Material Safety Data Sheet

SAFETY DATA SHEET

11/ 6/2004

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

DOW CHEMICAL COMPANY LTD
2 HEATHROW BOULEVARD
284 BATH ROAD
WEST DRAYTON
MIDDLESEX
UB7 0DQ

24 HOUR EMERGENCY RESPONSE NUMBER : +44-1553-761-251

For product information: +44-0208-917-5000

Product Name: DOWTHERM* A HEAT TRANSFER FLUID

LV70: 25576 Issue Date: Sept. 94 Ref: 00099
Revised: June 04 (Section(s) 8 & 15)

Use of the substance/preparation
For industrial use only.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Eutectic mixture of diphenyloxide and biphenyl

			CAS	EC No
Diphenyl oxide	73 %		000101-84-8	202-981-2

Dangerous components (see section 16 for complete R-phrases):

			CAS	EC No
Biphenyl	27 %	Xi,N; R36/37/38-50/53	000092-52-4	202-163-5

3. HAZARDS IDENTIFICATION

Irritating to eyes, respiratory system and skin. Very toxic to aquatic organisms, may cause long-term effects in the aquatic environment.

* Trademark of The Dow Chemical Company.

4. FIRST-AID MEASURES

Never give fluids or induce vomiting if patient is unconscious or is having convulsions.

Inhalation
Move person to fresh air; if effects occur, consult a physician.

Skin Contact
Wash skin with plenty of water.

Eye Contact
Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Ingestion
If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Note to Physician
If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE-FIGHTING MEASURES

Extinguishing Media
Water fog or fine spray. Carbon dioxide. Dry chemical fire extinguishers.

Hazardous Combustion Products
Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Combustion products may include and are not limited to: Benzene. Carbon monoxide. Carbon dioxide.
Dense smoke is produced when product burns.

Protection of Firefighters
Wear positive-pressure self-contained breathing apparatus and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots and gloves).

Specific Fire or Explosion Hazards
Keep people away. Isolate fire area and deny unneccessary entry. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Wear adequate personal protective equipment, see Section 8, EXPOSURE CONTROLS/PERSONAL PROTECTION. Evacuate non-emergency personnel from area.

Environmental Precautions
Contain liquid to prevent contamination of soil, surface water or ground water.

Methods of Cleaning Up
Large spills: Contain with dike. Pump into suitable and properly labelled containers. Recover if possible, or dispose of according to applicable regulations, see Section 13, DISPOSAL CONSIDERATIONS.
Small spills: Cover and soak up with a suitable absorbent material. Collect in suitable and properly labelled containers. Dispose of according to applicable regulations, see Section 13, DISPOSAL CONSIDERATIONS.

7. HANDLING AND STORAGE

Handling
Practice care and caution to avoid skin and eye contact. Avoid breathing vapours if generated.
When performing maintenance activities, proper care should be taken to prevent spilled fluid from entering the environment. Any spilled fluid should be absorbed and disposed of in accordance with all regulations.

Storage
Ground and bond all equipment. Store in a cool, well ventilated area, away from sources of ignition.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines
Biphenyl: The UK Health and Safety Executive have established an Occupational Exposure Standard(OES) of 0.2ppm 8-hour TWA, 0.6ppm 15-min STEL. ACGIH Threshold Limit Value (TLV) is 0.2 ppm TWA-8 hours.
Diphenyl oxide: The UK Health and Safety Executive has established an Occupational Exposure Standard(OES) of 1ppm 8-hour TWA. ACGIH Threshold Limit Value (TLV) is 1 ppm TWA-8 hours and Short Term Exposure Limit (STEL) is 2 ppm.

Engineering Controls
Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

Personal Protective Equipment

- Respiratory Protection
Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator.
Use a CE approved air-purifying respirator with cartridge/filter for: Organic vapours, type A (boiling point >65 deg.C).

- Skin Protection
When prolonged or frequently repeated contact could occur, use protective clothing chemically resistant to this material. Selection of specific items such as face shield, gloves, boots, apron, or full body-suit will depend on operation.

-Hand protection
Use chemical resistant gloves classified under standard EN 374:
Protective gloves against chemicals and micro-organisms.
Examples of preferred glove barrier materials include:
Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Polyvinyl chloride ("PVC" or "vinyl"). Styrene/butadiene rubber. Viton.
Examples of acceptable glove barrier materials include:
Butyl rubber. Chlorinated polyethylene. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR").

When prolonged or frequently repeated contact may occur, a glove with a protection class of 4 or higher (breakthrough time greater than 120 minutes according to EN 374) is recommended.
When only brief contact is expected, a glove with a protection class of 1 or higher (breakthrough time greater than 10 minutes according to EN 374) is recommended.
NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all requisite workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), as well as the instructions/specifications provided by the glove supplier.

- Eye/Face Protection
Use safety glasses. If exposure causes eye discomfort, use a full-face respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific gravity	: 1.050-1.075 (25/25 deg.C)
Rel. vapour density (air=1)	: >1
Vapour pressure	: 0.033 mbar (25 deg.C)
Freezing point/range	: 12 deg.C
Boiling point/range	: 257 deg.C
Water solubility	: 14 ppm
LogP (octanol/water)	: 4.08-4.2
pH	: not applicable
Flash point	: 113 deg.C (TCC)
Auto-ignition temp.	: 599 deg.C
Flammability-LFL	: 0.8 %vol/vol (175 deg.C)
Flammability-UFL	: 7.0 %vol/vol (175 deg.C)

10. STABILITY AND REACTIVITY

Chemical Stability
Excellent thermal stability characteristics at typical use temperatures.

Materials to Avoid
Oxidising agents.

Hazardous Decomposition Products
As with all commercially available aromatic heat transfer fluids, the potential exists for trace amounts of benzene to form when used at elevated temperatures. Similarly, with this product, small amounts of phenol may form. Both compounds are likely to concentrate in the vent pipe headers.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

- Ingestion
Low toxicity if swallowed. The oral LD50 for rats is >2000 mg/kg. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; swallowing amounts larger than that may cause injury.
Observations in animals include: Liver injury. Kidney injury.

- Skin Contact
Prolonged skin contact is unlikely to result in absorption of harmful amounts. The dermal LD50 has not been determined.

- Inhalation
May cause headache and nausea due to odour.

Irritation

- Skin
Prolonged or repeated exposure may cause skin irritation, even a burn.

- Eyes
May cause pain disproportionate to the level of irritation to eye tissues. May cause slight temporary eye irritation.
Vapours may cause eye irritation experienced as mild discomfort and redness.

- Inhalation
Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs.

Developmental/Reproductive Effects
Birth defects are unlikely. Even exposures having an adverse effect on the mother should have no effect on the fetus. Contains component(s) which have been shown to interfere with reproduction in animal studies. (Only at a dose producing generalised toxicity.)

Carcinogenicity
Available data are inadequate to evaluate carcinogenicity.

Mutagenicity
Biphenyl: In vitro mutagenicity tests were negative in some cases and positive in other cases. Animal genetic toxicity studies were negative.
Diphenyl oxide: In vitro genetic toxicity studies were negative.

Other Information
Repeated excessive exposure may cause:
Irritation to the upper respiratory tract (nose and throat) and lungs.
Excessive exposure may cause liver, kidney and gastrointestinal effects and possibly central and peripheral nervous system disorders.
May cause nausea or vomiting. May cause abdominal discomfort or diarrhea.

12. ECOLOGICAL INFORMATION

Assessments based on data for the individual components of this preparation.

Mobility and Bioaccumulation Potential
Measured log octanol/water partition coefficient (log Pow) is 4.08-4.2.
The experimentally determined bioconcentration factor (BCF) in fish is 195-1900.
No appreciable volatilization from water to air is expected.
Potential for mobility in soil is low (Koc between 500 and 2000).

Degradation
All components of this material are readily biodegradable according to OECD/EC guidelines. Biodegradation may be reduced or stopped by excessively high (inhibitory) concentration.

Aquatic Toxicity
Acute LC50s for fish are in the range of 2.1-5.5 mg/L.
Acute EC50 for water flea Daphnia magna is 0.12-0.72 mg/L.
Material is considered very toxic to aquatic organisms (LC50/EC50/IC50 below 1 mg/L in most sensitive species).

13. DISPOSAL CONSIDERATIONS

Any disposal practice must be in compliance with all local and national laws and regulations.

14. TRANSPORT INFORMATION

Road & Rail
Proper shipping name: 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Mixture of biphenyl and diphenyl oxide)
Truck/Rail ADR/RID : 9 Label :< >
Classification Code : M6
Packing Group : -
Kemler Code : 90 UN Number : 3082
Tremcard Nr. CEFIC : 90GM6-III

Sea
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Mixture of biphenyl and diphenyl oxide)
Sea - IMO/IMDG Class: 9 UN Nr : 3082 Label: 9
Packing Group : III EMS : -
Marine Pollutant : Y (Y/N)

Air
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Mixture of biphenyl and diphenyl oxide)
Air-ICAO/IATA Class : 9 UN Nr : 3082 Label: MIS
Sub Class : -
Packing Group : III Pack Instr. Passenger : 914
Pack Instr. Cargo : 914

Remarks : Sample shipment not allowed by mail.

15. REGULATORY INFORMATION

EC Classification and User Label Information

Classification according to the UK Chemicals (Hazard Information and Packaging) Regulations, CHIP.

Hazard Symbol : Xi - Irritant
N - Dangerous for the Environment

Risk Phrases : Irritating to eyes, respiratory system and skin (R36/37/38).
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment (R50/53).

Safety Phrases : Do not breathe fumes (S23).
Avoid contact with skin (S24).
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice (S26).
This material and its container must be disposed of as hazardous waste (S60).

Chemical name: Contains: Biphenyl
Diphenyl oxide

16. OTHER INFORMATION

Risk-phrases in Section 2
R36 - Irritating to eyes.
R37 - Irritating to respiratory system.
R38 - Irritating to skin.
R50/53 - Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

The information herein is given in good faith and to the best of our knowledge but no warranty, express or implied, is made.