- Containers may explode when heated.
- Some of these materials may burn, but none ignites readily.
- Fire will produce irritating and/or toxic gases.

- If inhaled, may be harmful.
- Some liquids produce vapors that may cause dizziness or suffocation.

5.3 Special protective equipment and precautions for fire-fighters

- 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; 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.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- Eliminate all ignition sources.
- Stop leak if you can do it without risk.
- Please note that materials and conditions to avoid.
- Ventilate the area.
- Do not touch or walk through spilled material.
- Prevent dust cloud.

6.2 Environmental precautions

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

6.3 Methods and materials for containment and cleaning up

- Small Spill; Flush area with flooding quantities of water. And take up with sand or other non-combustible absorbent material and place into containers for later disposal.
- Large Spill; Dike far ahead of liquid spill for later disposal.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

7. Handling and storage

7.1 Precautions for safe handling

- Please note that materials and conditions to avoid.
- Wash thoroughly after handling.
- Please work with reference to engineering controls and personal protective equipment.
- Be careful to high temperature.

7.2 Conditions for safe storage, including any incompatibilities

- Store in a closed container.
- Store in cool and dry place.
- Please note that materials and conditions to avoid.

8. Exposure controls/personal protection

8.1 Occupational Exposure limits

- **ACGIH regulation**: Not available
- **OSHA regulation**: Not available
- **NIOSH regulation**: Not available
- **Biological exposure index**: Not available
- **EU regulation**:
  - Croatia: TWA = 5 mg/m^3
  - Denmark: TWA= 3 mg/m^3
  - United Kingdom: TWA= 5 mg/m^3

o Other:

- New Zealand: TWA= 5 mg/m³
- Kenya: TWA= 5 mg/m³
- South Africa: TWA= 5 mg/m³

8.2 Exposure controls

Appropriate engineering controls

- Provide local exhaust ventilation system or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Individual protection measures, such as personal protective equipment

Respiratory protection

- In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998.

Eye protection

- Wear facepiece with goggles to protect.
- Wear breathable safety goggles to protect from particulate material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.

Hand protection

- Hand protection: Wear chemical resistant gloves.
- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

Body protection

- Wear appropriate protective chemical resistant clothing.
- 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:	Liquid
Color:	Colourless
Odor:	Mild odour
Odor threshold:	Not available
pH:	6~7
Melting point/freezing point:	-48℃
Initial boiling point and boiling range:	244-252 ℃ (6.6 hPa)
Flash point:	224 ℃ (Cleveland open cup, ASTM 92-18)
Evaporation rate:	Not available
Flammability (solid, gas):	Not applicable
Upper/lower flammability or explosive limits:	Not available
Vapor pressure:	0.0001 kPa (<0.001 hPa; 38℃)
Vapor density:	10 (>10 (air=1))
Relative density	0.975±0.003 at 20℃/68℉ (JISK6751)
Solubility:	< .1 vol% (20℃)
Solubility in organic solvents:	Not available
Partition coefficient: n-octanol/water:	log K_{ow} = 8.8
Auto ignition temperature:	260 ℃ (ca. 260 ℃; 1013 .25 hPa)
Decomposition temperature:	Not available
Viscosity:	90 mPa.s (20 ℃) (HSC internal

	method)
Molecular weight:	418.6 g/mol
Particle Size (Polymer compound)	Not applicable
Self-accelerated decomposition temperature (Polymer compound)	Not applicable

"NOTE: The physical data presented above are typical values and should not be construed as a specification"

10. Stability and reactivity

10.1 Reactivity/Chemical stability/Possibility of hazardous reactions:

- Fire may produce irritating and/or toxic gases.
- If inhaled, may be harmful.
- Some liquids produce vapors that may cause dizziness or suffocation.
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Some liquids produce vapors that may cause dizziness or suffocation.

10.2 Conditions to avoid:

- Heat, sparks or flames
- Anti-static measures : Not available

10.3 Incompatible materials:

- Combustibles

10.4 Hazardous decomposition products:

- Irritating and/or toxic gases

11. Toxicological information

Information on toxicological effects	
(a) Acute toxicity	
Oral	Not classified
	· Rat(male/female), LD_{50} > 40,000 mg/kg bw, no deaths (read across : Diisononyl phthalate; CAS No. 28553-12-0) (CLP)
Dermal	Not classified
	· Rabbit, LD_{50} > 3,160 mg/kg bw, no deaths
Inhalation	Not classified
	· Rabbit, LC_{50} > 4.4 mg/L air/4h, no deaths (read across : Diisononyl phthalate; CAS No. 28553-12-0)
(b) Skin Corrosion/ Irritation	Not classified
	· In skin irritation test with rabbits, irritating was no observed. (Primary Irritation Index = 0) (read across : Diisononyl phthalate; CAS No. 28553-12-0) (OECD TG 404)
(c) Serious Eye	Not classified

Damage/ Irritation	· In Serious Eye Damage/Irritation test with rabbits, irritating was no observed. (read across : Diisononyl phthalate; CAS No. 28553-12-0) (OECD TG 405)
(d) Respiratory sensitization	Not available (Insufficient data)
	· There have been reports of sensitivity reactions in 10-year-old children exposed to toys containing DINP, which may be indirect evidence that DINP may cause sensitivity reactions. However, according to the EU RAR, the results confirmed through direct patch on humans other than the corresponding report did not show any positive reactions, so direct evidence is insufficient to regard DINP as a sensitizing substance, and thus, it is not applied to classification.
(e) Skin Sensitization	Not classified
	· As a result of observation of a 10-year-old white child exposed to DINP contained in toys, small erythema and papules appeared on the exposed area after exposure, but recovered after 5 days when Mometason furoate Cream was applied twice daily. Symptoms did not recur. It may cause skin sensitization, but the symptoms are considered to be very weak.
(f) Carcinogenicity	Not classified
	· IARC, NTP, OSHA, ACGIH, EU CLP 1272/2008: not listed · As a result of repeated dose toxicity test by oral route for 2 years in rats (male/female), no benign and malignant tumors were observed, so NOAEL=17 mg/kg bw/day was determined (OECD TG 453)
(g) Mutagenicity	Not classified
	· *In vitro* Bacterial reverse mutation assay : negative with and without metabolic activation (read across : Diisononyl phthalate; CAS No. 28553-12-0) (OECD TG 471, GLP) · *In vitro* Ovary mutation assay with hamster : negative with and without metabolic activation (read across : Diisononyl phthalate; CAS No. 28553-12-0) (OECD TG 473, GLP) · *In vivo* micronucleus test : negative (OECD TG 474, GLP)
(h) Reproductive toxicity	Not classified
	· As a result of the two-generation reproductive toxicity test in rats (male/female), parental fertility was not affected at all concentrations of the test, so NOAELs were established as being 1000 mg/kg bw/day(F1 generation) and 500 mg/kg bw/day (F2 generation). In offspring, NOAEL=110 mg/kg bw/day was set based on liver and kidney weight gain. (OECD TG 415, GLP) · As a result of teratogenicity test in rats (female), at a concentration of 1,000 mg/kg/day, increased skeletal changes, decreased food intake, decreased weight, increased hepatic weight, increased soft tissue and skeletal changes, but the other fetus did not show any malformations. Based on these symtoms, NOAEL was established as being 200 mg/kg bw/day. (OECD TG 414, GLP)
(i) Specific target organ toxicity (single exposure)	Not classified
	· In acute oral toxicity gavage test with rats, at concentrations of 5000mg/kg clinical observations consisted of soft feces, rough coat and urine stains from 5,000 mg/kg and alopecia, red stains on nose and/or eyes and hunching from 15,000 mg/kg and thinness from 30,000 mg/kg.

(j) Specific target organ toxicity (repeat exposure)	Not classified
	· In Repeated Dose 13-weeks Oral Toxicity gavage test with monkeys (male/female) at concentrations of 0, 100, 500, 2500 mg/kg bw/day, evidence of significant toxicity was not observed. Based on minor changes (decreased weight), NOAEL was estabilished as being 500 mg/kg bw/day. (read across : Diisononyl phthalate; CAS No. 28553-12-0) (OECD TG 408)
(k) Aspiration Hazard	Not classified
	Viscosity of the product : 90 mPa.s (20 ℃) (HSC internal method)

12. Ecological information

12.1 Toxicity	
Acute toxicity	Not available
	· Fish: 96h-LC_{50} (*Rainbow trout O.mykiss*) > 0.16 mg/L (static, freshwater) · Invertebrate: 48h-EC_{50} (*Daphnia magna*) > 0.06 mg/L (static, freshwater) (US EPA) · Algae: 5d-EC_{50} (*Selenastrum capricornutum*) > 1.8 mg/L (static, freshwater) (US EPA) * No toxic effects observed until the limit of water solubility (0.0006 mg/L).
Chronic toxicity	Not classified
	· Fish: 284d-NOEC (*Oryzias latipes*) ≥ 18.5 mg/L (freshwater) (OECD TG 210) · Invertebrate: 21d-NOEC (*Daphnia magna*) = 0.034 mg/L (freshwater) (US EPA) · Algae: Not available * No toxic effects observed until the limit of water solubility (0.0006 mg/L).
12.2 Persistence and degradability	· 67.8±7.2% biodegradation was observed after 14 day.; readily biodegradable (read across : Diisononyl phthalate; CAS No. 28553-12-0) (EPA OPPTS 835.5045)
12.3 Bio-accumulative potential	· log Kow = 8.8 · DINP's FWMF (Food Web Magnification Factor) is 0.46, which is biologically diluted in the food chain and is easily metabolized in vivo, so the possibility of bioconcentration is low.
12.4 Mobility in soil	· Koc = 309,029
12.5 Results of PBT and vPvB assessment	The substance is not PBT / vPvB.
12.6 Hazardous to the ozone layer	Not classified
12.7 Other adverse effects	Not available

13. Disposal considerations

13.1 Disposal method

- Waste must be disposed of in accordance with federal, state and local environmental control regulations.

13.2 Disposal precaution

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

14. Transport information

14.1 UN No.: Not applicable

14.2 UN Proper shipping name: Not applicable

14.3 Transport Hazard class:

- ADR: Not applicable
- IMDG: Not applicable
- ICAO/IATA: Not applicable
- RID: Not applicable

14.4 Packing group: Not applicable

14.5 Environmental hazards: Not applicable

14.6 Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code): Not applicable

14.7 Special precautions for user

in case of fire: Not applicable

in case of leakage: Not applicable

15. Regulatory information

15.1 Safety, health and environmental regulation/legislation specific for the substance or mixture
USA Regulatory Information

TSCA (Toxic Substances Control Act): Section8 (b) inventory: Present
Proposition 65: Not regulated
OSHA Regulation: Not regulated
CERCLA Regulation: Not regulated
SARA 302 Regulation: Not regulated
SARA 304 Regulation: Not regulated
SARA 313 Regulation: Not regulated

Foreign Regulatory Information

Substance of Rotterdam] Protocol: Not regulated
Substance of Stockholm Protocol: Not regulated
Substance of Montreal Protocol: Not regulated

Foreign Inventory Status

- Korea management information: Phase-in substance (KE-02208), Phase-in substance subject to registration (475)
- European Inventory of Existing Commercial chemical Substances (EINECS): Present (249-079-5)
- China management information: Inventory of Existing Chemical Substances (IECSC): Present (22163)
- Japan management information: Existing and New Chemical Substances (ENCS): Present ((3)-1307)
- Canada management information: Domestic Substances List (DSL): Present
- Australia management information: Inventory of Industrial Chemicals (AIIC): Present
- New Zealand management information: Inventory of Chemicals (NZIoC): May be used as a single component chemical under an appropriate group standard.
- Philippines management information: Inventory of Chemicals and Chemical Substances (PICCS): Present

16. OTHER INFORMATION

16.1 Indication of changes:

Preparation date: December 26, 2017

Version: 4
Revision date: March 15, 2023

16.2 Key literature reference and sources for data:

- TSCA; http://iaspub.epa.gov/sor_internet/registry/substreg/searchandretrieve/searchbylist/search.do
- EU Regulation 1272/2008
- TOMES;LOLI ; http://csi.micromedex.com/fraMain.asp?Mnu=0
- UN Recommendations on the transport of dangerous goods 17th
- IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; http://monographs.iarc.fr
- ECHA CHEM; http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances
- OECD SIDS; http://webnet.oecd.org/
- HSDB; https://pubchem.ncbi.nlm.nih.gov/
- EPA; http://www.epa.gov/iris
- EPISUITE Program ver.4.1
- NIOSH(The National Institute for Occupational Safety and Health)
- ACGIH(American Conference of Governmental Industrial Hygienists)
- National chemicals information systems; http://ncis.nier.go.kr
- National Emergency Management Agency-Korea dangerous material inventory management system; http://hazmat.mpss.kfi.or.kr/material.do

16.3 Abbreviations

ACGIH: American Conference of Governmental Industrial hygienists
NIOSH: The National Institute for Occupational Safety and Health
OSHA: Occupational Safety & Health Administration
IARC: International Agency for Research on Cancer
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Dangerous Goods
ICAO/IATA: International Civil Aviation Organization/ International Air Transport Association
RID: Regulations Concerning the International Transport of Dangerous Goods by Rail

16.4 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.