1. IDENTIFICATION

Product Name	**HDDA - ETERMER 221/221-TF**
Other Names	2-Propenoic acid, 1,6-hexanediyl ester; EM221; EM221-TF
Uses	UV coatings; Inks; Adhesives; Photoresists.
Chemical Family	No Data Available
Chemical Formula	C12H18O4
Chemical Name	1,6-Hexanediol diacrylate
Product Description	Contains Inhibitor (MEHQ): 100 - 250 ppm.

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Ltd	11 Mayo Road Wiri Auckland 2104 New Zealand	+64-9-2506222
Redox Inc.	3960 Paramount Boulevard Suite 107 Lakewood CA 90712 USA	+1-424-675-3200
Redox Chemicals Sdn Bhd	Level 2, No. 8, Jalan Sapir 33/7 Seksyen 33, Shah Alam Premier Industrial Park 40400 Shah Alam Sengalor, Malaysia	+60-3-5614-2111

Emergency Contact Details

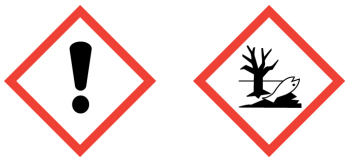
For emergencies only; DO NOT contact these companies for general product advice.

Organisation	Location	Telephone
Poisons Information Centre	Westmead NSW	1800-251525 131126
Chemcall	Australia	1800-127406 +64-4-9179888
Chemcall	Malaysia	+64-4-9179888
Chemcall	New Zealand	0800-243622 +64-4-9179888
National Poisons Centre	New Zealand	0800-764766
CHEMTREC	USA & Canada	1-800-424-9300 CN723420 +1-703-527-3887

2. HAZARD IDENTIFICATION

Poisons Schedule (Aust)	Not Scheduled

Globally Harmonised System

Hazard Classification		Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)	
Hazard Categories		Skin Corrosion/Irritation - Category 2	
		Serious Eye Damage/Irritation - Category 2A	
		Sensitisation (Skin) - Category 1	
		Acute Hazard To The Aquatic Environment - Category 1	
		Long-term Hazard To The Aquatic Environment - Category 1	
Pictograms			
Signal Word		Warning	
Hazard Statements		**H315**	Causes skin irritation.
		H317	May cause an allergic skin reaction.
		H319	Causes serious eye irritation.
		H410	Very toxic to aquatic life with long lasting effects.
Precautionary Statements	Prevention	**P280**	Wear protective gloves/eye protection/face protection.
		P261	Avoid breathing mist/vapours/spray.
		P272	Contaminated work clothing should not be allowed out of the workplace.
		P273	Avoid release to the environment.
	Response	**P302 + P352**	IF ON SKIN: Wash with plenty of water.
		P337 + P313	If eye irritation persists: Get medical advice.
		P333 + P313	If skin irritation or rash occurs: Get medical advice.
		P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
		P391	Collect spillage.
		P362 + P364	Take off contaminated clothing and wash it before reuse.
	Disposal	**P501**	Dispose of contents/container in accordance with local / regional / national / international regulations.

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

HSNO Classifications	Health Hazards	**6.3A**	Substances that are irritating to the skin
		6.4A	Substances that are irritating to the eye
		6.5B	Substances that are contact sensitisers
	Environmental Hazards	**9.1A**	Substances that are very ecotoxic in the aquatic environment

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
1,6-Hexanediol diacrylate	C12H18O4	13048-33-4	<=100 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed	IF SWALLOWED: Rinse mouth, then drink a glass of (lukewarm) water. Do not induce vomiting. Get immediate medical attention if a large quantity is swallowed or if you feel unwell. Never give anything by mouth to an unconscious person.
Eye	IF IN EYES: Immediately flush eyes with running water for several minutes, holding eyelids open and occasionally lifting the upper and lower lids. Remove contact lenses if present and easy to do. Continue rinsing for at least 15 minutes. If eye irritation persists, get medical attention.
Skin	IF ON SKIN: Remove and isolate contaminated clothing and shoes. Immediately wash skin with mild soap and water and flush with lukewarm water for at least 15 minutes. If skin irritation or rash occurs, get medical advice/attention. Wash contaminated clothing and shoes before reuse.
Inhaled	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms, get immediate medical attention. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult.
Advice to Doctor	Skin sensitization hazard. Chemical burn with long-term contact. Prompt action is essential! *Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Medical Conditions Aggravated by Exposure	May cause an allergic skin reaction.

5. FIRE FIGHTING MEASURES

General Measures	If safe to do so, move undamaged containers from fire area. Cool containers with water spray until well after fire is out. Avoid getting water inside containers.
Flammability Conditions	Combustible liquid; may burn but does not ignite readily.
Extinguishing Media	Use dry chemical, Carbon dioxide (CO2), foam or water spray for extinction - Do not use water jets.
Fire and Explosion Hazard	Containers may explode when heated. High temperatures, inhibitor depletion, accidental impurities, or exposure to radiation or oxidisers may cause spontaneous polymerising reaction, generating heat/pressure. Closed containers may rupture or explode during runaway polymerization.
Hazardous Products of Combustion	Fire may produce irritating and/or toxic gases, including Carbon monoxide, Carbon dioxide, acrid smoke.
Special Fire Fighting Instructions	Contain runoff from fire control water - Runoff may cause pollution.
Personal Protective Equipment	Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.
Flash Point	>110 °C [Closed cup]
Lower Explosion Limit	No Data Available
Upper Explosion Limit	No Data Available
Auto Ignition Temperature	235 °C
Hazchem Code	No Data Available

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Ensure adequate ventilation. ELIMINATE all ignition sources (no smoking, flares, sparks or flames). Do not touch or walk through spilled material. Avoid breathing vapours and contact with eyes, skin and clothing.
Clean Up Procedures	Pick up with sand or other non-combustible absorbent material and place into containers for later disposal (see SECTION 13).
Containment	Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. Dike far ahead of liquid spill for later disposal.
Decontamination	No information available.
Environmental Precautionary Measures	Spillages and decontamination runoff should be prevented from entering drains and watercourses.
Evacuation Criteria	Spill or leak area should be isolated immediately. Keep unauthorised personnel away. Stay upwind and/or uphill.
Personal Precautionary Measures	Use personal protective equipment as required (see SECTION 8).

7. HANDLING AND STORAGE

Handling	Safety showers and eyewash facilities should be provided within the immediate work area for emergency use. Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Avoid breathing mist/vapours and contact with eyes, skin and clothing. Use personal protective equipment as required (see SECTION 8). Keep away from heat and sources of ignition - No smoking. Avoid release to the environment - Collect spillage (see SECTION 6). *If material freezes, heat and mix to redistribute the inhibitor; Product may also be heated to facilitate handling. Heat product container slowly to 40 °C for not more than 24 hours. Convection ovens or warm water bath (preferred due to more efficient heat transfer) are recommended for heating - Do not use localised heat sources (e.g. drum or band heaters). An air space, preferably an air bubble flow, should be provided for at all times during heating.
Storage	Store drums in a cool (above 10 °C and below 32 °C), dry and well-ventilated place. Protect from direct sunlight/UV radiation. Prevent material from freezing (inhibitor can separate from product as a solid). Keep away from heat and sources of ignition - No smoking. Keep away from incompatible materials and other initiators (see SECTION 10). Use product within six months of receipt for optimum results. - Bulk storage temperature range: 15 - 27 °C
Container	Keep only in the original container. *This product is inhibited to prevent uncontrolled polymerisation. A polymerisation reaction can generate heat and pressure and may cause product container to rupture. Check inhibitor content often and add inhibitor to bulk liquid if needed. Maintain head space in storage containers to support oxygen requirements of the inhibitor(s). Do not blanket or mix with oxygen free (inert) gas.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	No specific exposure standards are available for this product.
Exposure Limits	No Data Available
Biological Limits	No information available.
Engineering Measures	A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Using local exhaust ventilation and closed processing system for mass production. *Use explosion-proof electrical/ventilating/lighting equipment.
Personal Protection Equipment	- Respiratory protection: Wear respiratory protection if handling this material at elevated temperatures or under mist forming conditions. Recommended: Organic vapour/particulate respirator (refer to AS/NZS 1715 & 1716). - Eye/face protection: Wear appropriate eye protection to avoid eye contact. Recommended: Eye protection, such as chemical splash goggles and/or face shield must be worn when possibility exists for eye contact due to splashing or

	spraying liquid, airborne particles or vapour. Contact lenses should not be worn. - Hand protection: Wear protective gloves. Recommended: Do not use natural rubber gloves! For products without solvents added, wear nitrile gloves. For products used with solvents, wear thick (>0.5 mm) nitrile gloves. Replace gloves immediately when torn or any change in appearance (dimension, colour, flexibility, etc) is noticed. - Skin/body protection: Wear appropriate personal protective clothing to avoid skin contact. Recommended: Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn. This equipment should be cleaned thoroughly after each use.
Special Hazards Precaustions	No information available.
Work Hygienic Practices	Do not eat, drink or smoke when using this product. Wash thoroughly after handling and before eating, drinking, smoking or using toilet facilities. Take off contaminated clothing and wash it before reuse. Contaminated work clothing should not be allowed out of the workplace.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Liquid
Odour	Mild, musty
Colour	Clean & clear
pH	6.8 - 7.2
Vapour Pressure	No Data Available
Relative Vapour Density	>1.0 Air = 1
Boiling Point	290 - 310 °C
Melting Point	No Data Available
Freezing Point	No Data Available
Solubility	Insoluble in Water
Specific Gravity	No Data Available
Flash Point	>110 °C [Closed cup]
Auto Ignition Temp	235 °C
Evaporation Rate	No Data Available
Bulk Density	No Data Available
Corrosion Rate	No Data Available
Decomposition Temperature	No Data Available
Density	1.01 - 1.03 g/cm3
Specific Heat	No Data Available
Molecular Weight	No Data Available
Net Propellant Weight	No Data Available
Octanol Water Coefficient	No Data Available
Particle Size	No Data Available
Partition Coefficient	No Data Available
Saturated Vapour Concentration	No Data Available
Vapour Temperature	No Data Available
Viscosity	No Data Available
Volatile Percent	No Data Available
VOC Volume	No Data Available
Additional Characteristics	No information available.
Potential for Dust Explosion	Not applicable.

Fast or Intensely Burning Characteristics	No information available.
Flame Propagation or Burning Rate of Solid Materials	No information available.
Non-Flammables That Could Contribute Unusual Hazards to a Fire	No information available.
Properties That May Initiate or Contribute to Fire Intensity	Combustible liquid; may burn but does not ignite readily.
Reactions That Release Gases or Vapours	Fire/decomposition may produce irritating and/or toxic gases, including Carbon monoxide, Carbon dioxide, acrid smoke.
Release of Invisible Flammable Vapours and Gases	No information available.

10. STABILITY AND REACTIVITY

General Information	This product is inhibited to prevent uncontrolled polymerisation.
Chemical Stability	Stable on normal condition.
Conditions to Avoid	Avoid high temperatures, localised heating and sources of ignition. Protect from direct sunlight/UV radiation. Prevent material from freezing. Avoid oxidising conditions and inert gas blanketing.
Materials to Avoid	Incompatible/reactive with strong oxidisers, strong reducers, free radical initiators, inert gases, oxygen scavengers.
Hazardous Decomposition Products	Fire/decomposition may produce irritating and/or toxic gases, including Carbon monoxide, Carbon dioxide, acrid smoke.
Hazardous Polymerisation	High temperatures, inhibitor depletion, accidental impurities, or exposure to radiation or oxidisers may cause spontaneous (runaway) polymerising reaction, generating heat/pressure.

11. TOXICOLOGICAL INFORMATION

General Information

- Acute toxicity: May be harmful if swallowed. Although no appropriate human or animal health effects data are known to exist, this material is expected to be a slight ingestion hazard.
- Skin corrosion/irritation: Causes skin irritation. Although no appropriate human or animal health effects data are known to exist, this material is expected to be a skin irritant. Symptoms may include localised redness or rash and swelling of the affected area. Symptoms may be delayed. A more severe skin response may occur after prolonged contact with this material.
- Eye damage/irritation: Causes serious eye irritation. Although no appropriate human or animal health effects data are known to exist, this material is expected to cause eye irritation with symptoms including burning sensation, tearing, redness or swelling.
- Respiratory/skin sensitisation: May cause an allergic skin reaction. Although no appropriate human or animal health effects data is known to exist, this material may cause an allergic skin reaction (sensitisation) in susceptible individuals upon repeated exposure.
- Germ cell mutagenicity: No information available.
- Carcinogenicity: No information available.
- Reproductive toxicity: No information available.
- STOT (single exposure): No significant signs or symptoms indicative of any adverse health hazard are expected to occur at standard conditions due to the low volatility of this material; However, aerosols or vapours which may be generated at elevated processing temperatures, may cause respiratory tract irritation, coughing, mucous production and shortness of breath.
- STOT (repeated exposure): No information available.
- Aspiration toxicity: No information available.

Acute

Ingestion

Acute toxicity (Oral):
- LD50, Rat: 3,600 mg/kg [Supplier's SDS].

Carcinogen Category	None

12. ECOLOGICAL INFORMATION

Ecotoxicity	Aquatic toxicity: - LC50, Fish: 0.87 mg/l (96 h) [Supplier's SDS].
Persistence/Degradability	HDDA is quite stable in water as it hydrolyses very slowly; However, it is inherently biodegradable. This substance is not considered to be persistent and bioaccumulative.
Mobility	It can be assumed that HDDA is biodegradable in soil and thus can be considered as non-persisting in soil.
Environmental Fate	Very toxic to aquatic life with long lasting effects - Avoid release to the environment.
Bioaccumulation Potential	Accumulation in organisms is not to be expected.
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	Dispose of residues and spilled material as hazardous waste due to potential for internal heat generation. Disposal must be in accordance with applicable federal, state or local regulations.
Special Precautions for Land Fill	Since the emptied containers retain product residue, follow label warnings even after container is emptied. The container for this product can present explosion or fire hazards, even when emptied. To avoid risk of injury, do not cut, puncture, or weld on or near this container.

14. TRANSPORT INFORMATION

Land Transport (Australia)

ADG Code

Proper Shipping Name	HDDA - ETERMER 221/221-TF
Class	C2 Combustible Liquids - Flash Point >93°C, Closed Cup, Not Excluded Flammable
Subsidiary Risk(s)	No Data Available
EPG	47 Low To Moderate Hazard Substances
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	AU01
Comments	Not regulated as DG when transported by road or rail in packagings that do not incorporate a receptacle exceeding 500 kg(L) or IBCs.

Land Transport (Malaysia)

ADR Code

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,6-Hexanediol diacrylate)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
EPG	47 Low To Moderate Hazard Substances

UN Number	3082
Hazchem	•3Z
Pack Group	III
Special Provision	No Data Available

Land Transport (New Zealand)
NZS5433

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,6-Hexanediol diacrylate)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
EPG	47 Low To Moderate Hazard Substances
UN Number	3082
Hazchem	•3Z
Pack Group	III
Special Provision	No Data Available

Land Transport (United States of America)
US DOT

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,6-Hexanediol diacrylate)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
ERG	171 Substances (Low to Moderate Hazard)
UN Number	3082
Hazchem	•3Z
Pack Group	III
Special Provision	No Data Available

Sea Transport
IMDG Code

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,6-Hexanediol diacrylate)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
UN Number	3082
Hazchem	•3Z
Pack Group	III
Special Provision	No Data Available
EMS	F-A, S-F
Marine Pollutant	Yes

Air Transport
IATA DGR

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,6-Hexanediol diacrylate)
Class	9 Miscellaneous Dangerous Goods and Articles
Subsidiary Risk(s)	No Data Available
UN Number	3082
Hazchem	•3Z
Pack Group	III
Special Provision	No Data Available

National Transport Commission (Australia)
Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	NOT Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

15. REGULATORY INFORMATION

General Information	No Data Available
Poisons Schedule (Aust)	Not Scheduled

Environmental Protection Authority (New Zealand)
Hazardous Substances and New Organisms Amendment Act 2015

Approval Code	HSR002503 HSR003631 (Revoked)

National/Regional Inventories

Australia (AIIC)	Listed
Canada (DSL)	Not Determined
Canada (NDSL)	Not Determined
China (IECSC)	Not Determined
Europe (EINECS)	Not Determined
Europe (REACh)	Not Determined
Japan (ENCS/METI)	Not Determined
Korea (KECI)	Not Determined
Malaysia (EHS Register)	Not Determined
New Zealand (NZIoC)	Listed
Philippines (PICCS)	Not Determined
Switzerland (Giftliste 1)	Not Determined
Switzerland (Inventory of Notified Substances)	Not Determined
Taiwan (NCSR)	Not Determined
USA (TSCA)	Not Determined

16. OTHER INFORMATION

Related Product Codes	MONOMB1000, MONOMB1001, MONOMB1010, MONOMB2000
Revision	4
Revision Date	26 Apr 2021
Key/Legend	< Less Than > Greater Than **AICS** Australian Inventory of Chemical Substances **atm** Atmosphere **CAS** Chemical Abstracts Service (Registry Number) **cm^2** Square Centimetres **CO2** Carbon Dioxide **COD** Chemical Oxygen Demand **deg C (°C)** Degrees Celcius **EPA (New Zealand)** Environmental Protection Authority of New Zealand **deg F (°F)** Degrees Farenheit **g** Grams **g/cm^3** Grams per Cubic Centimetre **g/l** Grams per Litre **HSNO** Hazardous Substance and New Organism **IDLH** Immediately Dangerous to Life and Health **immiscible** Liquids are insoluable in each other. **inHg** Inch of Mercury **inH2O** Inch of Water **K** Kelvin **kg** Kilogram **kg/m^3** Kilograms per Cubic Metre **lb** Pound **LC50** LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours. **LD50** LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals. **ltr** or **L** Litre **m^3** Cubic Metre **mbar** Millibar **mg** Milligram **mg/24H** Milligrams per 24 Hours **mg/kg** Milligrams per Kilogram **mg/m^3** Milligrams per Cubic Metre **Misc** or **Miscible** Liquids form one homogeneous liquid phase regardless of the amount of either component present. **mm** Millimetre **mmH2O** Millimetres of Water **mPa.s** Millipascals per Second **N/A** Not Applicable **NIOSH** National Institute for Occupational Safety and Health **NOHSC** National Occupational Heath and Safety Commission **OECD** Organisation for Economic Co-operation and Development **Oz** Ounce **PEL** Permissible Exposure Limit **Pa** Pascal **ppb** Parts per Billion **ppm** Parts per Million **ppm/2h** Parts per Million per 2 Hours **ppm/6h** Parts per Million per 6 Hours **psi** Pounds per Square Inch **R** Rankine **RCP** Reciprocal Calculation Procedure **STEL** Short Term Exposure Limit **TLV** Threshold Limit Value **tne** Tonne **TWA** Time Weighted Average **ug/24H** Micrograms per 24 Hours **UN** United Nations **wt** Weight