MATERIAL SAFETY DATA SHEET
Tetrahydrofurfuryl alcohol

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

1.1 Product identifier

Product name	: tetrahydrofurfuryl alcohol
Index number	: 603-061-00-7
EC-number	: 202-625-6
CAS-number	: 97-99-4
Product description	: not available
Product type	: Liquid
Chemical name	: tetrahydrofurfuryl alcohol
Other means of identification	: Tetrahydro-2-furylmethanol, 2-Furanmethanol, Tetrahydro-2furanmethanol; Tetrahydro-2-furancarbinol, 2-Hydroxymethyltetrahydrofuran, THFA
Chemical formula	: $C_5H_{10}O_2$
Molecular mass	: 102.13 g/mol
Registration number	: 01-2119968921-26-0003

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

Identified uses:	: Formulation of agrochemicals, Professional use of agrochemicals, Formulation of resins and adhesive (industrial, professional use) Formulation of solvent based cleaners for electronic industry (industrial use) Synthetic intermediate, Use as laboratory agent.
Used advised against	: Consumer use. (potential risk to consumers has not been assessed.)

1.3 Details of the supplier of the safety data sheet

Importer	Demasa Trading BV
Address	Rotterdam Airportplein 7 3045 AP Rotterdam The Netherlands
Telephone number	+31 10 23 80 559
E-mail address of person responsible for this SDS	demasa@luna.nl

1.4 Emergency telephone number

Telephone number	Demasa Trading BV +31 10 23 80 559

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition: : Mono-constituent substance

Classification According to Regulation (EC) No.1272/2008 [CLP/GHS]

Eye Irrit. 2, H319
Repr. 1B, H360Df
See Section 16 for the full text of H statements declared above.
See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

According to Regulation (EC) No.1272/2008 [CLP/GHS]

Hazard pictogram(s)

Signal word	: Danger
Hazard statement(s)	: H319 Causes serious eye irritation : H360Df May damage the unborn child. Suspected of damaging fertility.

Precautionary statements

Prevention	: P201 Obtain special instructions before use. : P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response	: P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. : P337+P313 If eye irritation persists: Get medical advice/attention

: P308+P313 IF exposed or concerned: Get medical advice/attention
Storage : Not applicable.
Disposal : P501 Dispose of contents/container to a specialised waste disposal plant in accordance to local/regional regulations

Supplementary label elements: : Not applicable

2.3 Other hazards

Substance meets the criteria for PBT according to Regulation (EC)No; 1907/2006, Annex XIII : No

Substance meets the criteria for vPvB according to Regulation (EC)No; 1907/2006, Annex XIII : No

Other hazards which do no result in classification : Narcotic in high concentrations.

SECTION 3: Composition/information on ingredients

3.1. Substances

Product/ingredient name	Identifiers	%	Classification Regulation (EC) No. 1272/2008 CLP	Type
Tetrahydro-2-furylmethanol	EC N°.202-625-6 CAS-N°.97-99-4 Index: 603-061-00-7	<=100	Eye Irrit. 2, H319 Repr. 1B, H360Df See section 16 for the full text of the H statements declared above	[A]

There are no additional ingredients present which, within the current knowledge of the supplier, are classified and contribute to the classification of the substance and hence require reporting in this section.
Type:
[A] Constituent
[B] Impurity
[C] Stabilising additive

Occupational exposure limits, if available are listed in Section 8.

3.2. Mixtures

Not applicable.

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 15 minutes. Get medical attention.

Inhalation : Remove victim into fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to mouth resuscitation. Get medical attention if adverse health effects persists or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove denture if any. Remove victim to fresh air and keep at rest in a position conformable for breathing. If material has been swallowed an the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or

physician. Never five anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation
Inhalation : No known significant effects or critical hazards
Skin contact : No known significant effects or critical hazards.
Ingestion : Irritation to mouth, throat and stomach.

Over exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Prolonged exposure to vapor may cause central nervous system depression characterized by potential dizziness, drowsiness and nausea.

Skin contact : No specific data.

Ingestion : No specific data

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested of inhaled.

Specific treatment : No specific treatment.

SECTION 5: Fire fighting measures

5.1 Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.
Water, Water spray, Alcohol-resistant foam, powder, carbon dioxide.

Unsuitable extinguishing media : None known.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous combustion products : Decomposition products may include following materials:
carbon dioxide
carbon monoxide

5.3 Advice for firefighters

Special precautions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment fighters : Fire-fighters should wear appropriate protective equipment and self-contained for fire-breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not

touch or walk though spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in " For non-emergency personnel".

6.2 Environmental precautions : Avoid dispersal of spilt material and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air)

6.3 Methods and material for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively , or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release form upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an affluent treatment plant or proceed as follows: Contain and collect spillage with non combustible, absorbent materials e.g. sand, earth, vermiculite or a diatomaceaous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the split product. Note: see section 1 for emergency contact information and section 13 for waste disposal. Dilute with water and mop up if water-soluble. Alternatively , or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

6.4 Reference to other sections : See section 1 for emergency contact information.
: See section 8 for information on appropriate personal protective equipment.
See section 13 for additional waste treatment information.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. avoid breathing vapour or mist. Keep in the original container or an approved alternative made from a compatible materials, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container**.**

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

7.3 Specific end use(s)

Recommendations : See information supplied by the manufacturer.
Industrial sector specific solutions : See information supplied by the manufacturer.

SECTION 8: Exposure controls/ personal protection

8.1 Control parameters

Occupational exposure limits
No exposure limit known.
Recommended monitoring : Not applicable
Derived effect levels
DNEL - value workers: **DNEL** $_{\text{long term, systemic, inhalation}}$: 1.4mg/m^3

DNEL $_{\text{acute, systemic, inhalation}}$: 1.4mg/m³
DNEL $_{\text{long term, systemic, dermal}}$: 0.35mg/kg bw/day
DNEL $_{\text{acute, systemic, dermal}}$: 0.35mg/kg bw/day

PNEC - value:

PNEC $_{\text{aqua freshwater}}$**:** 1.9mg/L
PNEC $_{\text{aqua marine water}}$**:** 0.19mg/L
PNEC $_{\text{aqua intermittent releases}}$**:** 0.917mg/L
PNEC $_{\text{sediment freshwater}}$**:** 8.6mg/kg soil dw
PNEC $_{\text{sediment marinewater}}$: 0.86mg/kg soil dw
PNEC $_{\text{STP}}$**:** 10mg/L
PNEC $_{\text{soil}}$**:** 0.6mg/kg soil dw

8.2 Exposure controls

Appropriate engineering controls exposure : Good general ventilation/local exhaust ventilation should be sufficient to protect worker to airborne contaminants

Individual protection measures

Hygiene measures: **:** Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety shower are close to the workstation locations.

Eye/face protection **:** Safety eyewear complying with and approved standard (EN 166) should be used to avoid exposure to liquid splashes, mists, gases or dusts.
Recommended: face shield (EN 166).

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with the approved standard (EN 374) should be worn at all times when handling chemical products
Recommended:
butyl rubber, break through time > 480min, 0,7mm (EN 374)
neoprene, break through time > 480 min, 0,4 mm (EN 374)
PE/EVOH (eg Silver shield) , break through time > 720 min (EN 374)
(eg Silver shield®, North Safety product)

Body protection : Wear suitable protective clothing to prevent skin exposure.

Respiratory protection : If insufficient ventilation: use respiratory protection complying with an approved standard or if a risk assessment indicates this is necessary. Mask selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Recommended: face mask with organic vapour filter (type A) (EN 14387)

Environmental exposure **:** Emission from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state:	Liquid
Colour:	Colourless
Odour:	Pleasant
Odour Threshold	Not available.
pH value	5-6 [Conc. (% w/w): 25%)
Melting point/freezing point	< -120°C
Initial boiling point and boiling range	177,7°C
Flashpoint ~~(open cup)~~ (closed cup)	73°C
Evaporation rate	0.04 (butyl acetate=1)
Flammability (solid/gas)	Not available
Burning time	Not applicable
Burning rate	Not applicable
Upper/lower flammability or explosive limits	Lower: 1.5% Upper: 9.7%
Vapour pressure	186Pa (25°C)
Relative density	1,05 at 20°C
Solubility(ies)	Easily soluble in the following materials: cold water, hot water and acetone. Water solubility >250g/l at 20°C.

Partition coefficient n-octanol/water	-0.14 at 24.7°C
Auto-ignition temperature	282°C at 1013hPa
Decomposition temperature	Not available
Viscosity(at 20°C)	6.24mPas at 20°C
Explosive properties	Not explosive.
Oxidising properties	Not oxidising

9.2 Other information

Surface Tension Not active

SECTION 10: Stability and reactivity

10.1 Reactivity : No specific test data related to reactivity is available for this product of its ingredients

10.2 Chemical stability : The product is stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid : Keep away from heat, sparks, flame or other sources of ignition. Hygroscopic**.**

10.5 Incompatible materials : Reactive or incompatible with the following materials: oxidizing materials, reducing materials, acids and moisture. Strong acids, strong bases.

10.6 Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 (oral, rat) (mg/kg)	: >2000
LD50 (dermal, rat) (mg/kg)	: not available
LC50 (inhalation, rat, 4 hrs) (mg/l)	: >751ppm (> 3.1mg/L) (vapour)
Skin corrosion/irritation	: No adverse effect observed (Not irritating)
Serious eye damage/irritation	: Adverse effect observed (irritating)
Respiratory or skin sensitization	:No adverse effect observed (Not sensitizing)
Germ cell mutagenicity	:.No adverse effect observed (negative) (in vitro)
Carcinogenicity	: No information available
Reproductive toxicity	: Suspected of damaging fertility or the unborn child for reproductive toxicity. Specific effect: Males: lower prostate, epididymal and testes weights, necrosis of the seminiferous tubular epithelium and lower sperm production. Females: prolonged oestrus cycle and gestation length. Foetal resorption or mummification and dead pups on PND 1. Route of exposure: Oral NOAEL $_{\text{oral, fertility}}$ 50mg/kg bw/day NOAEL $_{\text{dermal, fertility}}$ 100mg/kg bw/day NOAEC $_{\text{inhalation, fertility}}$ 200mg/m³/day NOAEL $_{\text{oral, development}}$ 50mg/kg bw/day
STOT single exposure	: No information available
STOT- repeated exposure	: No other significant adverse effects observed besides the observed effects on testes that are considered as likely to impair reproductive toxicity. No separate classification need for STOT RE. NOAEL $_{\text{oral, systemic}}$ 100mg/kg bw/day, subchronic, rat NOAEL $_{\text{dermal, systemic}}$ 35mg/kg bw/day, subchronic, rat LOAEC $_{\text{inhalation, systemic}}$ 209mg/m³,50 ppm, subschronic, rat
Aspiration hazard	: No information available
Information on likely routes of exposure:	: Routes of entry anticipated: Oral, Dermal, Inhalation

Potential acute health effects:

Inhalation	: No known significant effects or critical hazards
Ingestion	: Irritating to mouth, throat and stomach
Skin contact	: No known significant effects of critical hazards
Eye contact	: Causes serious eye irritation

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation	: Prolonged exposure to vapor may cause central nervous system depression characterized by potential dizziness, drowsiness and nausea.

Ingestion : No specific data.
Skin contact : No specific data.
Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure
Potential immediate effects : Not available
Potential delayed effects : Not available

Long term exposure
Potential immediate effects : Not available
Potential delayed effects : Not available

Potential chronic health effects
Suspected of damaging fertility or the unborn child

Conclusion/summary : Not available
General : Causes serious eye irritation and suspected of damaging fertility or the unborn child
Carcinogenicity : No known significant effects or critical hazards
Mutagenicity : No known significant effects or critical hazards
Teratogenicity : Suspected of damaging the unborn child
Developmental effects : Suspected of damaging the unborn child
Fertility : Suspected of damaging fertility
Other information : Not available

SECTION 12: Ecological Information

12.1 Toxicity

LC_{50} (Oryzias latipes) (mg/l) : >101
EC_{50} (Daphnia Magna, 48 hours) (mg/l) : >91.7
EC_{50} (Pseudokirchnerella subcaptitata 72 hours static) (mg/l) : >98.9
NOAEC(Daphnia Magna) (mg/l) : >95.1
NOAEC (Pseudokirchnerella subcaptitata 72 hours static) (mg/l) : >98.9

12.2 Persistence and degradability

Abiotic degradation : Hydrolysis (THFA) >1year at pH 4,7 and 9 and 50°C
Biotic degradation : 92% biodegradation (28d)
Phototransformation in air: $DT_{(50)}$: 0.7 days
Biodegradation: : Readily biodegradable in water.

12.3 Bioaccumulative potential

Aquatic bioaccumulation : Log Kow <3, low potential for bioaccumulation
Partition coefficient n-octanol/water:
: log Kow: -0.14 (24.7°C)

12.4 Mobility in soil

Surface tension : Not surface active
Log (Koc) : 1.0.
Adsorption/desorption : low potential for adsorption

12.5 Results of PBT and vPvB assessment

PBT : No
P: No, B:No, T: Yes
vPvB : No
vP: No, vB: No

12.6 Other adverse effects: : No known significant effects or critical hazards

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Substance

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental and waste disposal legislation and any regional local authority requirements.

Hazardous waste : Yes
: Waste material code (Flanders): 015, 034
: KCA (The Netherlands): category 03

European waste catalogue (EWC)

Waste code	Waste designation
07 01 04*	Other organic solvents, washing liquids and mother liquors

Packaging

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

European waste catalogue (EWC)

Waste code	Waste designation
15 01 10*	Packaging containing residues of or contaminated dangerous substances

Special precautions : This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners my retain some products residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

Not classified as dangerous in the meaning of transport regulations.

14.1 UN Number : Not regulated

14.2 UN proper shipping name : -

14.3 Transport hazard class(es) : -

14.4 Packing group : -

14.5 Environmental hazards : No

14.6 Specials precautions for user : None

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code
Not relevant.

SECTION 15: Regulatory information

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

EU Regulation (EC) No. 1907/2006 (REACH)
Annex XIV - List of substances subject to authorisation
Substances of very high concern
None of the components are listed
Annex XVII- restrictions on the manufacture, placing on the market, and use of certain dangerous substances, mixtures and articles
: Point 3 applicable
Other EU regulations:
Europe inventory: listed
International regulations:
Chemical weapons Convention List Schedule I Chemicals Not listed
Chemical weapons Convention List Schedule II Chemicals Not listed

Chemical weapons Convention List Schedule III Chemicals Not listed

15.2 Chemical safety assessment

A chemical safety assessment has been performed for the substance.

SECTION 16: Other information

Changes to the previous version:

Inclusion of Reach Registration number.

Indicates information that has changed from previously issued version.

Abbreviations and acronyms: CLP = Classification, Labelling and packaging Regulation [Regulation EC) No 1272/2008]
: DNEL = Derived No Effect Level
: PNEC = Predicted No Effect Concentration

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
Repr. 1B, H360Df	Regulatory Data
Eye Irrit. 2, H319	Regulatory Data

Full text of abbreviated H Statements : H319 Causes serious eye irritation
: H360Df May damage the unborn child. Suspected of damaging fertility.

Full text of classifications [CLP/GHS]

: Eye Irrit., H319	SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2
: Repr. 1B, H360Df	REPRODUCTIVE TOXICITY Category1B

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