



# Materials Safety Data Sheet

## Section 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifier

**Product name:** Dicyclopentadiene (DCPD)  
**Substance name:** 3a,4,7,7a-tetrahydro-4,7-methanoindene  
**REACH Reg. No.:** No registration number is given yet for this phase-in substance since the transition period for its registration according to Article 23 of REACH has not yet expired.  
**Index No.:** 601-044-00-9  
**CAS No.:** 77-73-6  
**EC No.:** 201-052-9

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

**Identified uses:** Mainly used to produce unsaturated polyester resin (UPR).  
**Uses advised against:** No uses advised against.

### 1.3 Details of the supplier of the SDS

**Manufacturer:** Shanghai Liluo Industrial Co., Ltd.  
**Address:** Room 5110, Building 5, No.735 Liyang Rd., Shanghai 200080, China  
**E-mail:** blackji@shliluo.com  
**Telephone:** +86-21-56973112  
**Fax:** +86-21-56721121

### 1.4 Emergency telephone number

## Section 2: Hazards identification

### 2.1 Classification of the substance or mixture

#### Classification according to Regulation (EC) No 1272/2008[CLP]

Flammable liquids, Category 3; H226  
Acute toxicity, Category 2, inhalation; H330  
Acute toxicity, Category 4, oral; H302  
Eye irritation, Category 2; H319  
Specific Target Organ Toxicity - Single exposure, Category 3; H335  
Skin irritation, Category 2; H315  
Hazardous to the aquatic environment, Chronic Category 2; H411

#### Classification according to Council Directive 67/548/EEC [DSD]

F; R10 - T; R23 - Xn; R22 - Xi; R36/37/38 - N; R51/53

#### Additional information

Full text of R-phrases and H-statements: see section 16.

## 2.2 Label elements

### Labelling according to Regulation (EC) No 1272/2008 [CLP]

**Substance name:** 3a,4,7,7a-tetrahydro-4,7-methanoindene

**Hazard pictograms:**



**Signal word:** Danger.

**Hazard statements:** H226: Flammable liquid and vapour.  
H330: Fatal if inhaled. H302:  
Harmful if swallowed.  
H319: Causes serious eye irritation.  
H335: May cause respiratory irritation.  
H315: Causes skin irritation.  
H411: Toxic to aquatic life with long lasting effects.

### Precautionary statements:

**Prevention:** P210: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

**Response:** P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

## 2.3 Other hazards

No information available.

## Section 3: Composition/information on ingredients

### 3.1 Substance

**Substance name:** 3a,4,7,7a-tetrahydro-4,7-methanoindene

**REACH registration No.:** No registration number is given yet for this phase-in substance since the transition period for its registration according to Article 23 of REACH has not yet expired.

**Index No.:** 601-044-00-9

**CAS No.:** 77-73-6

**EC No.:** 201-052-9

**Synonyms:** Dicyclopentadiene; 4,7-Methano-1H-indene, 3a,4,7,7a-tetrahydro-

**Purity:** ≥ 94%

Benzene, ≤ 50 ppm

**Hazard impurities:** 4-tert-butylpyrocatechol, 100-150 ppm

## Section 4: First aid measures

### 4.1 Description of first aid measures

**General notes:** In all cases of doubt, or when symptoms persist, seek medical attention.

**Following inhalation:**

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If symptoms persist, seek medical advice.

**Following skin contact:**

Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Seek medical advice if irritation persists.

**Following eye contact:**

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical advice if irritation persists.

**Following ingestion:**

Clean mouth with water and drink afterwards plenty of water. Call a POISON CENTER or doctor/physician if you feel unwell.

**Notes for the doctor:**

Treat symptomatically and supportively.

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

Causes eye irritation. This irritation can result in redness and swelling of the eyes.

Causes irritation to the skin. This irritation can result in redness and swelling of the skin. Repeat contact with the skin may cause it to become dry and cracked.

May cause respiratory irritation. If inhalation occurs, signs and symptoms may include sore throat, headache, nausea, coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath and may cause transient central nervous system (CNS) depression.

### 4.3 Indication of the immediate medical attention and special treatment needed

In case of ingestion, Ipecac-induced emesis is not recommended.

Consider use of charcoal as a slurry (240mL water/30 g charcoal). Usual dose: 25 to 100 g in adults.

If determined necessary (and under qualified medical supervision), the stomach should be emptied by gastric lavage with the airway protected by endotracheal intubation.

## Section 5: Fire-fighting measures

### 5.1 Extinguishing media

**Suitable extinguishing media:**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Unsuitable extinguishing media:**

For this substance no limitations of extinguishing agents are given.

### 5.2 Special hazards arising from the substance or mixture

Combustible material, vapours are heavier than air and may spread along floors.

Forms explosive mixtures with air at elevated temperatures.

Development of hazardous combustion gases or vapours possible in the event of fire: Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).

### **5.3 Advice for fire-fighters**

Vapour is denser than air – flashback may be possible over considerable distances.

Containers may explode under fire conditions - use water spray to cool unopened containers.

Do not allow run-off from fire fighting to enter drains or water courses – may cause explosion hazard in drains and may reignite on surface water.

Special protective equipment for fire-fighters: Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area).

## **Section 6: Accidental release measures**

### **6.1 Personal precautions, protective equipment**

Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Avoid substance contact. Evacuate personnel to safe areas, observe emergency procedures, and consult an expert. Beware of accumulation of vapours in low areas or contained areas, where explosive concentrations may occur.

### **6.2 Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Discharge into the environment must be avoided.

### **6.3 Methods and material for containment and cleaning up**

Small spillages can be taken up by collection with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and placed in container for disposal according to local / national regulations. Large spills: Dike area to contain spill. Apply vapor suppression foams until spill can be cleaned up. Use fine water spray to reduce vapors. Ground and bond all containers and handling equipment. Pump with explosion-proof equipment. If available, use foam to smother or suppress. Collect in suitable and properly labeled container.

### **6.4 Reference to other sections**

See Section 7 for information on safe handling.

See section 8 for information on personal protection equipment.

See Section 13 for information on disposal.

## **Section 7: Handling and storage**

### **7.1 Precautions for safe handling**

Smoking, eating and drinking should be prohibited. Use only in well ventilated areas. Avoid all sources of ignition. Use proper bonding and/or grounding procedures. This material is a static accumulator: Take precautionary measures against static discharges. Avoid contact with heat and ignition sources and oxidizing agents. Containers should be opened only under exhaust ventilation hood. Do not allow splash filling of bulk volumes. Do not use compressed air for filling, discharging or handling. Cleaning, inspection and maintenance of the internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations. Handle empty containers with care; vapour residue may be flammable. Do not pressurise, cut, weld, braze, solder, drill, or grind on containers. Dispose of rinse water in accordance with local and national regulations. The vapour is heavier than air, beware of

accumulation in pits and confined spaces. The product will float on water and can be reignited on surface water. Ensure that all relevant regulations regarding explosive atmospheres, and handling and storage facilities of flammable products are followed.

### 7.2 Conditions for safe storage, including any incompatibilities

No smoking. Store in either mild steel or stainless steel containers or vessels. Store in a designated cool and well-ventilated place. Store in the original, tightly closed, container. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep container tightly closed and properly labelled. Vapour space above stored liquid may be flammable/explosive unless blanketed with inert gas.

Storage installations should be designed with adequate bunds so as to prevent ground and water pollution in case of leaks or spills. Fixed storage containers, transfer containers and associated equipment should be earthed and bonded to prevent accumulation of static charge.

### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

## Section 8 : Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational exposure limit values:

CAS # 77-73-6	Occupational exposure limit values			
	Long term/ Eight hours		Short term	
Country of origin				
Austria	0.5 ppm	3 mg/m <sup>3</sup>	1 ppm	6 mg/m <sup>3</sup>
Belgium	5 ppm	27 mg/m <sup>3</sup>	-	-
Canada	5 ppm	27 mg/m <sup>3</sup>	-	-
Denmark	0.5 ppm	2.7 mg/m <sup>3</sup>	1 ppm	5.4 mg/m <sup>3</sup>
France	5 ppm	30 mg/m <sup>3</sup>	-	-
Germany (AGS)	0.5 ppm	2.7 mg/m <sup>3</sup>	0.5 ppm	2.7 mg/m <sup>3</sup>
Germany (DFG)	0.5 ppm	2.7 mg/m <sup>3</sup>	0.5 ppm	2.7 mg/m <sup>3</sup>
Switzerland	0.5 ppm	3 mg/m <sup>3</sup>	0.5 ppm	3 mg/m <sup>3</sup>
USA - NIOSH	5 ppm	30 mg/m <sup>3</sup>	-	-
United Kingdom	5 ppm	27 mg/m <sup>3</sup>	-	-

#### DNEL(Derived No Effect Level) for workers:

No DNEL values for workers available.

#### DNEL(Derived No Effect Level) for the general population:

No DNEL values for the general population available.

#### PNEC(Predicted No Effect Concentration) values:

No PNEC values available.

### 8.2 Exposure controls

#### Appropriate engineering controls:

Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location

### **Personal protective equipment:**

Eye and face protection: Sufficient eye protection must be worn. Wear glasses with side protection.

Skin protection: Wear flameproof protective clothing. Wear protective gloves.

The following materials are suitable for protective gloves (Permeation time  $\geq$  8 hours): Nitrile rubber/Nitrile latex - NBR (0.35 mm); Fluoro carbon rubber - FKM (0.4 mm).

Following materials are unsuitable for protective gloves: Natural rubber/Natural latex - NR; Polychloroprene - CR; Butyl rubber - Butyl; Polyvinyl chloride - PVC.

Respiratory protection: In an emergency, respiratory protection must be worn. Consider the maximum period for wear. Respiratory protection: Gas filter A, Colour code brown.

### **Environmental exposure controls:**

Do not empty into drains.

### **Industrial hygiene:**

Handle in accordance with good industrial hygiene and safety practice.

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

## **Section 9: Physical and chemical properties**

### **9.1 Information on basic physical and chemical properties**

<b>Colour:</b>	Colourless
<b>Odour:</b>	Musty
<b>pH:</b>	No information available.
<b>Melting point:</b>	33.6 °C
<b>Boiling point:</b>	170 °C
<b>Density:</b>	0.979 g/cm <sup>3</sup> at 20 °C
<b>Vapour pressure:</b>	1.86 hPa at 20 °C
<b>Partition coefficient (n -octanol/water):</b>	Log Pow = 2.78
<b>Solubility(ies):</b>	Practically insoluble in water: 0.02 g/l at 25°C in water. Soluble in ethanol, ether.
<b>Flash point:</b>	32.33 °C
<b>Auto-ignition temperature:</b>	503 °C
<b>Flammability:</b>	Flammable.
<b>Explosive properties:</b>	Lower and upper explosion limits are 0.8 %vol and 6.3 %vol.
<b>Oxidising properties:</b>	No information available.
<b>Viscosity:</b>	No information available.

### **9.2 Other information**

No information available.

## **Section 10: Stability and reactivity**

### **10.1 Reactivity**

Tends to polymerise; Vapour/air-mixtures are explosive at intense warming.

### **10.2 Chemical stability**

Stable under recommended storage conditions.

### 10.3 Possibility of hazardous reactions

Elevated temperatures can cause hazardous polymerization.

### 10.4 Conditions to avoid

Incompatible materials. Open flames, hot surfaces and sources of ignition. Excess heat.

### 10.5 Incompatible materials

Strong oxidizing agents.

### 10.6 Hazardous decomposition products

Carbon oxides, acrid smoke and fumes.

## Section 11: Toxicological information

### 11.1 Toxicokinetics, metabolism and distribution

Metabolism: When given by oral admin to lactating cows, metabolites were present in urine mainly in form of glucuronide conjugates. It is suggested that epoxidation of double bonds occurred, followed by hydrolysis of epoxides to diols & conjugation with glucuronic acid. (HSDB)

Absorption, Distribution & Excretion: In general, although some dicyclopentadiene can be exhaled unchanged, most of that absorbed is hydroxylated in the liver, undergoes glucuronide conjugation, and is excreted in the urine. (HSDB)

### 11.2 Information on toxicological effects

#### Acute toxicity:

Acute Oral toxicity: LD<sub>50</sub> = 590 mg/kg bw (male/female), 512 mg/kg (male) and 676 mg/kg/bw (female)

Acute Inhalation toxicity: LC<sub>50</sub> = 143 ppm (male) and 126 ppm (female)

Acute Dermal toxicity: LD<sub>50</sub> = 5080 mg/kg (rabbit)

#### Skin corrosion/irritation:

Causes skin irritation.

#### Serious eye damage/irritation:

Causes serious eye irritation.

#### Respiratory or skin sensitization:

Draize Test, guinea pig: not sensitizing.

#### CMR effects (Carcinogenicity, Mutagenicity and Toxicity for Reproduction):

Not classified as CMR substance.

#### STOT-single exposure and repeated exposure:

Specific target organ toxicity - single exposure: May cause respiratory irritation.

Specific target organ toxicity - repeated exposure: Not classified.

#### Additional information:

No information available.

## Section 12: Ecological information

### 12.1 Toxicity

Acute toxicity to fish: LC<sub>50</sub> = 4.3 mg/l/96h (*Oryzias latipes*);

Acute toxicity to daphnia: EC<sub>50</sub> = 4.2 mg/l/48h (*Daphnia magna*);

Acute toxicity to algae: LC<sub>50</sub> = 27 mg/l/72h (*Pseudococconeis butabata*)

### **12.2 Persistence and degradability**

Very slow biotransformation of dicyclopentadiene was observed when it was inoculated with soil and water obtained from the Rocky Mountain Arsenal. It is listed as being degradation resistant in consideration for the Chemical Substances Control Law of Japan. Two field studies in Alberta, Canada found biodegradation rates of 37-57% in 266 days and not appreciable to 60% in 116 days. (HSDB)

### **12.3 Bioaccumulative potential**

An estimated BCF of 55 was calculated in fish for dicyclopentadiene, using an estimated log Kow of 3.16 and a regression-derived equation. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is moderate. (HSDB)

### **12.4 Mobility in soil**

Using a structure estimation method based on molecular connectivity indices, the Koc of dicyclopentadiene can be estimated to be 1800. According to a classification scheme, this estimated Koc value suggests that dicyclopentadiene is expected to have low mobility in soil. (HSDB)

### **12.5 Results of PBT and vPvB assessment**

PBT/vPvB assessment information is not available as chemical safety assessment not conducted.

### **12.6 Other adverse effects**

Toxic to aquatic life with long lasting effects.

## **Section 13: Disposal considerations**

### **13.1 Waste treatment methods**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

## **Section 14: Transport information**

### **14.1 Land transport(ADR/RID/GGVSE)**

<b>UN-No.:</b>	2048
<b>Official transport designation:</b>	DICYCLOPENTADIENE
<b>Class:</b>	3
<b>Classification Code:</b>	F1
<b>Packing group:</b>	III
<b>Hazard label:</b>	3 + Environmental mark (fish and tree)

### **14.2 Sea transport(IMDG-Code/GGVSee)**

<b>Proper Shipping Name:</b>	DICYCLOPENTADIENE
<b>Class:</b>	3
<b>UN-No.:</b>	2048
<b>Packing group:</b>	III
<b>EmS No.:</b>	F-E, S-D



### 14.3 Air transport(ICAQ-TMATA-DGR)

Proper Shipping Name:	DICYCLOPENTADIENE
Class:	3
UN-No.:	2048
Packing group:	III

### 14.4 Additional information

No other information available.

## Section 15: Regulatory information

### 15.1 Safety, health and environmental regulations/legislation specific for substance or mixture

EU regulation:

**Authorisations:** No information available.

**Restrictions on use:** No information available.

**EINECS:** CAS# 77-73-6 is listed in the inventory.

**DSD(67/548/EEC):** CAS# 77-73-6 is listed in the Annex I.

Other chemical regulation:

**USA-TSCA:** CAS# 77-73-6 is listed in the inventory.

**Canada-DSL:** CAS# 77-73-6 is listed in the inventory.

**Australia-AICS:** CAS# 77-73-6 is listed in the inventory.

**Korea-ECL:** CAS# 77-73-6 is listed in the inventory.

**Japan-ENCS:** CAS# 77-73-6 is listed in the inventory.

**China-IECSC:** CAS# 77-73-6 is listed in the inventory.

### 15.2 Chemical Safety Assessment

No Chemical Safety Assessment has been carried out for this substance.

## Section 16: Other information

### 16.1 Revision Information:

Date of the previous revision: Not applicable.

Date of this revision: 23/08/2011.

Revision summary: The first new SDS

### 16.2 Abbreviations and acronyms

**CLP:** EU regulation (EC) No 1272/2008 on classification, labelling and packaging of chemical substances and mixtures.

**CAS:** Chemical Abstracts Service (division of the American Chemical Society).

**EINECS:** European Inventory of Existing Commercial Chemical Substances.

**RID:** European Rail Transport.

**IMDG:** International Maritime Code for Dangerous Goods.

**IATA:** International Air Transport Association.

**OSHA:** The United States Occupational Safety and Health Administration.

**TSCA:** Toxic Substances Control Act, The American chemical inventory.

**DSD:** Dangerous Substance Directive (67/548/EEC).

**IECSC:** Inventory of existing chemical substances in China.

**DSL:** Domestic Substances List, The Canadian chemical inventory.

- AICS:** The Australian Inventory of Chemical Substances.  
**ECL:** Existing Chemicals List, the Korean chemical inventory.  
**ENCS:** Japanese Existing and New Chemical Substances.

### **16.3 Key literature references and sources for data**

- ESIS Dataset: European chemical Substances Information System.  
NLM: U.S. National Library of Medicine.  
GESTIS-database: Information system on hazardous substances of the German Social Accident Insurance.  
HSDB: Hazardous Substances Data Bank.  
ECHA database for information on registered substances.

### **16.4 Relevant R-phrases and H-statements**

#### **R-phrases (code and full text):**

- R10: Flammable.  
R22: Harmful if swallowed.  
R23: Toxic by inhalation.  
R36/37/38: Irritating to eyes, respiratory system and skin.  
R51/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

#### **H-statements (code and full text):**

- H226: Flammable liquid and vapour.  
H330: Fatal if inhaled.  
H302: Harmful if swallowed.  
H319: Causes serious eye irritation.  
H335: May cause respiratory irritation.  
H315: Causes skin irritation.  
H411: Toxic to aquatic life with long lasting effects.

### **16.5 Training advice**

- Provide adequate information, instruction and training for operators.

### **16.6 Declare to reader**

The information in this Safety Data Sheet (SDS) was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable. According to REACH Article 31(5), the SDS shall be supplied in an official language of the Member State(s) where the substance or mixture is placed on the market, unless the recipient Member State(s) concerned provide otherwise. It should also be noted that this SDS is applicable to the countries with English as an official language.