1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product name: **AROPOL® POLYESTER RESIN SOLUTION MSDS CODE S GRADES**
CRYSTIC® POLYESTER RESIN SOLUTION MSDS CODE S GRADES
ESTAREZ® POLYESTER RESIN SOLUTION MSDS CODE S GRADES
HETRON® POLYESTER RESIN SOLUTION MSDS CODE S GRADES
HETRON® VINYL ESTER RESIN SOLUTION MSDS CODE S GRADES

AROPOL® and HETRON® -Registered Trademarks of Ashland Inc. U.S.A., Permitted User: Huntsman Chemical Company Australia Pty. Limited

CRYSTIC® -Registered Trademark of Scott Bader & Company Limited, U.K., Permitted User: Huntsman Chemical Company Australia Pty. Limited

ESTAREZ® -Registered Trademark of Huntsman Chemical Company Australia Pty. Limited

Other names: Compounded unsaturated halogenated polyester resin solution in styrene monomer.
Compounded halogenated vinyl ester resin solution in styrene monomer

Huntsman Product Codes: This MSDS covers all AROPOL/CRYSTIC /ESTAREZ/HETRON polyester resin grades and HETRON vinyl ester resin solution grades with the notation "MSDS CODE S" immediately after the grade name on the label e.g. AROPOL 6450 PAW MSDS CODE S; HETRON FR992HPSB MSDS CODE S. The MSDS Code is also referenced in technical literature.

The MSDS code letter "S" indicates the **different hazardous decomposition products** compared with the standard (MSDS Code G) polyester resin grades products due to the presence of **polymerised halogenated flame retardants and post-added antimony compound flame retardant synergist.**

Recommended use: Manufacture of fire retardant modified reinforced and filled plastic composites e.g. fibreglass products. Industrial use only.

Manufacturer /Supplier: Huntsman Chemical Company Australia Pty Limited
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ABN: 48 004 146 338
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2. HAZARDS IDENTIFICATION

Health Hazard classification:

This material is classified as hazardous according to the health criteria of NOHSC Australia.

Hazard category

Xn, Xi	Harmful, Irritant

Risk phrase(s)

R10	Flammable
R20	Harmful by inhalation
R36/38	Irritating to eyes and skin.

Safety phrase(s)

S23	Do not breathe vapour or spray.

Note: European Commission Risk (R) & Safety (S) phrases relating to physico-chemical properties are provided for information only.

Dangerous Goods classification:

Classified as Dangerous Goods by the criteria of the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code).

Class 3	Flammable Liquid

Poisons schedule (Aust): 6 [Contains antimony compounds (<1% wt. as Sb)]

3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL ENTITY	CAS NO.	PROPORTION (%weight/weight)
Unsaturated halogenated polyester resin and/or halogenated vinyl ester resin(1)	Not available	45-75
Styrene monomer	100-42-5	25-55
Other ingredients determined not to be hazardous		to 100%

Note (1): Not classified as hazardous according to the criteria of NOHSC.

4. FIRST AID MEASURES

For advice, contact Poisons Information centre (Phone Australia 13 1126) or a doctor.

Ingestion:
If swallowed, do NOT induce vomiting. If patient is conscious, give a glass of water. Seek immediate medical assistance. Transport to a doctor or hospital.

Eye contact:
If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. Transport to a doctor or hospital.

Skin contact:
If skin or hair contact occurs, remove contaminated clothing. Wipe resin off skin and hair. Wash skin and hair thoroughly with soap and water. Wash clothing before reuse.

Inhalation:
If inhaled, remove to fresh air. Seek medical assistance. If not breathing give artificial respiration. If breathing difficult give oxygen.

First aid facilities:
Provide eye baths and safety showers close to areas where eye or skin contact may occur.

Medical attention and Special Treatment:
Treat symtomatically.

5. FIRE-FIGHTING MEASURES

Flammable liquid. Polymerisable in a fire situation.

Suitable extinguishing media:
Foam, dry chemical and carbon dioxide. Use water spray to cool exposed closed containers.

Hazards from combustion products:
Combustion products may include carbon monoxide and carbon dioxide, styrene, hydrogen chloride and/or hydrogen bromide, antimony compounds and acrid smoke.

Precautions for fire fighters and special protective equipment:
Fire-fighters and others exposed to the products of combustion should wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

Vapours are heavier than air and can accumulate in low areas; they may travel a considerable distance to a source of ignition and flash back. The liquid normally contains an inhibitor to prevent polymerisation. At elevated temperatures, such as fire conditions, polymerisation may take place. If polymerisation takes place in a closed container, there is the possibility of violent rupture of the container. Styrene vapours are uninhibited and may form polymers in vents and flame arresters of storage tanks, resulting in blockage of vents.

Hazchem code: 3[Y]

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures:
Keep unprotected people away. Wear appropriate protective equipment/clothing to prevent eye and skin contact and inhalation of vapours and/or mist (see Section 8 - Personal Protection). Remove all ignition sources. Increase ventilation. Use water spray to disperse vapours. For large spills, wear self-contained breathing apparatus and full protective clothing.

Methods and materials for containment and clean up procedures:
Contain and absorb spill with sand, earth or other inert absorbent and seal in properly labelled drums for disposal. Do not use untreated clay or mica absorbents-may cause fire. Alternatively, pump to salvage tank using an air- operated or other non-spark producing pump. Keep out of sewer, stormwater drains and waterways.

7. HANDLING AND STORAGE

Precautions for safe handling:
Flammable liquid. Vapour may form explosive mixtures with air. Avoid all ignition sources. Use only in well ventilated areas. Flameproof equipment necessary in area where product is being used. Earth (ground) and bond shipping container, transfer line transfer and receiving vessel. Use non sparking tools. Consult AS1940 for further information on the storage and handling of flammable liquids. Handle in accordance with State and Territory regulations for Dangerous Goods.

Avoid contact with skin, eyes and clothing. Keep away from incompatible materials. Use only in well ventilated areas. Wash thoroughly after handling. When using, do not eat, smoke or drink.

Solvents should not be used to remove resin from skin. A waterless hand cleanser followed by a mild soap and water wash is recommended for clean-up. The application of a barrier cream under suitable gloves and moisturiser cream after hand washing is also recommended. These practices can assist in the prevention of dermatitis.

Conditions for safe storage:
Keep away from sources of ignition-No smoking. Keep container tightly closed. Store in shade, preferably below 30 deg.C. Store in a well ventilated area. Store away from incompatible materials. Storage containers should be protected from physical damage. Outside storage or detached storage is preferred. Tanks should be above ground and bunded to contain the entire contents. The vents of storage tanks and flame arresters should be checked regularly for polymer blockages. Store in accordance with State and Territory regulations for Dangerous Goods.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National exposure standards:
As published by NOHSC Australia.

	8-hr TWA		STEL (15 min's)		Peak Limitation		Carcinogen Category	Notices
	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³		
Styrene monomer	50	213	100	426	-	-	-	-
Antimony compounds (as Sb)	-	0.5	-	-	-	-	-	

Keep exposures as low as practicable below the exposure standards.

Biological limit values:
None established by NOHSC.

Engineering controls:
Provide sufficient ventilation to control exposure levels below the exposure standards. Use local exhaust ventilation at sources of air contamination such as open process equipment.

Personal protective equipment:
Avoid breathing vapours and/or mist. If inhalation risk exists, wear respiratory protection equipment meeting AS/NZS1716 in accordance with AS/NZS1715. For low airborne concentrations, an air-purifying respirator fitted with organic vapour and particulate filters may be suitable. Air-purifying respirators do not provide protection in oxygen-deficient atmospheres. High airborne concentrations may require the use of air supplied or self-contained breathing apparatus.

Wear impervious gloves, preferably with cotton inners. Glove supplier data indicates that Viton or polyvinyl alcohol gloves are suitable for prolonged contact with styrene. Other glove types, such as nitrile rubber, may be suitable for short-term protection (eg. splash protection).

Wear chemical splash goggles where there is potential for eye contact. Do not wear contact lenses..

Wear industrial trousers and long-sleeved shirt and safety boots where potential for skin contact is low; wear PVC splash suit and PVC boots where potential for skin contact is high.

Protective equipment/clothing should meet, and be selected and used in accordance with, the relevant Australian Standards. Consult protective equipment/clothing supplier for appropriate equipment/clothing for a given application. Protective equipment and clothing should be decontaminated before storage and/or reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form / colour / odour: Opaque white viscous liquid with a sweet or sharp aromatic odour.

pH: Not App
Vapour Pressure (20°C): Styrene: 4.5 mm Hg
Rel Vapour Density (air=1): Styrene: 3.6
Boiling Point (°C): N App (Polymerises)
Melting Point (°C): N App
Solubility in water: Immiscible

Specific Gravity (°C): 1.1 @ 25°C
Flash Point (°C): 30-33 (Tag Closed Cup)
Flammability Limits (%): Styrene: 1-6.1% by vol.
Evaporation Rate (n-Butyl acetate=1): N Av
Odour threshold: Styrene: Approx. 0.1 ppm

Solubility in organic solvents: Miscible with acetone, glycol ethers and toluene.

(Typical values only - consult specification sheet)
N Av = Not available N App = Not applicable

10. STABILITY AND REACTIVITY

Chemical stability:
The product in stable under the normal conditions of storage and transport. Will polymerise with generation of heat at elevated temperatures, in the presence of direct sunlight and certain contaminants (see below).

Conditions to avoid:
Keep away from sunlight, heat and sources of ignition.

Incompatible materials:
Contamination with alkalis reduces inhibitor concentration and increases the risk of spontaneous polymerisation. Exposure to UV radiation (including from light fittings) can initiate slow polymerisation that may continue in a sealed container. Oxidising agents (e.g. organic peroxides), strong acids (e.g. sulphuric acid), ferrous salts present in rust, and some metal halides, can promote polymerisation. Untreated clays and mica absorbents may cause an exothermic reaction with styrene and ignite the monomer. Under acidic reducing conditions, the antimony compounds may form the poisonous gas stibine.

Styrene degrades most plastics and corrodes copper and copper alloys.

Hazardous decomposition products:
Thermal decomposition products may include carbon monoxide and carbon dioxide, styrene, hydrogen chloride and/or hydrogen bromide, antimony compounds and acrid smoke.

Hazardous reactions:
May undergo hazardous polymerisation in closed containers at elevated temperatures and in the presence of initiating contaminants. If depleted of inhibitor, the product will undergo slow non hazardous polymerisation at ambient temperatures.

11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms that may arise if the product is mishandled are:

Acute Effects:

Ingestion:
No data. Styrene may cause irritation to the mouth and throat and abdominal discomfort, nausea and vomiting.

Eye Contact:
Irritating to eyes. Possible injury to cornea.

Skin Contact:
Irritating to skin. Prolonged or repeated contact may cause irritant contact dermatitis (itching dryness redness). Scientific studies indicate that absorption of styrene from skin contact with liquid resin during normal use is unlikely to add significantly to exposure.

Inhalation:
Inhalation of styrene vapour and/or mist can cause irritation to the respiratory system and central nervous system depression resulting effects such as dizziness, drowsiness, euphoria, loss of coordination, headache, nausea and vomiting.

Chronic Effects:
Repeated skin contact may cause irritant contact dermatitis. Repeated inhalation of styrene may cause lung damage. Prolonged and repeated overexposure to styrene may cause damage to the liver and kidney.

Other Health Effects Information:

STYRENE

Carcinogenicity (Capability to cause cancer):
Chronic (lifetime) inhalation studies on rats and mice exposed to styrene vapours showed evidence of lung tumours in mice but not in rats. Further research is in progress to determine the relevance of these mouse tumours to humans.

It should be noted, however, that several workplace exposure (epidemiological) studies investigating the incidence of cancer in a large number of workers employed in the styrene, polystyrene and reinforced plastics industries have shown no increased incidence of cancer risk due to workplace exposures to styrene.

The International Agency for Research on Cancer (IARC) has evaluated styrene and classified it as “Possibly Carcinogenic to Humans”, under group 2B.

The National Occupational Health and Safety Commission (NOHSC) has not classified styrene as a carcinogen under any category.

Developmental and reproductive toxicity:
Laboratory studies investigating human developmental and reproductive toxicity of styrene have indicated that styrene exposures, either as vapour, oral or drinking water, do not result in any specific developmental or reproductive toxicity. Although some minor developmental effects were noted in some studies, these effects were either within the historical range for these effects, or were secondary to maternal toxicity from exposure to relatively high levels of styrene.

Although there have been very few studies investigating human developmental and reproductive toxicity following exposures to styrene, the limited available information supports the observation that there is no evidence of developmental or reproductive toxicity from workplace exposures to styrene.

Neurological (nervous system) effects:
Some evidence of hearing loss was observed in rats repeatedly exposed to high concentrations of styrene vapour. Effects on human hearing are not expected from workplace exposures to styrene.

Slight effects on colour discrimination have been detected in workers exposed to styrene vapours. These subtle effects are unlikely to be noticed by those affected.

Other nervous system effects have been noted in humans exposed to styrene. However, these effects have not been consistently or reliably observed at exposure levels below 50 ppm.

Genetic effects:
Some cytogenetic (cell formation) studies on workers exposed to styrene have shown increases in chromosomal (genetic) damage, although these effects do not appear to be related to styrene exposure and are not supported by the data observed in animal studies.

Medical Conditions Aggravated by Exposure:
Because of styrene's defatting properties, prolonged and repeated skin contact may aggravate an existing dermatitis (skin condition). Repeated overexposure may aggravate or enhance existing nervous system dysfunction. Repeated overexposure may aggravate existing respiratory, liver or kidney disease.

12. ECOLOGICAL INFORMATION

Ecotoxicity:
Styrene is moderately toxic to fish and daphnia and highly toxic to algae.

Persistance/degradability:
Styrene has been shown to undergo slow, but nearly complete biodegradation in laboratory studies. It is unlikely to persist in the environment.

Mobility:
Styrene is expected to bind to soils and sediments and have low mobility.

13. DISPOSAL CONSIDERATIONS

Disposal methods:
The material is considered to be a hazardous waste because of its flammability and toxicity. If feasible, recycle. Liquid waste resin may be solidified by heating in an approved heating chamber. The properly cured resin may be disposed of to an approved landfill. Otherwise, dispose of by burning in an approved incinerator. In all cases, disposal should be in accordance with regulations.

Special precautions for landfill or incineration:
Emptied containers retain vapour and product residue and may therefore present explosive vapour and health hazards. Observe all safeguards on label and in this MSDS until container is cleaned, reconditioned or destroyed. DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER. In all cases, disposal should be in accordance with regulations.

14. TRANSPORT INFORMATION

Road and Rail Transport (ADG Code)

UN Number	1866
Proper Shipping Name:	RESIN SOLUTION
Dangerous Goods Class:	3
Subsidiary Risk:	None allocated
Packing Group:	III
Hazchem Code:	3[Y]
Emergency Information:	IER Guide 14

Marine Transport (IMDG Code)

UN Number	1866
Proper Shipping Name:	RESIN SOLUTION
Dangerous Goods Class:	3.2
Subsidiary Risk:	None allocated
Packing Group:	III

Air Transport (IATA Regulations)

UN Number	1866
Proper Shipping Name:	RESIN SOLUTION
Dangerous Goods Class:	3
Subsidiary Risk:	None allocated
Packing Group:	III

Dangerous Goods Segregation (ADG Code):
Do not load and pack with Class 1 (Explosives), Class 2.1 (Flammable Gases - where flammable liquids/gases are in bulk), Class 2.3 (Toxic Gases), Class 4.2 (Spontaneously Combustible Substances), Class 5.1 (Oxidising Agents), Class 5.2 (Organic Peroxides), Class 7 (Radioactive Substances). Transport in accordance with State and Territory regulations for Dangerous Goods.

15. REGULATORY INFORMATION

Country/Region	Inventory	Status
Australia	AICS	All components are listed.

Poisons schedule (Aust): 6 [Contains antimony compounds (<1% wt. as Sb)

16. OTHER INFORMATION

Reason(s) for Issue: Original.

Abbreviations:

AICS:	Australian Inventory of Chemical Substances
IARC:	International Agency for Research on Cancer
IATA Regulations:	International Air Transport Association Regulations
IERG:	Initial Emergency Response Guide (SAA/NZS HB: 76)
IMDG Code:	International Maritime Dangerous Goods Code
NOHSC:	National Occupational Health and Safety Commission Australia

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