Safety Data Sheet dated 4-6-2012, version 1
Supersedes previous Safety Data Sheet dated 18/03/2011
In compliance with the requirement of the Regulation (EC) N°1907/2006

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product Identifier

Mixture identification:

Trade name: TELENE © 1810 B

Trade code: 1810 B

1.2. Relevant identified uses of the substance/mixture and uses advised against

Recommended use:

Reactive liquid resin for production of plastic parts.

1.3. Details of the supplier of the safety data sheet

Company:

TELENE SAS

2 rue Marie Curie

F-59910 BONDUES - FRANCE

Telephone contact (office hours): +33 (0)3 20 69 57 10

Competent person responsible for the safety data sheet:

msds@telene.com

1.4. Emergency telephone number

Poison Centers in Europe: http://www.eapcct.org/index.php?page=links

For all information in the event of a transport accident or other emergency: +1 703 527 3887 (CHEMTREC - International - 24/24).

SECTION 2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Directive criteria, 67/548/CE, 99/45/EC and following amendments thereof:

Properties / Symbols:

Xn Harmful

Xi Irritant

N Dangerous for the environment

R Phrases:

R10 Flammable.

R20/22 Harmful by inhalation and if swallowed.

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.

EC regulation criteria 1272/2008 (CLP)

Flam. Liq. 3, Flammable liquid and vapour.

Acute Tox. 4, Harmful if swallowed.

Acute Tox. 3, Toxic if inhaled.

Skin Irrit. 2, Causes skin irritation.

Eye Irrit. 2, Causes serious eye irritation.

STOT SE 3, May cause respiratory irritation.

Aquatic Chronic 2, Toxic to aquatic life with long lasting effects.

Adverse physicochemical, human health and environmental effects:
Prolonged or repeated contact may cause skin irritation and dermatitis.

2.2. Label elements
Symbols:

Danger
Hazard statements:
H226 Flammable liquid and vapour.
H302 Harmful if swallowed.
H331 Toxic if inhaled.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H411 Toxic to aquatic life with long lasting effects.
Precautionary statements:
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.
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
Special Provisions:
None.

2.3. Other hazards
vPvB Substances: None - PBT Substances: None.
Other Hazards:
Shavings, dust and/or very fine powder formed during the processing pf parts/molded products as with most finely divided materials constitute under certains conditions both a fire and explosion hazard.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances
Not Relevant.

3.2. Mixtures
Hazardous components within the meaning of EEC directive 67/548 and CLP regulation and related classification:
80% - 90% 3a,4,7,7a-tetrahydro-4,7-methanoindene
REACH No.: 01-2119463601-44, Index number: 601-044-00-9, CAS: 77-73-6, EC: 201-052-9
F,T,Xn,Xi,N; R23-11-22-36/37/38-51/53
Flam. Liq. 2 H225
Eye Irrit. 2 H319
STOT SE 3 H335
Skin Irrit. 2 H315

Aquatic Chronic 2 H411
Oral Acute Tox. 4 H302
Inhal Acute Tox. 2 H330

1% - 3% 2,6-di-tert-butyl-p-cresol
REACH No.: 01-2119565113-46, CAS: 128-37-0, EC: 204-881-4
Xn,Xi,N; R22-36/37/38-50/53
Oral Acute Tox. 4 H302
Aquatic Acute 1 H400
Eye Irrit. 2 H319
STOT SE 3 H335
Skin Irrit. 2 H315
Aquatic Chronic 1 H410

SECTION 4. FIRST AID MEASURES

4.1. Description of first aid measures

In case of skin contact:

Immediately take off all contaminated clothing.
Areas of the body that have - or are only even suspected of having - come into contact with the product must be rinsed immediately with plenty of running water and possibly with soap.
Wash thoroughly the body (shower or bath).
Remove contaminated clothing immediatley and dispose off safely.
After contact with skin, wash immediately with soap and plenty of water.

In case of eyes contact:

After contact with the eyes, rinse with water with the eyelids open for a sufficient length of time, then consult an opthalmologist immediately.
Protect uninjured eye.

In case of Ingestion:

Do NOT induce vomiting.
Give nothing to eat or drink.

In case of Inhalation:

If breathing is irregular or stopped, administer artificial respiration.
In case of inhalation, consult a doctor immediately and show him packing or label.

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

None.

4.3. Indication of any immediate medical attention and special treatment needed

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).
Treatment:
None.

SECTION 5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media:
Water spray.
Dry chemical
Anti-alcohol foam.
CO_2
Extinguishing media which must not be used for safety reasons:
Water in the form of a solid jet.
Avoid using foam and water on a surface at the same time as the water will destroy the foam.

5.2. Special hazards arising from the substance or mixture

Products of combustion: carbon monoxide, carbon dioxide and smoke.

Do not inhale explosion and combustion gases.
Combustion produces volatile vapours heavier than air (risk of spreading along the ground and distant ignition: backfire).

5.3. Advice for fire-fighters

Use suitable breathing apparatus .
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Move undamaged containers from immediate hazard area if it can be done safely.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Wear personal protection equipment.
Remove all sources of ignition.
Wear breathing apparatus if exposed to vapours/dusts/aerosols.
Provide adequate ventilation.
Use appropriate respiratory protection.
See protective measures under point 7 and 8.

6.2. Environmental precautions

Do not allow to enter into soil/subsoil. Do not allow to enter into surface water or drains.
Retain contaminated washing water and dispose it.
In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.
Suitable material for taking up: absorbing material, organic, sand.

6.3. Methods and material for containment and cleaning up

Wash with plenty of water.

6.4. Reference to other sections

See also section 8 and 13.

SECTION 7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Avoid contact with skin and eyes, inhaltion of vapours and mists.
Use localized ventilation system.
Don't use empty container before they have been cleaned.
Before making transfer operations, assure that there aren't any incompatible material residuals in the containers.
Contamined clothing should be changed before entering eating areas.
Do not eat or drink while working.
See also section 8 for recomened protective equipment.

7.2. Conditions for safe storage, including any incompatibilities

Keep away from heat and sources of ignition.
Keep in a tightly-closed container in a well-ventilated place.
Keep in a dry, cool place.
Keep away from direct sunlight.
Keep away from unguarded flame, sparks, and heat sources. Avoid direct exposure to sunlight.
Keep away from food, drink and feed.
Incompatible materials:
None in particular.
Instructions as regards storage premises:
Cool and adequately ventilated.

7.3. Specific end use(s)

Release of plastic finished parts may produce a flammable mixture of vapor/air that could ignite.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

3a,4,7,7a-tetrahydro-4,7-methanoindene - CAS: 77-73-6

OEL Type: Germany - LTE: 3 mg/m3, 0.5 ppm
OEL Type: Austria - LTE: 3 mg/m3, 0.5 ppm, 1 ppm - Notes: Dicyclopentadiene
OEL Type: Belgium - LTE: 3 mg/m3, 0.5 ppm
OEL Type: Denmark - LTE: 3 mg/m3, 0.5 ppm
OEL Type: Finland - STE: 5.5 mg/m3, 1 ppm
OEL Type: France - LTE: 27 mg/m3, 5 ppm
OEL Type: Ireland - LTE: 27 mg/m3, 5 ppm
OEL Type: Portugal - LTE: 27 mg/m3, 5 ppm
OEL Type: United Kingdom - LTE: 27 mg/m3, 5 ppm
OEL Type: Switzerland - LTE: 3 mg/m3, 0.5 ppm, 0.5 ppm
TLV TWA: 5 ppm - 27 mg/m3

2,6-di-tert-butyl-p-cresol - CAS: 128-37-0

OEL Type: United Kingdom - LTE: 10 mg/m3 - STE: 30 mg/m3
OEL Type: France - LTE: 10 mg/m3
OEL Type: Belgium - LTE: 10 mg/m3
OEL Type: Portugal - LTE: 2 mg/m3
OEL Type: Finland - LTE: 10 mg/m3 - STE: 20 mg/m3
OEL Type: Denmark - LTE: 10 mg/m3
OEL Type: Switzerland - LTE: 10 mg/m3
OEL Type: Ireland - LTE: 10 mg/m3
OEL Type: Germany - LTE: 10 mg/m3 - Notes: inhalable fraction
OEL Type: Holland - LTE: 10 mg/m3

DNEL Exposure Limit Values

Dicyclopentadiene - CAS: 77-73-6

Worker Industry: 160 mg/m3 - Consumer: 143 mg/m3 - Exposure: Human Inhalation Short Term, systemic effects
Worker Industry: 160 mg/m3 - Consumer: 143 mg/m3 - Exposure: Human Inhalation Short Term, local effects
Worker Industry: 0.34 mg/kg - Consumer: 0.14 mg/kg - Exposure: Human Dermal Long Term, systemic effects
Worker Industry: 2.3 mg/m3 - Consumer: 0.49 mg/m3 - Exposure: Human Inhalation Long Term, systemic effects
Worker Industry: 2.3 mg/m3 - Consumer: 0.1 mg/kg - Exposure: Human Oral Long Term, systemic effects

PNEC Exposure Limit Values

Dicyclopentadiene (DCPD-T) - CAS: 77-73-6

Worker Industry: 0.029 mg/l - Exposure: Environment: Water
Worker Industry: 0.85 mg/l - Exposure: STP
Worker Industry: 5.49 mg/kg - Exposure: sediments
Worker Industry: 0.86 mg/kg - Exposure: Environment: Soil

8.2. Exposure controls

Eye protection:

Use close fitting safety goggles, don't use eye lens.

Protection for skin:

Use clothing that provides comprehensive protection to the skin, e.g. cotton, rubber, PVC or viton.

Protection for hands:

Use protective gloves that provides comprehensive protection, e.g. P.V.C., neoprene or rubber.

Respiratory protection:

Use respiratory protection where ventilation is insufficient or exposure is prolonged, e.g. CEN/FFP-2 or CEN/FFP-3.

Use adequate protective respiratory equipment, e.g. CEN/FFP-2 or CEN/FFP-3.

Thermal Hazards:

None.

Environmental exposure controls:

Not available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Unless otherwise indicated, tests have been carried out at 20°C and at normal atmospheric pressure (760 mm Hg - 1 atm).

9.1. Information on basic physical and chemical properties

Appearance and colour:	Colorless to pale liquid
Odour:	Camphor-like
Odour threshold:	N.A.
pH:	N.A.
Melting point / freezing point:	- 5°C
Initial boiling point and boiling range:	170°C
Solid/gas flammability:	N.A.
Upper/lower flammability or explosive limits:	N.A.
Vapour density:	N.A.
Flash point:	41 - 49 ° C
Evaporation rate:	N.A.
Vapour pressure:	2.28 mmHg
Relative density:	N.A.
Solubility in water:	Insoluble
Lipid solubility:	N.A.
Partition coefficient (n-octanol/water):	N.A.
Auto-ignition temperature:	N.A.
Decomposition temperature:	N.A.
Viscosity:	150 - 450 mPa.s
Explosive properties:	N.A.
Oxidizing properties:	N.A.

9.2. Other information

Miscibility:	N.A.
Fat Solubility:	N.A.
Conductivity:	N.A.

Substance Groups relevant properties: N.A.

SECTION 10. STABILITY AND REACTIVITY

10.1. Reactivity

Stable under normal conditions.

10.2. Chemical stability

Metal chloride salts or heat can act as a catalyst to polymerisation.

10.3. Possibility of hazardous reactions

The mixture of A and B components of resin TELENE for operations other than moulding may cause an uncontrolled exothermic reaction generating temperatures higher than 200°C and releasing vapours such as ethane and nitrogen.

It may generate toxic gases on contact with powerful oxidising agents, and powerful reducing agents.
It may catch fire on contact with powerful oxidising agents.

10.4. Conditions to avoid
Avoid humidity.

10.5. Incompatible materials
Reacts with polyols and isocyanates.
Avoid all contact with strong oxidizing agents.
Avoid contact with combustible materials. The product could catch fire.

10.6. Hazardous decomposition products
Decomposition gases: hydrogen chloride, carbon monoxide, carbon dioxide.
Products of combustion: carbon monoxide, carbon dioxide and smoke.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects
There is no toxicological data available on the mixture. Consider the individual concentration of each component to assess toxicological effects resulting from exposure to the mixture.
Since the mixture has not been generally tested to establish its effects on health, the information pertaining to substances set out in section 3 is provided below.
Dicyclopentadiene - CAS: 77-73-6
Test: LD50 - Route: Oral - Species: Rat 590 mg/kg
Test: LC50 - Route: Inhalation - Species: Rat 1723 mg/m3 - Duration: 6H
Test: LD50 - Route: Skin - Species: Rat > 2000
Test: Skin Irritant - Route: VIVO - Species: Rabbit Positive - Notes: Moderately irritating.
Test: Eye Irritant - Route: VIVO - Species: Rabbit Negative
Test: Skin Sensitization - Route: VIVO - Species: GUINEA Negative
Test: Mutagenesis - Route: VITRO Negative
Test: Reproductive Toxicity - Species: Rat Negative
Test: NOAEL - Species: Rat 750 Ppm
Dicyclopentadiene can cause disorders and/or liver damage, disorders and/or kidney damage & respiratory and/or lung damage.

2,6-di-tert-butyl-p-cresol - CAS: 128-37-0
Test: LD50 - Route: Oral - Species: Rat 890 mg/kg
Test: LD50 - Route: Oral - Species: Rabbit 2100 mg/kg
Test: LD50 - Route: Oral - Species: Mouse 650 mg/kg
Test: LD50 - Route: Skin - Species: Rabbit > 2000 mg/kg
Test: LC11 - Route: Skin - Species: Rabbit Positive - Duration: 48h - Notes: Moderate
Test: LC11 - Route: EYES - Species: Rabbit Positive - Duration: 24H - Notes: Moderate
Test: Mutagenesis Negative - Source: Ames test
Test: Carcinogenicity No - Source: IARC Group 3

SECTION 12. ECOLOGICAL INFORMATION

12.1. Toxicity
Adopt good working practices, so that the product is not released into the environment.
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Since no ecotoxicological data about the mixture is available, the concentration of each substance must be considered to assess the ecotoxicological effects resulting from exposure to the mixture.
2,6-di-tert-butyl-p-cresol - CAS: 128-37-0
Test: EC50 Daphnia - Duration h: 48 - mg/l: 0.31
Test: EC50 Algae - Duration h: 72 - mg/l: 0.42

Test: LC50 Fish - Duration h: 96 - mg/l: 0.57

12.2. Persistence and degradability
None.
12.3. Bioaccumulative potential
N.A.
12.4. Mobility in soil
N.A.
12.5. Results of PBT and vPvB assessment
vPvB Substances: None - PBT Substances: None.
12.6. Other adverse effects
None.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods
Recover, if possible. Send to authorised disposal plants or for incineration under controlled conditions. In so doing, comply with the local and national regulations currently in force.

SECTION 14. TRANSPORT INFORMATION

14.1. UN number

ADR-UN Number:	2048
IATA-UN Number:	2048
IMDG-UN Number:	2048

14.2. UN proper shipping name

ADR-Shipping Name:	DICYCLOPENTADIENE
IATA-Shipping Name:	DICYCLOPENTADIENE
IMDG-Shipping Name:	DICYCLOPENTADIENE

14.3. Transport hazard class(es)

ADR-Class:	3
ADR-Label:	3

ADR - Hazard identification number: 30

IATA-Class:	3
IATA-Label:	3
IMDG-Class:	3
IMDG-Label:	3

14.4. Packing Group

ADR-Packing Group:	III
IATA-Packing group:	III
IMDG-Packing group:	III

14.5. Environmental hazards

ADR-Enviromental Pollutant:	Yes
IMDG-Marine pollutant:	Marine Pollutant

14.6. Special Precautions for User
ADR-Tunnel Restriction Code: (D/E)
14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
No.

SECTION 15. REGULATORY INFORMATION

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

Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances

Where applicable, refer to the following regulatory provisions:

Dir. 98/24/EC (Risks related to chemical agents at work).
Dir. 2000/39/EC (Occupational exposure limit values)
Directive 2003/105/CE ('Activities linked to risks of serious accidents') and subsequent amendments.
Regulation (EC) nr 648/2004 (detergents).
1999/13/EC (VOC directive)

15.2. Chemical Safety Assessment

No.
Two exposure scenarios for Dicyclopentadiene - CAS: 77-73-6 are attached in the appendix.

SECTION 16. OTHER INFORMATION

Full text of phrases referred to in Section 3:

R11 Highly flammable.
R22 Harmful if swallowed.
R23 Toxic by inhalation.
R36/37/38 Irritating to eyes, respiratory system and skin.
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

H225 Highly flammable liquid and vapour.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H315 Causes skin irritation.
H411 Toxic to aquatic life with long lasting effects.
H302 Harmful if swallowed.
H330 Fatal if inhaled.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.

This document was prepared by a competent person who has received appropriate training.

Main bibliographic sources:

ECHA CHEM (European Chemicals Agency)
eCHEMPORTAL (OECD Global Portal of Information on Chemical Substances)
GESTIS International Limit Values (IFA)
Chemical Safety Report (LOA REACH Consortium)

The information contained herein is based on our state of knowledge at the above-specified date. It refers solely to the product indicated and constitutes no guarantee of particular quality.
It is the duty of the user to ensure that this information is appropriate and complete with respect to the specific use intended.

This safety data sheet has been completely updated in compliance with Regulation 453/2010/EU.
This document supersedes any previous version.

ADR:	European Agreement concerning the International Carriage of Dangerous Goods by Road.
CAS:	Chemical Abstracts Service (division of the American Chemical Society).
CLP:	Classification, Labeling, Packaging.
EC50:	Median effective concentration.
IATA:	International Air Transport Association.
IMDG:	International Maritime Code for Dangerous Goods.
LC50:	Lethal concentration, for 50 percent of test population.
LD50:	Lethal dose, for 50 percent of test population.
LTE:	Long-term exposure.
N.A.:	Not available
OEL:	Occupational exposure limit.
PBT:	Persistent, Bioaccumulative and Toxic.
RID:	Regulation Concerning the International Transport of Dangerous Goods by Rail.
STE:	Short-term exposure.
vPvB:	very Persistent and very Bioaccumulative.

APPENDIX

EXPOSURE SCENARIOS

- Distribution of 3a,4,7,7a-tetrahydro-4,7-methanoindene
- Use of 3a,4,7,7a-tetrahydro-4,7-methanoindene in polymer processing – Industrial

Exposure scenario: Distribution of 3a,4,7,7a-tetrahydro-4,7-methanoindene

Exposure scenario

Section 1	Exposure Scenario Title
Title	**Distribution of DCPD;CAS RN77-76-3**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9, SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15
	Environmental Release Categories: ERC1 (loading) ERC2 (repacking)
Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its distribution and associated laboratory activities
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
General exposures (closed systems) [CS15].	No other specific measures identified [EI20]. Wear suitable gloves tested to EN374 [PPE15].
General exposures (closed systems) [CS15]. ; With sample collection [CS56]. With occasional controlled exposure [CS137]	Ensure material transfers are under containment or extract ventilation [E66].

General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	Ensure material transfers are under containment or extract ventilation [E66].
General exposures (open systems) [CS16]. Batch process [CS55]. ; With sample collection [CS56].	Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out operation for more than 4 hours [OC12].Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Process sampling [CS2].	Ensure material transfers are under containment or extract ventilation [E66]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Laboratory activities [CS36].	Handle in a fume cupboard or under extract ventilation [E83].Avoid carrying out operation for more than 4 hours [OC12]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Bulk transfers [CS14]. ; (closed systems) [CS107]	Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out operation for more than 4 hours [OC12].Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Bulk transfers [CS14]. ; (open systems) [CS108]	Ensure material transfers are under containment or extract ventilation [E66]. Wear suitable gloves tested to EN374 [PPE15]. Wear a respirator conforming to EN140 with Type A filter or better. [PPE22]
Drum and small package filling [CS6].	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Ensure operation is undertaken outdoor [E69] or provide a good standard of general ventilation. Natural ventilation is from windows and doors etc. Controlled ventilation means air is supplied or/removed by powered fan [E1 Wear chemically resistant gloves (tested to EN374) in combination with 'specific' activity training [PPE17].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55].Apply vessel entry procedures including use of forced supplied air [AP15]. Wear suitable gloves tested to EN374 [PPE15].
Storage [CS67]With occasional controlled exposure [CS137]	Transfer via enclosed lines [E52].Ensure operation is undertaken outdoors [E69]. Locate bulk storage outdoors [E88].Avoid carrying out operation for more than 15 minutes [OC10].Wear suitable gloves tested to EN374 [PPE15].

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1. This is only applicable to the intermediate exposure scenario.*

Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A.2 for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 81.6% which would be typically found in waste-water treatment plant.*
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

Exposure estimation

Workers exposure

The worker exposure estimates for the activities associated with the manufacturing of 3a,4,7,7a-tetrahydro-4,7-methanoindene were assessed using ECETOC TRAv2 (Further details on request).

Consumer exposure

Not applicable.

Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. (Further details on request.)

Environmental exposure

The PECs are based on the factors shown in Section 2.2 (Further details on request.).

Exposure scenario: Use of 3a,4,7,7a-tetrahydro-4,7-methanoindene in polymer processing – Industrial

Exposure scenario

Section 1	Exposure Scenario Title
Title	**Use in polymer processing of DCPD;CAS RN77-73-6**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC21
	Environmental Release Categories: ERC 6D
Processes, tasks, activities covered	Processing of formulated polymers including material transfers, additives handling (e.g. pigments, stabilisers, fillers, plasticisers, etc.), moulding, curing and forming activities, material re-works, storage and associated maintenance.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure < 0.5 kPa [OC3].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]; Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*
Bulk transfers [CS14].,(closed systems) [CS107]	No other specific measures identified [EI20]. Wear suitable gloves tested to EN374 [PPE15].
Bulk transfers [CS14].(closed systems) [CS107] With occasional controlled exposure [CS137]	Ensure material transfers are under containment or extract ventilation [E66].
Bulk transfers [CS14]. Dedicated facility [CS81].	Ensure material transfers are under containment or extract ventilation [E66].

Bulk weighing [CS91](closed systems) [CS107].	No other specific measures identified [EI20]. Wear suitable gloves tested to EN374 [PPE15].
Bulk weighing [CS91]With occasional controlled exposure [CS137]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Avoid carrying out operation for more than 4 hours [OC12].Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Small scale weighing [CS90]	Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out operation for more than 1 hour [OC11].
Additive premixing [CS92](closed systems) [CS107]	Ensure material transfers are under containment or extract ventilation [E66].
Additive premixing [CS92](open systems) [CS108]; With sample collection [CS56].	Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out operation for more than 4 hours [OC12].
Additive premixing [CS92] General exposures (open systems) [CS16].	Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out operation for more than 4 hours [OC12].
Bulk transfers [CS14]. Drum/batch transfers [CS8].	Provide enhanced mechanical ventilation by mechanical means [E48]. Ensure material transfers are under containment or extract ventilation [E66]. Wear suitable gloves tested to EN374 [PPE15].
Bulk transfers [CS14]. Small package filling [CS7].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].; Ensure material transfers are under containment or extract ventilation [E66]. Wear suitable gloves tested to EN374 [PPE15].
Calendering (including Banburys) [CS64]	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Production of articles by dipping and pouring [CS113].	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Extrusion and masterbatching [CS88]	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Wear suitable gloves tested to EN374 [PPE15].
Injection moulding of articles [CS89]	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Provide extract ventilation to material transfer points and other openings [E82].Wear suitable gloves tested to EN374 [PPE15].

Equipment maintenance [CS5].	Drain down system prior to equipment break-in or maintenance [E65].Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].Avoid carrying out operation for more than 4 hours [OC12].Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].
Storage [CS67]With occasional controlled exposure [CS137]	Provide extract ventilation to points where emissions occur [E54].

Section 3	**Exposure Estimation**
3.1. Health	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment	*When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.*
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	*Confirm that RMMs and OCs are as described or of equivalent efficiency. The required efficiency removal from water is 81.6% which would be typically found in waste-water treatment plant.*
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	

Selection of relevant RMM Core Phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*

Exposure estimation

Workers exposure

The worker exposure estimates for the activities associated with the manufacturing of 3a,4,7,7a-tetrahydro-4,7-methanoindene were assessed using ECETOC TRAv2 (Further details on request).

Consumer exposure

Not applicable.

Indirect exposure of humans via the environment (oral)

The estimation of indirect human exposure via the environment was conducted using EUSES v2.1.1. (Further details on request).

Environmental exposure

The PECs are based on the factors shown in Section 2.2 (Further details on request).

End of the safety data sheet.