Material Safety Data Sheet

1 . Identification of the material and supplier

Product name : ARADUR® 249-1 CI

ARADUR® is a registered trademark of Huntsman Corporation or an affiliate thereof in one or more countries, but not all countries.

Other names : Not available.

Proper shipping name : ISOPHORONEDIAMINE

Recommended use : Hardener for coating systems

Supplier name and address : Huntsman Advanced Materials (Australia) Pty Ltd
ACN:09162879
Gate 3, 765 Ballarat Road
Deer Park Victoria 3023
Australia

Telephone : +613 9933 6691 (Customer Service: Huntsman Advanced Materials)
1300 366 819 (Toll-free - Australia only)
0800 441 216 (Toll-free- New Zealand only)

e-mail address for MSDS information : Global_Product_EHS_AdMat@huntsman.com

Emergency telephone number : **Australia: 1800 786 152 (ALL HOURS)**
International: +65 6336 6011 (ALL HOURS)

2 . Hazards identification

Hazard classification : HAZARDOUS SUBSTANCE. DANGEROUS GOODS.

This material is classified as hazardous according to Australian criteria.

Classified as Dangerous Goods for the purpose of transport by road, rail, sea or air. Refer to relevant regulations for storage and transport requirements.

Class : Class 8: Corrosive material

Risk phrase(s) : R21/22- Harmful in contact with skin and if swallowed.
R34- Causes burns.
R43- May cause sensitisation by skin contact.
R52/53- Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

2 . Hazards identification

Safety phrase(s) : S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Poison schedule (Australia) : S5

3 . Composition/information on ingredients

Physical state : Liquid.

Colour / Appearance : Light yellow

Ingredient name	CAS number	Concentration (%)
isophorone diamine	2855-13-2	>60
benzyl alcohol	100-51-6	10 - <30
JEFFAMINE D 400		< 10
trimethylhexamethylenediamine	25620-58-0	< 10
Other ingredients determined not to be hazardous	-	to 100

4 . First-aid measures

Ingestion
Get medical attention immediately. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and 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. Chemical burns must be treated promptly by a physician. Never give 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.

Eye contact
Get medical attention immediately. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

Skin contact
Get medical attention immediately. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Inhalation

4 . First-aid measures

Get medical attention immediately. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. 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. 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. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Medical Attention and Special Treatment
In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

If poisoning occurs, contact a doctor or Poisons Information Centre. Phone Australia 13 1126; New Zealand 0800 764 766.

5 . Fire-fighting measures

Extinguishing media
Use an extinguishing agent suitable for the surrounding fire.

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

Special protective equipment for fire-fighters
Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

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. This material is harmful to aquatic organisms. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

In a fire or if heated, a pressure increase will occur and the container may burst.

Hazchem code : 2X

6 . Accidental release measures

Emergency procedures

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 through spilt material. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

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

Methods and materials for containment and clean-up procedures

Large spill

Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous 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 spilt product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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.

7 . Handling and storage

Precautions for safe handling

Put on appropriate personal protective equipment (see Section 8). 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. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapour or mist. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Precautions for safe storage

Store between the following temperatures: 2 to 40°C (35.6 to 104°F). 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.

This material is a Scheduled Poison S5 and must be stored, maintained and used in accordance with the relevant regulations.

8 . Exposure controls/personal protection

National exposure standards
No value assigned to this material by the Australian regulatory authority.

Biolgical limit values
No biological limit allocated.

Engineering controls
If user operations generate dust, fumes, gas, vapour or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
If cured material made from this product is to be cut or sanded, ensure that dust is kept below the Australian Exposure Standard for inspirable dusts (10mg/m3) or the ACGIH Exposure Standard for respirable dusts (3mg/m3).

Personal protective equipment

Eyes
Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Refer to Australian/New Zealand Standard AS/NZS 1337:1992 for guidance on selection and use of protective eyeware.

Hands
Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. > 8 hours (breakthrough time): Ethyl Vinyl Alcohol Laminate (EVAL), butyl rubber

Refer to Australian/New Zealand Standard AS/NZS 2161.1: 2000 for guidance on selection and use of protective gloves.

Respiratory
Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Refer to Australian/New Zealand Standard AS/NZS 1715 and AS/NZS 1716 for guidance on selection and use of respiratory devices.

Skin
Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

9 . Physical and chemical properties

Physical state : Liquid.
Colour / Appearance : Light yellow
Odour : Amine-like.
Solubility : Almost insoluble in water

Density	: 0.95 to 1 g/cm³ [25°C]	**Vapour density**	: Not available.
Specific gravity	: Not available.	**Vapour pressure**	: 0.004 kPa (0.03 mm Hg) [room temperature]
Boiling point	: >200°C	**Flash point**	: Closed cup: 115°C [DIN 51758 EN 22719 (Pensky-Martens Closed Cup)]
Melting point	: Not available.	**Flammable limits**	: Not available.
Viscosity	: Dynamic (room temperature): 50 to 80 mPa·s 25 deg C	**Auto-ignition temperature**	: Not available.
pH	: 11 [Conc. (% w/w): 50%]		

(Typical values only - consult specification sheet)

10 . Stability and reactivity

Chemical stability : The product is stable.
Conditions to avoid : No specific data.
Materials to avoid : Reactive or incompatible with the following materials: oxidizing materials. strong acids, strong bases, strong oxidising agents
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous Reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11 . Toxicological information

Potential acute health effects

Ingestion : Harmful if swallowed. May cause burns to mouth, throat and stomach.
Skin contact : Corrosive to the skin. Causes burns. Harmful in contact with skin. May cause sensitisation by skin contact.
Eye contact : Corrosive to eyes. Causes burns.
Inhalation : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Acute toxicity

11 . Toxicological information

Product/ingredient name	Exposure	Species	Dose	Result
isophorone diamine	LD50 Oral	Rat - Male	1030 mg/kg	-
benzyl alcohol	LD50 Oral	Rat - Male	1620 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat - Male, Female	>4178 mg/m³	4 hours
JEFFAMINE D 400	LD50 Dermal	Rabbit - Male, Female	1555 mg/kg	-
	LD50 Oral	Rat	1100 mg/kg	-
ARADUR 249-1 CI	LD50 Oral	Rat	1100 mg/kg	-

Potential chronic health effects

Chronic toxicity

Product/ingredient name	Result	Species	Dose	Exposure
isophorone diamine	Sub-chronic NOAEL Oral	Rat - Male, Female	60 mg/kg	13 weeks; 24 hours per day
benzyl alcohol	Sub-chronic NOAEL Oral	Rat - Male, Female	400 mg/kg	13 weeks; 5 days per week
	Sub-chronic NOEC Inhalation Dusts and mists	Rat - Male, Female	1072 mg/m³	4 weeks; 6 hours per day
JEFFAMINE D 400	Sub-acute NOAEL Dermal	Rat - Male, Female	1000 mg/kg/d	28 days
	Sub-chronic NOAEL Dermal	Rat - Male, Female	300 mg/kg/d	90 days

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
benzyl alcohol	Negative - Oral - NOAEL	Rat - Male, Female	400 mg/kg	103 weeks; 5 days per week

Mutagenicity

Product/ingredient name	Test	Experiment	Result
benzyl alcohol	OECD 474 Mammalian Erythrocyte Micronucleus Test	Experiment: In vivo Subject: Mammalian-Animal	Negative
JEFFAMINE D 400	OECD 476 In vitro Mammalian Cell Gene Mutation Test	Experiment: In vitro Subject: Mammalian-Animal Cell: Somatic Metabolic activation: +/-	Negative

Teratogenicity

Product/ingredient name	Result	Species	Dose	Exposure
isophorone diamine	Negative - Oral	Rat - Female	>250 mg/kg NOAEL	15 days; 7 days per week
benzyl alcohol	Negative - Oral	Mouse - Female	550 mg/kg NOAEL	10 days; 7 days per week
trimethylhexamethylenediamine	Negative - Oral	Rabbit - Female	>250000 ppm NOAEL	13 days; 7 days per week

11 . Toxicological information

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Developmental toxin	Species	Dose	Exposure
trimethylhexamethylenediamine	Negative	Negative	Negative	Rat - Male, Female	Oral: 10 mg/kg NOAEL	2 years; 7 days per week

Chronic effects : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Inhalation : No specific data.

Ingestion : Adverse symptoms may include the following:
stomach pains

Skin : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Eyes : Adverse symptoms may include the following:
pain
watering
redness

Target organs : Contains material which may cause damage to the following organs: kidneys, liver, eyes, central nervous system (CNS).

12 . Ecological information

Environmental effects : Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure

12 . Ecological information

isophorone diamine	Measured	Acute EC10 1120 mg/l	Bacteria - Pseudomonas putida	18 hours
	EU EC C.3 Algal Inhibition Test	Acute EC50 37 mg/l Fresh water	Algae - Scenedesmus subspicatus	72 hours Static
	OECD 202 *Daphnia* sp. Acute Immobilisation Test	Acute EC50 23 mg/l Fresh water	Daphnia - Daphnia magna Straus 1820	48 hours Static
	EU EC C.1 Acute Toxicity for Fish	Acute LC50 110 mg/l Fresh water	Fish	96 hours Semi-static
benzyl alcohol	OECD 202 *Daphnia* sp. Acute Immobilisation Test	Acute EC50 230 mg/l Fresh water	Daphnia - Daphnia magna	48 hours
	OECD 201 Alga, Growth Inhibition Test	Acute EgC50 770 mg/l Fresh water	Algae	72 hours Static
	EPA OPPTS	Acute LC50 460 mg/l Fresh water	Fish - Fathead minnow (Pimephales promelas)	96 hours Static
	OECD 201 Alga, Growth Inhibition Test	Chronic NOEC 310 mg/l Fresh water	Algae	72 hours Static
	OECD 211 Daphnia Magna Reproduction Test	Chronic NOEC 51 mg/l Fresh water	Daphnia	21 days Semi-static
JEFFAMINE D 400	-	Acute EC50 15 mg/l	Daphnia	48 hours
	-	Acute IC50 135 mg/l	Algae	72 hours
	-	Acute LC50 >100 mg/l	Fish	96 hours
trimethylhexamethylenediamine	DIN	Acute EgC50 29.5 mg/l	Algae	72 hours
	DIN	Acute IC50 89 mg/l	Bacteria	17 hours

Conclusion/Summary : Not available.

Biodegradability

Product/ingredient name	Test	Result	Dose	Inoculum

12 . Ecological information

isophorone diamine	EU EC C.4-A Biodegradation: Determination of the "Ready" Biodegradability: Dissolved Organic Carbon (DOC) Die-Away Test	8 % - Not readily - 28 days	6.9 mg/l DOC	25.9 mg/l Activated sludge
benzyl alcohol	OECD 301A Ready Biodegradability - DOC Die-Away Test	95 to 97 % - Readily - 21 days	20 mg/l DOC	-
JEFFAMINE D 400	-	<60 % - Not readily - 28 days	-	-
trimethylhexamethylenediamine	EU	7 % - Not readily - 28 days	11.4 mg/l DOC	Activated sludge

Conclusion/Summary : Not available.

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
isophorone diamine	-	-	Not readily
benzyl alcohol	-	-	Readily
JEFFAMINE D 400	-	-	Not readily
trimethylhexamethylenediamine	-	-	Not readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
isophorone diamine	0.99	-	low
benzyl alcohol	1.1	1	low
trimethylhexamethylenediamine	0.77	-	low

Mobility : Not available.

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

13 . Disposal considerations

Methods of disposal

The generation of waste should be avoided or minimised wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. 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 may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

14 . Transport information

Road and rail transport
Classified as dangerous goods by the criteria of the Australian Dangerous Goods (ADG) Code for transport by road and rail.

Marine transport
Classified as dangerous goods by the criteria of the International Maritime Dangerous Goods (IMDG) Code for transport by sea.

Air transport
Classified as dangerous goods by the criteria of the International Air Transport Association (IATA) Code for transport by air.

Regulation	UN number	Proper shipping name	Classes	PG*	Label	Additional information
ADG	UN2289	ISOPHORONEDIAMINE	8	III		**Hazchem code** 2X
IMDG	UN2289	ISOPHORONEDIAMINE SOLUTION	8	III		**Emergency schedules (EmS)** F-A, S-B
IATA	UN2289	ISOPHORONEDIAMINE SOLUTION	8	III		**Passenger and Cargo Aircraft**Quantity limitation: 5 L Packaging instructions: 852 **Cargo Aircraft Only** Quantity limitation: 60 L Packaging instructions: 856

PG* : Packing group

15 . Regulatory information

Inventory status

15 . Regulatory information

Country	Inventory	Status
Australia	AICS	All components are listed or exempted.
Canada	DSL	All components are listed or exempted.
China	IECSC	All components are listed or exempted.
Europe	EINECS/ELINCS/NLP	All components are listed or exempted.
Japan	ENCS	At least one component is not listed.
Korea	KECI	At least one component is not listed.
New Zealand	NZIoC	All components are listed or exempted.
Philippines	PICCS	All components are listed or exempted.
United States	TSCA	All components are listed or exempted.

Carcinogen schedule (Australia) : None Allocated.

Poison schedule (Australia) : S5

16 . Other information

Indicates information that has changed from previously issued version.

Disclaimer

While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

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16 . Other information

WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS