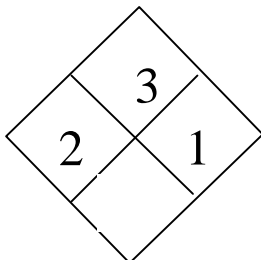


PRODUCT: POLYESTER RESINS**POLYESTER RESINS (GEL COAT)**

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HAZARDS DIAMMOND – NFPA 704**Fire:**

3- Flammability Hazard.

Health:

2-Dangerous

Reactivity:

1-Unstable under heating

1. PRODUCT AND COMPANY IDENTIFICATION

- Product name (label): Polyester Resins
Polyester Resins (Gel Coat)
- Supplier name, address and telephone number:
Elekeiroz S.A. - Rua Dr. Edgardo de Azevedo Soares, 392 Várzea Paulista - SP
CEP 13224-030
(00-55-11) 4596-8880 or (00-55-11) 4596-8788 or (00-55-11) 4596-8882(business hours)
(00-55-11) 4596-8800 or (00-55-11) 9961-4808 (24h)
Fax: (00-55-11) 4596-8881
E-mail: resinas@elekeiroz.com.br

2. COMPOSITION AND INFORMATION ABOUT INGREDIENTS

- Common chemical name of the substance:
Polyester Resins
- Synonyms:
Not available
- Register in *Chemical Abstract Service* (n° C.A.S):
[9065-68-3]
- Ingredients that contribute to risk:
Styrene Monomer 23 to 54% (n° CAS: 100-42-5)

3. HAZARDS IDENTIFICATION

- Specific hazards and most important effects:
Toxic if inhaled, ingested and absorbed through the skin. Irritant vapours to eyes, skin and respiratory system. Flammable liquid.

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4. FIRST AID MEASURES

- **Inhalation:**
Remove the victim to fresh air. If necessary, apply artificial respiration.
- **Contact with skin:**
Remove contaminated clothes and shoes, wash the affected area with alcohol and/or plenty of water (during 15 minutes), in the sequence, with water and soap.
- **Contact with eyes:**
Wash the eyes immediately with plenty of water, during at least 15 minutes, including under eyelids.
- **Ingestion:**
Do not induce vomit; do not give anything through the mouth if the person is unconscious.
- **Observation:** In any situation, the victim should be sent to emergency medical treatment.
- **Information to physician:**
If the exposure is acute, the person should be carefully monitored during some period of time to check signs of central nervous system depression, because styrene can be quickly absorbed through the skin (even it is intact). Inhalation: oxygen therapy. If necessary, induce respiration. After acute exposures, 100% oxygen can be ministered (by qualified persons) to avoid lung edema. Ingestion: do not induce emesis. Aspiration through nose-gastric probe. In case, other systems were affected, follow the instructions above and ask for an expert.

5. FIREFIGHTING MEASURES

- **Proper extinguishing media:**
Light fire: Dry powder, CO₂, water fog or mechanical foam.
Intense fire: water fog or mechanical foam.
- **Specific hazards:**
Flammable liquid due to styrene monomer presence. Styrene vapour is heavier than air and can travel long distances until reaching an ignition source. Polymerization can occur if exposed to the heat of the fire. If the polymerization occurs in a closed vessel there is the possibility of a violent rupture of it.
- **Special methods and firemen protection:**
Remove the vessels from the fire area, if this procedure could be accomplished without risks. Cool with water the side parts of the containers exposed to flames, long time after the fire is extinguished. Evacuate personnel in the affected area, turn off electricity, move away vessels with combustible and flammable material. Use water fog to spread vapours, cool surfaces or to protect the workers to minimize damages or spills. Do not discharge fire water in sewage galleries, rivers, creeks or lakes. The personnel involved in firefighting should wear self contained apparatus and complete protection clothes.

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6. MEASURES TO CONTROL SPILLS OR LEAKAGES

- Personal precautions:
Keep away bystanders, isolate the risk area and do not allow people entrance, remove ignition sources, do not smoke, keep on the wind and keep away from low areas. Use protective equipment according to item 8. Do not touch the spilled material. Contain the spill, if this procedure could be applied without risks. Avoid discharging the product to bodies of water and sewage galleries. Prevent the contact of the product with skin, eyes and respiratory ducts, wearing personal protective equipment, mentioned in item 8. There is no dust formation.
- Environment precautions:
-Little spills: absorb with sand or other absorbant and non-combustible material and put in adequate and closed vessels, for later disposal. Remove the vessels from the spill area.

-Big spills: contain for later removal.
- Cleaning methods:
Follow the above recommendations.

7. HANDLING AND STORAGE

- Handling (technical measures):
The levels of styrene monomer in the atmosphere should be kept below the occupational exposure limits. Transfer equipment should permit static charges flowing and it should be used anti-deflagration equipment. Prevent contact of the product with skin, eyes and respiratory ducts. Wear protective equipment according to item 8. Do not smoke or take meals in areas where the product is handled, processed or stored. The place should have emergency showers and eyes washing fountains. Prevent soil and underground water contamination.
- Storage (technical measures):
Packages:
They should be stored in a covered area, dry and well ventilated environment, protected against sun and bad weather conditions. Storage temperature should be less than 25°C. Packages should be stored over pallets, preferably non-combustible and piled vertically, with three layers, maximum. Damaged or punctured packages should be emptied.

Safe materials for packages:
Note: the packages should be certified according to Resolution ANTT 420/04 (Brazil) and International Regulation (IATA/IMDG).

Recommended:
Polyethylene, Polypropilene, Stainless Steel, Carbon Steel. For other packages, consult the supplier.

Inadequate:
Consult the supplier.

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Bulk:

Store in stainless steel ou carbon steel vessels coated with proper resin, preferably out of doors, with dikes to contain spills. Storage tanks should be grounded.

General recommendations:

The place should be provided with protection against atmospheric discharges and static electricity. Empty the vessels only under inert or non-flammable atmospheres, due to the risk of fire or explosion caused by static electricity. The storage place should have adequate ventilation. Protect the area against physical damages and isolated from incompatible substances (see item 10). Empty recipients/tanks may be hazardous if they have residues of the product.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

- Specific control parameters, for styrene monomer:
 - Portaria 3214/78, Regulating Standard NR-15: 78 ppm or 328 mg/m³ (up to 48h/week).
 - ACGIH-TLV/TWA(revision 2005) = 20 ppm 40 hours per week.
 - ACGIH-TLV/STEL (CEILING)= 40 ppm.
- Environmental evaluation for styrene:
 - Retention method: passive samplers (3M / OVM 3500). Analytical technique: gas chromatography.
- Personal Protective Equipment:
 - Semi-facial respirator with chemical filter for organic vapours.
 - Air compressed mask for high concentrations of styrene monomer.
 - Panoramic glasses.
 - PVC or latex gloves.
 - Safety shoes
 - PVC apron
 - Selfcontained apparatus for respiration, in case of emergencies involving fire.
- Other informations:
 - Indoor areas should be provided with gas exhaustion equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

- Physical state: viscous liquid
- Colour:
 - Polyester Resins: colorless or light crystalline colour .
 - Polyester Resins (Gel Coat): opaque or diversified colored.
- Odour: characteristic of styrene monomer (aromatic).
- pH: not available
- Specific temperatures where occur physical state changes:
 - Boiling Point: 145°C.
 - Melting Point: not available
- Flash Point: closed cup: 31°C (styrene monomer)

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- Auto-ignition temperature: 490°C (styrene monomer).
- Explosion limits (styrene monomer):
Lower: 1,1% p/air volume.
Upper: 7% p/air volume.
- Vapor pressure: 4,3.
- Vapor density (air=1): 3.6.
- Liquid density: 1,05 to 1,20 g/cm³ (at 25°C)
- Solubility:
Water: insoluble.
Partially soluble in acetone and styrene
- Evaporation rate: 12,4.

10. STABILITY AND REACTIVITY

- Specific conditions:
Stable in closed recipientes at ambient temperature (25°C). Hazardous polymerizations can occur due to lack of inhibitor or if the product is exposed to high temperatures, or strong acids.
- Incompatible substances:
Oxidizing materials, depending on the concentration, strong acids, aluminium chloride and strong alkalis.
- Conditions to avoid:
Avoid exposures to ignition sources or to chemically incompatible products.
- Hazardous products of decomposition:
Carbon monoxide.

11. TOXICOLOGICAL INFORMATION

(Information about Styrene Monomer):

- Contact with skin and eyes:
Irritation.
- Inhalation:
Excessive concentration of vapours can be reached and only one exposure can be harmful. Signs and symptoms of excessive exposure can have anesthetic or narcotic effects.
- Ingestion:
Toxicity of an only oral dose is low. The lethal dose (DL50) for rats is 5000 mg/kg.
- Chronical toxicity (Styrene monomer):
It is not known systemic effects in workers repeatedly exposed to low styrene concentrations. Repeated contact with the skin can produce dermatitis similar to those caused by other organic solvents.

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- Dose and lethal concentration (Styrene Monomer):
Lethal dose (DL₅₀): 5000 mg/kg (rats);
Lethal concentration (LC₅₀): 2800 ppm (rats 4h);
- Mutagenicity (Styrene monomer):
The results from mutagenicity tests in vitro and in animals are not conclusive.
- Effects over Development/Reproduction (Styrene Monomer):
Birth defects are not probable. Even exposure with adverse effects over the mother have no effects over the fetus. Animal studies has shown that the product do not interfere with reproduction.

12. ECOLOGICAL INFORMATION

Styrene monomer:

- Motion & partition:
Log coefficient of partition octanol/water (log Pow) is 3,6.
Bioconcentration factor for fishes, determined experimentally, is 13,5.
Volatilization of water to air is probable.
- Degradation & transformation:
The biodegradation observed during tests in closed cups after 20 days is of 54%
It is expected the product to be readily biodegradable in test with closed cup within 28 days. It is expected soil degradation of the area.
- Ecotoxicity:
Acute LC50 for fishes is in the range 10-100 mg/L.
Acute LC50 for Daphnia magna is of 255 mg/L.
The product is dangerous to aquatic organisms (LC50/EC50/IC50 between 10 and 100mg/L).

13. CONSIDERATIONS ABOUT TREATMENT AND DISPOSAL

- Treatment and disposal methods of the product, wastes and used packages:
Any waste treatment should be according to local and national regulations.

14. INFORMATION ABOUT TRANSPORTATION

- National and international regulations:
Follow the regulation for hazardous products road transportation according to decree n° 96044, 05/18/88 and Resolution ANTT 420/04 (Brazil). Follow the regulation for hazardous products railroad transportation according to decree n° 98973, 02/21/90 (Brazil). Follow the Mercosul regulation for hazardous products transportation according to decree n° 1797, 01/25/96.

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- **Road transportation (Brazil/MERCOSUL):**
Proper name for shipping: RESIN, SOLUTION
Hazard class: 3 (flammable liquid)
Hazard number: 30
UN number: 1866
Packages group: III

- **US DOT (terrestrial USA)**
PSN code: MQS
Proper Shipping Name: Resin solution
Hazard Class: 3
UN/NA: UN 1866
Packing Group: III
Label: flammable liquid.

- **IMO (maritime – international)**
PSN code: NBJ
Proper Shipping Name: resin, solution
Regulations page number: 3379
U N number: 1866
U N class: 3.3

- **IATA (international aerial)**
PSN code: USA
ID number: 1866
Proper Shipping Name: resin solution
U N Class: 3.
Label: flammable liquid

15. REGULATION**EPA Regulations (for Styren):****RCRA 40 CFR:** Not listed**CERCLA 40 CFR 302.4:** Listed per CWA Section 311(b)(4) 1000 lb (453.5 kg)**SARA 40 CFR 372.65:** Listed**SARA EHS 40 CFR 355:** Not listed**TSCA:** Listed

EPA – Environmental Protection Agency

SARA - Superfund Amendments and Reauthorization Act

RCRA - Resource Conservation and Recovery Act

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

TSCA - Toxic Substances Control Act

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16. OTHER INFORMATION

References:

- ACGIH manual, portuguese version, 2005 (traduction: ABHO).
- Elekeiroz specifications.
- MSDS – Interplastic Corp. – <http://msds.pdc.cornell.edu/msds/siri/msds/h/q320.html>.
- MSDS – Advance Coating – <http://siri.uvm.edu/msds/h/q321/q296.html>
- FISP – Dow Química – Estireno do Nordeste S A – 25/09/97
- IATA – International Air Transport Association – Edition 2004.
- IMDG – International Maritime Dangerous Goods – Edition 2002.

Observation:

The information contained in this MSDS are offered in good faith and, as a orientation instrument. The company cannot be liable for unproper use of the product or of the information in this document. If additional information is needed, consult the supplier.