1. SUPPLIERS DETAILS

Manufacturers: Crystic Resins India Private Limited, 19/6 Mathura Road, Faridabad, Haryana, India – 121006

Telephone Number: +91-129-4004813 / 2283948 (Day)

Product Description: Solution of unsaturated polyester resin in styrene monomer.

2. HAZARDS IDENTIFICATION

Toxic by Inhalation, in contact with skin, by eye ingestion and if swallowed.

3. INFORMATION ON INGREDIENTS

Identification of the preparation: Halogen free fire retardant Unsaturated polyester resin in styrene.

<table>
<thead>
<tr>
<th>Chemicals Name</th>
<th>CAS-No</th>
<th>EINECS-No</th>
<th>Class</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESIN SOLUTION IN STYRENE</td>
<td>100-42-5</td>
<td>601-026-00-0</td>
<td>R10 Xn;R20</td>
<td>56</td>
</tr>
<tr>
<td>(proprietary)</td>
<td></td>
<td></td>
<td>(Xi; R36/38)</td>
<td></td>
</tr>
<tr>
<td>(for styrene)</td>
<td></td>
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</tbody>
</table>

4. RECOMMENDED FIRST AID TREATMENT

Inhalation of Noxious Fumes
Remove the affected person to fresh air; keep him warm and quiet; get medical attention. Resuscitate if breathing fails.

Ingestion
Do not induce vomiting. Consult a doctor immediately.

Skin Contact
It is recommended that clean rags or paper and proprietary skin cleansers be used to remove polyester resin. Skin contaminated with accelerator, should be thoroughly washed with soap and water. Solvents should
Eye Contact
Flush the eye with copious amounts of clean water for at least ten minutes. Get immediate medical attention.

General
It is important when summoning medical attention that the doctor or hospital be fully advised in detail of the nature of the product.

5. EMERGENCY ACTION/ FIRE MEASURES

No special or additional drills are required with regard to Polyester resins

Small Fires
Dry powder and foam extinguishers are suitable for dealing with minor outbreaks of fire involving polyester resin solutions and polyester resins.

Large Fires
In general only professional fire fighters can deal with large fires.

Spillage
Small spillages of resin solutions and accelerators may be cleaned up using clean rag, paper or inert absorbent. These materials must subsequently be disposed of carefully by controlled incineration or approved landfill. Large spillages of resin solution and accelerators should be contained in the smallest area possible. Sand, earth or inert absorbent should be used to absorb the material. The spent absorbent should be collected and disposed of in the proper manner.

6. RECOMMENDED PRECAUTION FOR USAGE

Usage
Specific product data is generally available for users to determine the uses to which a product may be put. It is the users responsibility to determine the precaution to be taken using the information provided by the supplier.
In general the following comments will apply to all resin systems and most use situations.
**Temperature and Stability**
Polyesters resin sensitive to temperature. When mixed ready for use with catalysts and/or accelerators, they are more sensitive and may gel in relatively short times at comparatively low work area temperatures. Catalyst and accelerator concentrations affect the stability of the resin system. Work area temperatures and catalyst and accelerator concentrations must therefore be in accordance with the suppliers' recommendations for each particular application. Temperatures of and around 25 °C are considered suitable for work areas where resins and resin systems are used.

**Ventilation and Extraction**
Work area must have good ventilation to remove vapors, fumes, and dust associated with the resins and curing systems. Positive extraction and particulate collection at respiratory zone level should ensure effective ventilation. It is recommended that extraction and collection equipment is housed outside the work area.

**Lighting**
Diffused daylight lighting is preferred for work areas provided no direct sunlight is allowed to fall upon the resin or resin system since this will cause premature gelation.

**Mixing**
It is essential that resins, catalysts and accelerators are kept apart until required for mixing. It is essential also to keep mixtures apart from their constituent elements. Under no circumstances must catalysts and accelerators be mixed directly together as they can react with explosive violence. It is therefore strongly recommended that a clear labeling and storage system is designed and used. Resin mixes containing catalyst and accelerator should never be left unsupervised in the work area and particularly they must never be left overnight.

**RECOMMENDED PRECAUTION FOR STORAGE**

**Storage**
Unless specifically stated the following notes relate to polyester resins, their solutions and accelerator. Resin solutions and accelerators in highly flammable solvents.

**Temperature**
Materials should be stored at a temperature no higher than 25 °C.
Ventilation
Materials should be stored in a well-ventilated area.

Mixed Storage
Materials should be stored in a well-ventilated area. Resin solutions, accelerators and catalysts must be stored apart from each other and also apart other materials.

Storage precaution
It is highly recommended that all the material is stored at stable temperature less than 25°C preferably indoors and away from direct sunlight for a shelf life of 3 months from date of manufacture. Liquid polyester resins are flammable but not highly flammable. Most resins have a flashpoint of 31 °C (88 °F). Resins and accelerators should be kept preferably in a brick-build store conforming to the normal fire regulations. Storage at higher temperatures even for only a few days will considerably reduce the shelf life. Similarly resins stored in glass, especially if exposed to direct sunlight, will gel rapidly, often in as little as two days. As a general guide, as long as the resins remains a pour able liquid it will be usable.

Fire retardant and filled resins: It is strongly recommended to mix resin thoroughly before use and if kept unused, should mix well once every 10 days since it is a filled resin and to avoid filler settling.

7. RECOMMENDED PRECAUTION FOR HANDLING

Handling
Protective Wear and Hygiene Care should be taken to avoid accidental splashing of resin. Protective clothing such as a boiler suit, gloves, apron and goggles of the approved types must be worn. Barrier creams may also be used and afterwards removed with proprietary cleansing agents. Finally, wash thoroughly with soap and water. Accelerators should be handled in the same manner. Smoking, eating and drinking should be forbidden in areas where polyester resins being used or stored. Contaminated clothing should be removed and cleansed before re-use and must not be left in clothes lockers or enclosed places.

Trimming
Certain polyester resins may contain additives, which are toxic when inhaled e.g. antimony trioxide, which may be present in reduced fire hazard polyesters. Therefore during cutting and grinding of laminates care should be taken to avoid inhalation by providing good dust extraction.

Partly Empty Containers
Particular care should be taken to avoid the presence of any means of ignition when handling part-filled or empty containers because solvent vapor may build-up to explosive levels in the air space. Cleaning solvents may be more hazardous than the polyester resin systems and reference should be made to the suppliers before use.
8. CHEMICAL PROPERTIES

- Form: Viscous Liquid
- Colour: clear, pale yellow, opaque white
- Flash Point: 32 Degree Celsius
- Relative density: (25 deg C) = 1.10 – 1.3
- Water solubility: immiscible

9. RECOMMENDED GENERAL PRECAUTIONS/ EXPOSURE CONTROL

Health Considerations
Information with regard to the monomers currently used for Polyester Resin solutions is reasonably well documented and relatively uncontroversial. Less well documented and medically controversial are the organic metal compounds, the amines and some of the fillers.

Resin Solutions

*The effects of styrene vapour are:*
- 25 ppm - odour is detectable
- 100 ppm - Threshold limit Value
- 200-400 ppm - transient irritating effect on eyes and nasal Passage
- 400-1000 ppm - increasing systemic effects such as dizziness, nausea and headaches
- 1000 ppm - can lead to unconsciousness
- 5700 ppm - saturated vapour pressure at 15 C
- 10000 ppm - might cause death in less than an hour
- 11500 ppm - lower explosion limit

*The effects of methyl methacrylate are:*
- 10 ppm - odour is detectable
- 100 ppm - Threshold limit Value
10. STABILITY

At the recommended storage temperature the stability of the materials is good. Heat, moisture and contaminants will adversely affect their stability. Oxidizing agents and strong acids such as organic and inorganic peroxides, sulphuric acid, phosphorus pentoxide, ferrous salts and certain metal halides are known to promote polymerisation. Care should be taken to ensure that such materials do not contaminate polyester resin solutions. Alkali contaminants such as sodium hydroxide may remove inhibitors from resin solutions and thus increase the possibility of uncontrolled polymerisation occurring.

11. TOXICOLOGICAL INFORMATION

By Ingestion
The LD50 for styrene in rats is 5g/kg and for methyl methacrylate 9.4/kg. Both monomers would fall into the slight to moderately toxic class.

By skin Contact
Almost all ‘chemicals’ particularly solvents and monomers have a basic dermatitis effect on human skin. Styrene and methyl methacrylate remove the naturally occurring protective oil from the skin surface thereby exposing it to bacterial attack.

By Inhalation
Styrene has a pleasant odour at low concentration in the atmosphere but becomes increasingly unpleasant as the concentration increases. At levels of 800 ppm and above styrene is an immediate and intolerable irritant to mucous membranes. As a consequence of this intolerable irritation voluntary exposure at these levels is unlikely to continue. Methyl methacrylate has a sweetish pleasant odour and behaves similarly to styrene at low concentrations. At higher concentration it is relatively less harmful than styrene.

Fire and Explosion
The fire and explosion hazards associated with polyester resin solutions arise from their monomer content. The majority of polyester resin solutions are classified as Highly Flammable. The flash points of the two most common monomers used are styrene 31 ºC and methyl methacrylate 10 ºC.
12. ECOLOGICAL INFORMATION

No experimental ecological data are available on the preparation as such.

13. DISPOSAL CONSIDERATIONS

Fully cured polyester resin systems may be disposed of as unnotifiable waste. Resin, solutions and accelerators must be disposed of in accordance with regulations. Most polyester resins contain monomeric styrene, which is a good grease solvent and may cause irritation to the skin. The most effective method of protecting hands is the use of a barrier cream and this is strongly recommended. Resin can be removed from the hands with proprietary resin removing creams, or with acetone followed immediately by a wash in warm soapy water. It is preferable, however, not to wash the hand in acetone or other solvent. If these simple precautions are taken there will be little likelihood of skin irritation or dermatitis. In sufficient concentration styrene vapour is irritating to the eyes and respiratory passages.

Workshops, therefore, should be well ventilated. When resin is sprayed a gauze mask should be worn to protect the mouth and nose. This also applies to trimming operation when resin and glass dust can cause irritation. Catalyst an accelerator must never be mixed directly with each other, since they can react with explosive violence.

Resin, curing agents, Crystic cleaner, acetone and most cleaning solvents are flammable and must be kept away from naked flames. Smoking should not be allowed in a moulding shop. Precautionary notices should be displayed in workshops.

14. TRANSPORT INFORMATION

Road/Rail (CDGCPL Regulations 1994.)

Shipping Name: Resin Solution
United Nations No.: 1866
Class No.: 3
Subsidiary Hazard No.: 185, 187
Emergency Action Code: 3[Y]
Hazard Identification No.: 30
Packing Group: III

Maritime (IMDG Code) & IATA

Shipping Name: Resin Solution
United Nations No.: 1866
Class No.: 3.3
IMDG Code Page: 3379
Packing Group: III
Marine Pollutant Mark Applies
IATA Shipping Name: Resin Solution
IATA Class no.: Class 3
IATA subsidiary risk: None
15. REGULATORY INFORMATION

Supply Label : Symbol for Harmful
Risk Phrases :   R10 - Flammable
    R20 - Harmful by Inhalation
    R36/38 - Irritating to eyes and skin
Safety Phrases : S23 - Do not breathe fumes / vapours
    S38 - In case of insufficient ventilation wear suitable respiratory equipment.
    S43 - In case of fire use foam, CO2 or dry Chemical.

16. OTHER INFORMATION

The information contained in this Material Safety Data Sheet, as of the issue date, is believed to be true and correct. However, the accuracy or completeness of this information and any recommendations or suggestions are made without warranty or guarantee. Since the conditions of use are beyond the control of our company, it is the responsibility of the user to determine the conditions of safe use of this product. The information in this sheet does not represent analytical specifications, for which please refer to our technical data sheet.