

Antifreeze safety sheet

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

1.1 Product identifier

Product Name Thermax DTX

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

Identified uses Non-toxic heat transfer fluid with antifreeze and inhibitor functions designed for use in geothermal and air source heating systems.

Uses advised against This product is not recommended for any industrial, professional or consumer use other than the identified uses above.

1.3 Details of the supplier of the safety data sheet

Supplier Hydra Technologies Ltd.
Europa Way,
Swansea West Business Park,
Forestfach,
Swansea,
SA5 4AJ

+44 (0) 1792 586800
info@hydratech.co.uk

1.4 Emergency telephone number

Emergency telephone number 01792 586800
Opening Hours 08:30 - 17:00

Out of hours emergency information

First aid advice number For emergencies that occur outside of office opening hours that pose a threat to human health, the environment or require immediate first aid advice call:
+44 (0) 1792 572296

Note This number is for emergencies only and will not accept calls or queries regarding equipment failures.

Section 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (EC 1272/2008)

Physical and chemical hazards	Not classified
Human health	Not classified
Environment	Not classified

In accordance with Article 9 and Article 12 of EC 1272/2008, Thermax DTX has been assessed as a mixture where adequate and reliable scientific information demonstrates the occurrence of synergistic and antagonistic effects that renders the mixture non-toxic as determined by an EPA certified laboratory with an LD50 (Oral Rat) > 15,000 mg/kg body weight.

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2.2 Label elements

EC No Under CLP review.
Labelling Regulation (EC) No. 1272/2008 Not classified.

2.3 Other hazards

Other Hazards This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

Section 3: Composition/information on ingredients

3.2 Mixtures

Component	Monoethylene glycol (ethane-1, 2-diol)
Concentration	80-90%
EC Number	203-473-3
CAS Number	107-21-1
Reach Registration Number	01-2119456816-28
Classification (EC 1272/2008)	Acute Tox. 4 - H302 STOT RE 2 - H373

Component	ADH Enzyme - Detoxifying Additive 1
Concentration	8-18%
EC Number	N/A
CAS Number	N/A
Reach Registration Number	N/A
Classification (EC 1272/2008)	Not classified - substance has a Community WEL

Component	ADH Enzyme - Detoxifying Additive 2
Concentration	2-5%
EC Number	N/A
CAS Number	N/A
Reach Registration Number	N/A
Classification (EC 1272/2008)	Not classified - substance has a Community WEL

Component	ADH Enzyme - Detoxifying Additive 3
Concentration	0.5-1.5%
EC Number	N/A
CAS Number	N/A
Reach Registration Number	N/A
Classification (EC 1272/2008)	Flam. Liq. 2 - H225 Eye Irrit. 2 - H319

- The classification listed for monoethylene glycol above is that which is listed, according to CLP (EC) No. 1272/2008. However, the monoethylene glycol present in this mixture is rendered non toxic (as determined by an EPA certified laboratory) upon the addition of the ADH Enzyme - Detoxifying Additives listed above.

- The classification listed above for the ADH Enzyme - Detoxifying Additives are those which are also the classifications according to CLP (EC) No. 1272/2008 for the REACH registered substances, whose names have been changed to "ADH Enzyme - Detoxifying Additive 1, 2 and 3" on this Safety Data Sheet, in order to protect the intellectual property rights of Hydra Technologies Ltd.

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- Further, more detailed information on the composition and classifications of this product and its constituents can be found in Section 16.

Section 4: First Aid Procedures

4.1 Description of first aid procedures

General Information	When safe to do so remove the victim from the source of exposure giving consideration as to whether this may cause further discomfort to the victim.
Inhalation	Move the affected person to fresh air at once. Keep the affected person warm in a position comfortable for breathing. Get medical attention if any discomfort continues.
Ingestion	Move the affected person to fresh air at once. Keep the affected person warm in a position comfortable for breathing. Rinse mouth thoroughly with water. Get medical attention if any discomfort continues.
Skin Contact	Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention if any discomfort continues.
Eye Contact	Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rise for at least 15 minutes. Get medical attention if any discomfort continues.

4.2 Most important symptoms and effects, both acute and delayed

General Information	The following symptoms are listed in case of exposure to the 100% neat product.
Inhalation	Inhalation of vapours may cause mild irritation of the upper respiratory tract.
Ingestion	No specific symptoms noted.
Skin Contact	Prolonged and repeated contact may cause mild irritation of the skin.
Eye Contact	Direct eye contact may cause slight reddening of the eyes.

4.3 Indication of immediate medical needs or special treatment

No specific recommendations given, but first aid may still be required in case of accidental exposure, inhalation or ingestion of this chemical. If in doubt, get medical attention promptly and present a copy of this Safety Data Sheet.

Notes for the doctor

No specific recommendations other than to read all sections of this Safety Data Sheet, especially Section 16.

Section 5: Firefighting Measures

5.1 Extinguishing media

Extinguish with alcohol-resistant foam, carbon dioxide (CO₂), dry chemicals, sand and dolomite or water fog.

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5.2 Special hazards arising from the substance or mixture

Specific Hazards	When heated and in the case of a fire, harmful vapours/gases (such as CO and CO ₂) may be formed.
Unusual fire and explosion hazards	Exposure to extreme heat may cause product containers to explode.

5.3 Advice for firefighting

Protective actions during firefighting	Keep people away, isolate the fire and deny unnecessary entry. Use water fog to keep fire exposed containers cool and disperse vapours. Runoff water should be prevented from entering sewers and watercourses.
Specialist protective equipment for firefighters	Wear positive-pressure self-contained breathing apparatus (SCBA) and full protective clothing.

Section 6: Procedure for Unwanted Emissions

6.1 Personal precautions, protective equipment and emergency procedures

Avoid flames, sparks, heat and smoking.
In the case of inadequate ventilation, use respiratory protection.
Warn everybody of potential danger and evacuate if necessary.
Extinguish all ignition sources if safe to do so.
Wear protective clothing as described in Section 8 of this Safety Data Sheet.

6.2 Environmental precautions

Do not discharge into drains, water courses or onto the ground.
Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.

6.3 Methods and materials for containment and cleanup

Absorb spillage with inert, damp, non-combustible material, then lush the contaminated area with water.
Collect and place unsuitable waste disposal containers and seal securely. For waste disposal, see Section 13.

6.4 Reference to other sections

Wear protective clothing as described in Section 8 of this Safety Data Sheet.
Collect and dispose of spillage as indicated in section 13.

Section 7: Handling and Storage

7.1 Precautions for safe handling

Avoid spilling and contact with skin and eyes.
Avoid inhalation of vapours and spray mists.
Provide good ventilation.
Keep away from heat, sparks and open flame.

7.2 Conditions for safe storage including any compatibilities

Store in tightly-closed, original containers.
Keep separate from food, feedstuffs, fertilisers and other sensitive material.
Do not store near heat sources or expose to high temperatures.
Keep away from heat, sparks and open flame.

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7.3 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

Name	STD	TWA-8 Hrs	STEL-15 Min
Monoethylene glycol (ethane-1, 2-diol)	WEL	53 mg/m ³	104 mg/m ³

DNEL

Industry, Inhalation - Long term local effects: 35mg/m³
 Industry, Dermal - Long term systemic effects: 106mg/m²
 Consumer, Inhalation - Long term local effects: 7mg/m³
 Consumer, Dermal - Long term systemic effects: 7mg/m²

PNEC

Fresh water: 10 mg/L
 Marine water: 1 mg/L
 STP: 199.5 mg/L
 Sediment fresh water: 20.9 mg/kg
 Soil: 1.53 mg/kg

Name	STD	TWA-8 Hrs	STEL-15 Min
ADH Enzyme - Detoxifying Additive 1	WEL	459 mg/m ³	Not available

DNEL

Industry, Inhalation - Long term systemic effects: 159 mg/m³
 Consumer, Inhalation - Long term systemic effects: 44 mg/m³

PNEC

Fresh water: 248 mg/L
 Marine water: 22 mg/L
 Soil: 46 mg/kg

Name	STD	TWA-8 Hrs	STEL-15 Min
ADH Enzyme - Detoxifying Additive 2	WEL	9 mg/m ³	Not available

DNEL

No DNEL data available

PNEC

No PNEC data available

Name	STD	TWA-8 Hrs	STEL-15 Min
ADH Enzyme - Detoxifying Additive 3	WEL	1880 mg/m ³	Not available

DNEL

Industry, Inhalation - Short term local effects: 1820 mg/m³

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Industry, Inhalation - Long term systemic effects: 932 mg/m³
 Consumer, Inhalation - Short term local effects: 939 mg/m³
 Consumer, Dermal - Long term systemic effects: 197 mg/kg/day

PNEC

Fresh water: 0.89 mg/L
 Marine water: 0.77 mg/L

8.2 Exposure controls



Technical procedures

Engineering measures

Methods to prevent or control exposure are preferred. Such methods include process or personnel enclosure, mechanical ventilation and control of process conditions.

Respiratory equipment

If ventilation is inadequate, suitable respiratory protection must be worn.

Hand protection

Wear PVC gloves.

Eye protection

Wear approved chemical goggles or face shield.

Skin Protection

Wear rubber apron or protective clothing in case of contact.

Other Protection

Wear rubber footwear.

Environmental Exposure Controls

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance	Clear liquid
Colour	Colourless (unless dyed according to customer specification)
Odour	Non-pungent but characteristic aroma
Odour Threshold	Not applicable
pH	7.5 - 10.5 depending on inhibitor formulation
Melting point / Pour point	-40°C
Initial boiling point	>180°C
Flash point	>115°C (closed cup)
Evaporation Rate	Not determined
Flammability	Product is not classified as flammable
Flammability / explosion limits	Upper limit - 15% Lower limit - 3%
Vapour pressure	13 Pa @ 25°C
Vapour destiny (air = 1)	2.2
Relative density of the mixture	1.04 - 1.15
Solubility	Soluble in water
Partition coefficient: n-octanol / water	Not determined
Auto-ignition temperature	>400°C
Decomposition temperature	Not determined
Viscosity	See product data sheet

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Explosive properties
Oxidising properties

Not applicable - product is not classified as an explosive
Not applicable - product is not classified as an oxidising agent

9.2 Other information

Not determined.

Section 10: Stability and Reactivity

10.1 Reactivity

There are no known reactivity hazards associated with this product.

10.2 Chemical stability

Stable at normal ambient temperatures and when used as recommended.
Product is hygroscopic and will absorb water by contact with the moisture in the air.

10.3 Possibility of hazardous reactions

There are no known hazardous reactions associated with this product.

10.4 Conditions to avoid

Avoid temperatures $>180^{\circ}\text{C}$ for prolonged periods of time, flames and sources of ignition.

10.5 Incompatible materials

Avoid strong oxidising agents, strong acids and strong alkalis.

10.6 Hazardous decomposition products

In case of fire, toxic gases (such as CO and CO₂) may be formed.

Section 11: Toxicological Information

11.1 Information on toxicological effects

Acute toxicity	LD 50, Oral, Rat: $>15,000$ mg/kg bw
Skin corrosion/ irritation	Skin irritation is not expected when this product is used correctly.
Serious eye damage/ irritation	Eye irritation is not expected when this product is used correctly.
Respiratory/ skin sensitisation	Vapours may cause mild irritation of the respiratory system.
Germ cell mutagenicity	Product is not expected to be mutagenic.
Carcinogenicity	Product is not expected to be carcinogenic.
Reproductive toxicity	Product is not expected to damage the reproductive system or harm a developing fetus.
Evaluation of CMR properties	Not determined.
STOT-single exposure	Not determined.
STOT-repeated exposure	Not determined.
Aspiration hazard	Not determined.

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General Information

See Section 4 of this Safety Data Sheet.

Inhalation	Inhalation of vapours may cause mild irritation of the upper respiratory tract.
Ingestion	No specific symptoms noted.
Skin contact	Prolonged and repeated contact may cause mild irritation of the skin.
Eye contact	Direct eye contact may cause reddening of the eyes.
Health warnings	This product has low toxicity. Only very large volumes may have adverse impact on human health.

Section 12: Ecological Information

Ecotoxicity

The product is not expected to be hazardous to the environment.

12.1 Toxicity

LC50, 96 hours, Fish:	> 10,000 mg/L
EC50, 48 hours, Daphnia:	> 10,000 mg/L
IC50, 72 hours, Algae:	> 10,000 mg/L

12.2 Persistence and degradability

This product is readily biodegradable (90% over 10 days).

12.3 Bio-accumulate potential

Will not bio-accumulate.
Partition coefficient - not determined.

12.4 Mobility in soil

Product is mobile in soil as it is water soluble.

12.5 Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6 Other adverse effects

Not determined.

Section 13: Advice on Disposal

General information

Waste to be treated as controlled waste. Disposal to licensed waste disposal site in accordance with Local Waste Disposal Authority.

Disposal methods

Dispose of waste and residues in accordance with local authority and/or local sewage treatment plant requirements.

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Section 14: Transport information

14.1 UH Number

Product not hazardous for transport - no information required

14.2 UH proper shipping name

Product not hazardous for transport - no information required

14.3 Transport hazard class(es)

Product not hazardous for transport - no information required

Transport labels

Product not hazardous for transport - no information required

14.4 Packing group

Product not hazardous for transport - no information required

14.5 Environmental hazards

Product not classed as an environmentally hazardous substance or marine pollutant

14.6 Special precautions for user

Product not hazardous for transport - no information required

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

Product not hazardous for transport - no information required

Section 15: Regulatory Information

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

EU legislation

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 notes

CHIP for everyone HSG228. Approved Classification and Labelling Guide (Sixth edition) L131. Safety Data Sheets for substances and preparations.

15.2 Chemical Safety Assessment

A chemical safety assessment has been carried out. This product does not meet the criteria for human health environmental hazard classification. In addition, this product does not meet PBT/vPvB criteria. Therefore no exposure scenarios are required.

Section 16: Other Information

Issued by	Hydra Technologies Ltd
Revision Date	31/08/2015
Approved by	Stephen Hickson
Revision Comments	Review in line with CLP regulation

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Hazard statements in full

H302 - Harmful if swallowed
H373 - May cause damage to organs - Kidneys - through prolonged or repeated exposure if swallowed
H225 - Highly flammable liquid and vapour
H319 - Causes serious eye irritation

Further Classification and Composition Comments

Monoethylene glycol is classified as Acute Tox. 4 - H302 according to CLP (EC) No. 1272/2008. Here it should be noted that monoethylene glycol is in itself, not toxic. The toxicity classification for monoethylene glycol arises from the fact that upon its metabolism in the liver by the enzyme Alcohol Dehydrogenase (ADH), toxic carboxylic acids - glycolic acid and oxalic acid - are released and cause metabolic acidosis, cardiovascular dysfunction and ultimately kidney failure.

Hydra Technologies Ltd have developed a method of inhibiting the metabolism of monoethylene glycol in the liver by the addition of ADH Enzyme - Detoxifying Additives, thus preventing the release of the toxic metabolites - glycolic and oxalic acid - into the body. A test study by an EPA certified laboratory has determined that by the occurrence of synergistic and antagonistic effects, the addition of the ADH Enzyme - Detoxifying Additives to monoethylene glycol detoxifies it, resulting in a mixture with an LD50 (Oral, Rat) > 15,000 mg/kg bw.

CLP (EC) No. 1272/2008 states that enterprises should re-evaluate the classifications of substances or mixtures if they become aware of new adequate and reliable scientific or technical information that may affect those classifications. It is also stated that enterprises, where necessary, may describe the chemical identity of certain substances in such a way that does not negatively affect the confidential nature of their business. Taking these two statements into consideration, as well as that the REACH registered substances whose names have been changed to "ADH - Enzyme Detoxifying Additive 1, 2 and 3" in this Safety Data Sheet are not classified as hazardous to human health, or as an environmental hazard according to CLP (EC) No. 1272/2008 (or present in a large enough concentration as to affect the final classification of this product), we consider these identity changes to have no impact on the users of this product to ensure it is used safely and hence believe these changes of chemical identities are necessary in order to protect the intellectual property rights of Hydra Technologies Ltd.

(i) indication of changes

Section 3 updated to include the classification according to Regulation (EC) No 1272/2008 [CLP]

Section 8 updated to include appropriate exposure controls according to Regulation (EC) No 1272/2008 [CLP]

Section 9 updated to include the list of physical and chemical properties according to Regulation (EC) No 1272/2008 [CLP]

(ii) Abbreviations and acronyms

bw: bodyweight

CAS No: Chemical Abstracts Service number

CLP: Classification Labelling and Packaging Regulation

DNEL: Derived No-Effect Level

EC: European Commission

EC No: European Chemical number: EINECS, ELINCS or NLP

ECHA: European Chemicals Agency

EEC: European Economic Community

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

LC50: Lethal Concentration, 50%

LD50: Median Lethal Dose

PBT: Persistent, Bioaccumulative & Toxic

PNEC: Predicted No Effect Concentration

REACH: Registration, Evaluation, Authorisation & restrictions of Chemicals

SDS: Safety Data Sheet

vPvP: Very persistent, very bioaccumulative

WEL: Workplace Exposure Limit

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(iii) Training advice

Product should only be handled by trained operators.

(iv) Additional information

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.