SAFETY DATA SHEET
DIOCTYL MALEATE

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name	DIOCTYL MALEATE
Product number	D0750200,D0750945,D075004.7
Synonyms; trade names	BIS-(2-ETHYLHEXYL) MALEATE,DOM
REACH registration number	01-2119524002-60-xxxx
CAS number	142-16-5
EC number	205-524-5

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

Identified uses	Plasticiser/Cross-linking agent/Intermediate.

1.3. Details of the supplier of the safety data sheet

Supplier	Whyte Chemicals Limited 298 Regents Park Road London N3 2UA +44 (0) 208 346 5946 +44 (0) 208 349 4589 mugford@whytechem.co.uk

1.4. Emergency telephone number

Emergency telephone	+44 (0)1270 502891

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification

Physical hazards	Not Classified
Health hazards	STOT RE 2 - H373
Environmental hazards	Aquatic Chronic 1 - H410
Classification (67/548/EEC or 1999/45/EC)	Xn;R48/22. N;R51/53.

2.2. Label elements

EC number	205-524-5

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Pictogram

Signal word	Warning
Hazard statements	H373 May cause damage to organs through prolonged or repeated exposure. H410 Very toxic to aquatic life with long lasting effects.
Precautionary statements	P260 Do not breathe vapour/spray. P273 Avoid release to the environment. P314 Get medical advice/attention if you feel unwell. P391 Collect spillage. P501 Dispose of contents/container in accordance with national regulations.

2.3. Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

SECTION 3: Composition/information on ingredients

3.1. Substances

Product name	DIOCTYL MALEATE
REACH registration number	01-2119524002-60-xxxx
CAS number	142-16-5
EC number	205-524-5
Composition comments	>98%

SECTION 4: First aid measures

4.1. Description of first aid measures

General information	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation	Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Get medical attention if any discomfort continues.
Ingestion	Immediately rinse mouth and drink plenty of water (200-300 ml). Do not induce vomiting. Get medical attention immediately.
Skin contact	Remove affected person from source of contamination. Remove contaminated clothing and rinse skin thoroughly with water. Get medical attention promptly if symptoms occur after washing.
Eye contact	Remove affected person from source of contamination. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention promptly if symptoms occur after washing.

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

General information	Chronic effects: Chronic nephropathy (kidney failure) and mineralisation in the kidneys.
Inhalation	No specific symptoms known.
Ingestion	Harmful: danger of serious damage to health by prolonged exposure if swallowed.
Skin contact	May cause skin irritation.

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Eye contact May cause eye irritation.

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

Notes for the doctor Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media Extinguish with the following media: Extinguish with alcohol-resistant foam, carbon dioxide or dry powder.

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

Specific hazards Carbon monoxide (CO). Carbon dioxide (CO2).

5.3. Advice for firefighters

Protective actions during firefighting Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Do not use water jet as an extinguisher, as this will spread the fire. Control run-off water by containing and keeping it out of sewers and watercourses. Contain and collect extinguishing water.

Special protective equipment for firefighters Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Wear protective clothing as described in Section 8 of this safety data sheet. Eliminate all sources of ignition. No smoking, sparks, flames or other sources of ignition near spillage. Provide adequate ventilation. Use suitable respiratory protection if ventilation is inadequate. Avoid inhalation of vapours and contact with skin and eyes. Take precautionary measures against static discharges. Warn everybody of potential hazards and evacuate if necessary.

6.2. Environmental precautions

Environmental precautions Avoid the spillage or runoff entering drains, sewers or watercourses. Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Absorb in vermiculite, dry sand or earth and place into containers.

6.4. Reference to other sections

Reference to other sections Wear protective clothing as described in Section 8 of this safety data sheet. See Section 11 for additional information on health hazards. Collect and dispose of spillage as indicated in Section 13.

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions Wear protective clothing as described in Section 8 of this safety data sheet. Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges. Wear suitable protective equipment for prolonged exposure and/or high concentrations of vapours, spray or mist. Provide adequate ventilation. If ventilation is inadequate, suitable respiratory protection must be worn. Good personal hygiene procedures should be implemented. Wash hands and any other contaminated areas of the body with soap and water before leaving the work site. Avoid inhalation of vapours/spray and contact with skin and eyes.

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Store in tightly-closed, original container in a dry, cool and well-ventilated place. Store away from incompatible materials (see Section 10). Take precautionary measures against static discharges. Earth container and transfer equipment to eliminate sparks from static electricity. Use explosion-proof electrical/ventilating/lighting/…/equipment.

7.3. Specific end use(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure Controls/personal protection

8.1. Control parameters

Ingredient comments No exposure limits known for ingredient(s).

DNEL

Workers - Inhalation; Long term systemic effects: 186.11 mg/m³
Workers - Inhalation; Long term local effects: 1.95 mg/m³
Workers - Dermal; Long term systemic effects: 0.42 mg/m³
Workers - Dermal; Long term local effects: 3.91 mg/cm²

PNEC

- Fresh water; 0.00104 mg/l
- Marine water; 0.000104 mg/l
- Sediment (Freshwater); 15.95 mg/kg
- Sediment (Marinewater); 1.595 mg/kg
- Soil; 3.19 mg/kg
- STP; 100 mg/l
- Intermittent release; 0.00619 mg/l

8.2. Exposure controls

Protective equipment

Appropriate engineering controls Provide adequate ventilation.

Eye/face protection The following protection should be worn: Chemical splash goggles. Use face shield in case of splash risk.

Hand protection It is recommended that chemical-resistant, impervious gloves are worn. Wear protective gloves made of the following material: Butyl rubber. The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material.

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Other skin and body protection	Provide eyewash station and safety shower. Wear apron or protective clothing in case of contact.
Hygiene measures	When using do not eat, drink or smoke. Wash promptly if skin becomes contaminated. Wash hands at the end of each work shift and before eating, smoking and using the toilet. Avoid heat, flames and other sources of ignition.
Respiratory protection	If ventilation is inadequate, suitable respiratory protection must be worn.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance	Clear liquid.
Odour	Slight. Ester.
pH	Not determined.
Melting point	-60°C
Initial boiling point and range	164°C @ 10 mbar
Flash point	185°C
Evaporation rate	Not determined.
Upper/lower flammability or explosive limits	Not determined.
Vapour density	Not determined.
Relative density	0.94 @ 20°C
Solubility(ies)	Insoluble in water.
Partition coefficient	log Pow: 7.24
Decomposition Temperature	Not determined.
Viscosity	8.29 mPa s @ 20°C
Oxidising properties	Not relevant.

9.2. Other information

Other information	No information available.

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	There are no known reactivity hazards associated with this product.

10.2. Chemical stability

Stability	Stable at normal ambient temperatures and when used as recommended.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	Will not polymerise.

10.4. Conditions to avoid

Conditions to avoid	Keep away from heat, sparks and open flame. Static electricity and formation of sparks must be prevented.

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10.5. Incompatible materials

Materials to avoid Strong oxidising agents. Strong alkalis. Strong acids.

10.6. Hazardous decomposition products

Hazardous decomposition products Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours. Oxides of carbon.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Skin corrosion/irritation

Animal data Not irritating.

Serious eye damage/irritation

Serious eye damage/irritation Not irritating.

Germ cell mutagenicity

Genotoxicity - in vitro Chromosome aberration: Negative.

Carcinogenicity

Carcinogenicity Not available.

Reproductive toxicity

Reproductive toxicity - fertility - NOAEL 1000 mg/kg, Oral, Rat

Inhalation No specific health hazards known.

Ingestion Harmful: danger of serious damage to health by prolonged exposure if swallowed.

Skin contact May cause skin irritation.

Eye contact May cause eye irritation.

Acute and chronic health hazards Chronic effects: Chronic nephropathy (kidney failure) and mineralisation in the kidneys.

SECTION 12: Ecological Information

Ecotoxicity The product contains a substance which is toxic to aquatic organisms and which may cause long-term adverse effects in the aquatic environment.

12.1. Toxicity

Acute toxicity - fish LC_{50}, 96 hours: >100 mg/l, Brachydanio rerio (Zebra Fish)

Acute toxicity - aquatic invertebrates EC_{50}, 48 hours: 59.5 mg/l, Daphnia magna

Acute toxicity - aquatic plants EC_{50}, 72 hours: >100 mg/l, Pseudokirchneriella subcapitata

Acute toxicity - microorganisms Not available.

12.2. Persistence and degradability

Persistence and degradability The product is biodegradable.

12.3. Bioaccumulative potential

Partition coefficient log Pow: 7.24

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12.4. Mobility in soil

Mobility No information available.

Adsorption/desorption coefficient Soil - log Koc: 5.1858 @ °C

Henry's law constant > 416 Pa m3/mol @ 20°C

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment This substance is not classified as PBT or vPvB according to current EU criteria.

12.6. Other adverse effects

Other adverse effects None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

General information Waste is classified as hazardous waste. Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

Disposal methods Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority. Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

SECTION 14: Transport information

14.1. UN number

UN No. (ADR/RID) 3082

UN No. (IMDG) 3082

UN No. (ICAO) 3082

14.2. UN proper shipping name

Proper shipping name (ADR/RID) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dioctyl maleate)

Proper shipping name (IMDG) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dioctyl maleate)

Proper shipping name (ICAO) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dioctyl maleate)

Proper shipping name (ADN) ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dioctyl maleate)

14.3. Transport hazard class(es)

ADR/RID class 9

ADR/RID subsidiary risk

ADR/RID label 9

IMDG class 9

IMDG subsidiary risk

ICAO class/division 9

ICAO subsidiary risk

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Transport labels

14.4. Packing group

ADR/RID packing group	III
IMDG packing group	III
ICAO packing group	III

14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant

14.6. Special precautions for user

EmS	F-A, S-F
Emergency Action Code	•3Z
Hazard Identification Number (ADR/RID)	90
Tunnel restriction code	(E)

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

SECTION 15: Regulatory information

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

National regulations	The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (SI 2009 No. 716). EH40/2005 Workplace exposure limits. Health and Safety at Work etc. Act 1974 (as amended). Control of Substances Hazardous to Health Regulations 2002 (as amended). The Control of Substances Hazardous to Health Regulations 2002 (SI 2002 No. 2677) (as amended). Control of Pollution Act 1974. Control of Pollution (Special Waste) Regulations 1980 (as amended). Dangerous Substances Directive 67/548/EEC. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended). Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

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EU legislation	Dangerous Substances Directive 67/548/EEC. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended). Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).
Guidance	Workplace Exposure Limits EH40. Approved Classification and Labelling Guide (Sixth edition) L131. Dangerous Substances Directive 67/548/EEC. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended).

15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

SECTION 16: Other information

Revision comments	NOTE: Lines within the margin indicate significant changes from the previous revision.
Issued by	HS&E Manager.
Revision date	10/06/2015
Revision	7
Supersedes date	28/10/2011
SDS number	20382
SDS status	Approved.
Risk phrases in full	R48/22 Harmful: danger of serious damage to health by prolonged exposure if swallowed. R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Hazard statements in full	H373 May cause damage to organs through prolonged or repeated exposure. H410 Very toxic to aquatic life with long lasting effects.

Annex: Exposure scenario

Short title of the exposure scenario:	Industrial use as an intermediate
Sector of Use:	SU8 Manufacture of bulk, large scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals
Product category:	PC19 Intermediate
Process category:	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b Transfer of substance or preparation (charging/discharging) from/ to vessels/large containers at dedicated facilities PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 Use as laboratory reagent
Environmental release category:	ERC1 Manufacture of substances ERC6a Industrial use resulting in manufacture of another substance (use of intermediates) ERC6c Industrial use of monomers for manufacture of thermo-plastics
Notes:	The product is not intended for private use.
Description of the activities / processes covered in the Exposure Scenario	See section 1 of the annex to the Safety Data Sheet. Industrial use als raw material or intermediate for the manufacture of another substance.
Conditions of use	According to directions for use.
Duration and frequency:	5 workdays/week. >240 days/year 365 days/year
Worker	PROC 1,2: 4-8 h/day PROC 8b: 1-4 h/day PROC 3, 4, 9, 15: 0,25 - 1 h/day
Environment:	Indoor use The product may not be released into the environment without control. Avoid contact to soil and / or ground water during application
Physical parameters	
Physical state:	Fluid
Concentration of the substance in the mixture:	Raw material.
Used amount per time or activity:	>1000 tons per year >10 kg per day
Other operational conditions:	Observe the general safety regulations when handling chemicals
Other operational conditions affecting environmental exposure:	No special measures required.

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Use only on hard ground.

Other operational conditions affecting worker exposure: Observe the instructions in Chapter 7 and 8 of the data sheet.

Other operational conditions affecting consumer exposure: Not required.

Other operational conditions affecting consumer exposure during the use of the product Not applicable.

Risk management measures

Worker protection

Organisational protective measures: Ensure that activities are executed by specialists or authorised personnel only.

Technical protective measures: Ensure that suitable extractors are available on processing machines
Sufficient ventilation is recommended.
Check seals on flanges and valves for suitability and corrosion resistance.
If necessary inspection intervals should be defined!
Waste gases should be led into the atmosphere only via appropriate separators, scrubbers or incinerators.

Personal protective measures Do not inhale gases / fumes / aerosols.
Use only liquid proof and chemical resistant protective suit.
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
Filter A.

Environmental protection measures

Air: Exhaust air is introduced into the incinerator.

Water: Discharge into waste water channels and biological treatment plants only after clearence with the operating company and in accordance with local Authority approval.

Soil: Prevent contamination of soil.

Notes: In case of unintended release of the product: See section 6 of the Safety Data Sheet.

Disposal measures: Disposal must be made according to official regulations.

Disposal procedures Must not be disposed together with household garbage. Do not allow product to reach sewage system.
Additional data in section 13 of the Safety Data Sheet.

Waste type: Partially emptied and uncleaned packaging

Exposure estimation: For exposure assessment ECETOC TRA was used.
RCR: Risk characterisation ratio

Worker (dermal): PROC 1: 0,09 mg/cm²; RCR: 0,02
PROC 2: 0,02 mg/cm²; RCR: 0,00
PROC 3: 0,01 mg/cm²; RCR: 0,00
PROC 4: 0,19 mg/cm²; RCR: 0,05
PROC 8b: 0,09 mg/cm²; RCR: 0,02
PROC 9: 0,09 mg/cm²; RCR: 0,02

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	PROC 15: 0,01 mg/cm²; RCR: 0,00
Worker (inhalation):	PROC 1: 0,14 mg/m³; RCR: 0,07 PROC 2: 1,4 mg/m³; RCR: 0,73 PROC 3: 0,86 mg/m³; RCR: 0,44 PROC 4: 1,4 mg/m³; RCR: 0,73 PROC 8b: 1,3 mg/m³; RCR: 0,65 PROC 9: 1,4 mg/m³; RCR: 0,73 PROC 15: 1,4 mg/m³; RCR: 0,73
Environment	The estimation of environmental exposure was carried out in accordance with EUSES. The calculated value is smaller than the PNEC. Detailed information on the estimation of the environmental exposure can be found at http://ecb.jrc.ec.europa.eu/euses/.
Sweet water:	PEC: 0,88E-03 mg/L PNEC: 1,04E-03 mg/L PEC/PNEC: 0,945
Sediment:	PEC: 45,7E-03 mg/kg wwt PNEC : 15,95 mg/kg wwt PEC/PNEC: 0,73
Soil:	Substance is biologically degraded, see chapt. 12 RCR for terrestrial food chain: <1.
Consumer:	Not relevant for this Exposure Scenario.
Guidance for downstream users:	No further relevant information available. Detailed information for exposure assessment can be found under http://www.ecetoc.org/tra.