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# Material Safety Data Sheet

**POLYKLEAR R99-400 RESIN-GP CHEMICAL RESISTANCE ISO**

## I. PRODUCT IDENTIFICATION

**Product Name:** POLYKLEAR RESIN-GP CHEMICAL RESISTANCE ISO  
**Product Code:** R99-400

## II. HAZARDS IDENTIFICATION

HAZARDS TO CLASSIFY : INFLAMMABLE TO THIRD CLASS, CORRODE/ SKIN CONTACT TO SECOND CLASS, EYE CONTACT TO SECOND CLASS CANCER TO SECOND CLASS, BIOLOGY SYSTEM OF TOXICITY SUBSTANCE TO SECOND CLASS, ENVIRONMENT TO THIRD CLASS

### LABELLING:



### WARN : DANGER WARN INFORMATION :

### EMERGENCY OVERVIEW:

Straw-yellow viscous liquid. Pungent styrene odor. Flammable. Reactive. Causes eye irritation. Highly toxic to fish and/or other aquatic organisms

### POTENTIAL HEALTH EFFECTS:

Refer to Section XI for toxicological data, Effects of Overexposure: for styrene

### EYE CONTACT:

May cause moderate eye irritation. May cause slight corneal injury. Vapors may irritate eyes. Vapors may cause lacrimation (tears).

### SKIN CONTACT:

Prolonged or repeated exposure may cause skin irritation. Material may stick to skin causing irritation upon removal. A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts.

### INGESTION:

Single dose oral toxicity is considered to be low. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

#### LUZON:

REGIONAL OFFICE  
TAGUIG  
1st Avenue, Sta. Maria Industrial Subd,  
Bagumbayan, Taguig City  
Tel. #: (02) 506-8519 ; 837-0710  
837-0708  
Fax #: (02) 519-1552 ; 553-2551

#### VISAYAS:

HEADQUARTERS  
CEBU  
2F SEA Olympus Building, AC Cortes Ave.  
Trunkline #: (032) 421-7777  
Tel. #: (032) 346-7137 ; 421-7800 to 06  
421-7817 to 18 ; 421-7823  
Fax #: (032) 421-7789 ; 346-1817

#### MINDANAO:

REGIONAL OFFICE  
DAVAO  
Unit A16 J.King Warehouse Complex  
Km.3 Maa Road, Davao City 8000  
Telefax #: (082) 244-1206 ; 302-2711

[inquiry@olymplus.com.ph](mailto:inquiry@olymplus.com.ph)



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#### **INHALATION:**

Excessive vapor concentrations are attainable and could be hazardous on single exposure. Signs and symptoms of excessive exposure may be anesthetic or narcotic effects and result in injury to other body systems.

#### **SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:**

Contains styrene, which, in animals, has been reported to cause effects on the following organs; central nervous system, kidney, liver and respiratory tract. Lung effects have been observed in mice following repeated exposure to styrene. Styrene is reported to have caused hearing loss in laboratory animals upon exposure to high concentrations (>600 ppm); however, the relevance of this to humans is unknown. Some studies in humans allege that repeated exposure to styrene may result in minor subclinical decreases in the ability to discriminate between colors.

#### **CANCER INFORMATION:**

This mixture contains a component (s) which are listed as potential carcinogens for hazard communication purposes under OSHA Standard 29 CFR 1910.1200. Component(s) listed by IARC; styrene. An increased incidence of lung tumors was observed in mice from a recent inhalation study on styrene. The relevance of this finding to humans is uncertain since data from other long-term animal studies and from epidemiology studies of workers exposed to styrene do not provide a basis to conclude that styrene is carcinogenic.

#### **TERATOLOGY:**

In laboratory animals, styrene did not produce birth defects or any other effects on the fetus even at exposure concentrations having an adverse effect on the mother.

#### **REPRODUCTIVE EFFECTS:**

Contains component(s) which did not interfere with reproduction in animal studies. The component(s) is/are: styrene.

### **III.COMPOSITION ON INGREDIENTS**

<b>CHEMICAL</b>	<b>%</b>	<b>CAS NO.</b>
POLYMER	50-70	068610-47-9
STYRENE	30-50	000100-42-5

### **IV. FIRST AID MEASURES**

#### **SKIN CONTACT:**

Thoroughly wash exposed area with soap and water immediately. Remove contaminated clothing. Launder contaminated clothing before re-use.

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[inquiry@olymplus.com.ph](mailto:inquiry@olymplus.com.ph)



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**EYE CONTACT:**

Flush with large amount of water immediately and continuously for 20 minutes, lifting upper and lower lids occasionally. Get medical attention.

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**INGESTION:**

Do not induce vomiting. Keep person warm, quiet and get medical attention. Aspiration of material into the lungs can cause chemical pneumonitis which can be fatal.

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**INHALATION:**

If affected, remove individual to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm, quiet, and get medical attention

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**NOTE TO PHYSICIAN:**

Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or exophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. No Specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

## V. FIRE FIGHTING MEASURES

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**HAZARDOUS DECOMPOSITION PRODUCT:**

May form toxic materials: carbon dioxide and carbon monoxide, various hydrocarbons.

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**OTHER FLAMMABILITY INFORMATION:**

Dense smoke is produced when product burns. Violent steam generation or eruption may occur upon application of direct water stream. Vapors are heavier than air and may travel a long distance and accumulate in low areas. Ignition and/or flash back may occur. Flammable mixtures may exist within the vapor space of containers at room temperature. Flammable concentrations of vapor can accumulate at temperatures above 74°F. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the auto-ignition temperatures possibly resulting in spontaneous combustion.

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**EXTINUISHING MEDIA:**

Water fog or fine spray, carbon dioxide, dry chemical, foam. Water fog, applied gently may be used as a blanket for fire extinguishments. General purpose synthetic foams (including AFFF type) or protein foams are preferred if available. Alcohol resistant foams (ATC type) may function. Do not use direct water stream, straight or direct water. Stream may not be effective to extinguish fire.

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Tel. #: (02) 506-8519 ; 837-0710  
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#### **MEDIA TO BE AVOIDED:**

Do not use direct water stream.

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#### **FIRE FIGHTING INSTRUCTIONS:**

Keep people away. Isolate fire area and deny unnecessary entry. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Water fog, applied gently may be used as a blanket for fire extinguishments. Eliminate ignition sources. Stay upwind.

Keep out of low areas where gases (fumes) can accumulate. Do not use direct water stream. May spread fire. Water may not be effective in extinguishing fire. Move container from fire area if this is possible without hazard.



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#### **PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS:**

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.



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## **VI. ACCIDENTAL RELEASE MEASURE**



#### **PROTECT PEOPLE:**

Do not breathe vapors. Vapor explosion hazard, keep out of sewers. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. For large spills, warn public of downwind explosion hazard. Check area with explosion meter before reentering area. Ground and bond all containers and handling equipment



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#### **PROTECT THE ENVIRONMENT:**

For large spills, evacuate upwind of spills and contain with dike.



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#### **CLEANUP:**

Pump with explosion-proof equipment. If available use foam to smother and suppress. Remove residual with hot soapy water. Residual can be removed with solvent. Solvents are not recommended for cleanup unless the recommended exposure guide-lines and safe handling practices for the specific solvent are followed. Consult appropriate solvent MSDS for handling information and exposure guidelines.



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## **VII. HANDLING AND STORAGE**



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#### **HANDLING INFORMATION:**

Avoid inhalation and contact with eyes, skin, and clothing. Wash hands thoroughly after handling and before eating or drinking. Remove and wash contaminated clothing before reuse. Use with adequate ventilation. Ground and bond containers when transferring the material to prevent static electricity sparks which could ignite the vapor. Use spark-proof tools and explosion-proof equipment.



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837-0708  
Fax #: (02) 519-1552 ; 553-2551

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Consult your supplier or promoters and catalysts for additional instructions on proper mixing and usage.

Empty containers may retain product residue (liquid and/or vapor). Do not pressurize, cut, weld, braze, solder, drill, grind, or expose these containers to heat, flame, sparks, static electricity, or other sources of ignition as the container may explode and may cause injury or death.

Empty drums should be completely drained and properly bunged. Empty drums should be promptly returned to a drum re-conditioner or properly disposed.

#### **STORAGE INFORMATION:**

Keep away from ignition sources; flames, pilot lights, electrical sparks, and sparking tools. NO SMOKING. Do not store in direct sunlight. Store separate from oxidizing materials, peroxides, and metal salts. Keep container closed when not in use. To ensure maximum stability and maintain optimum resin properties, resins should be stored in closed containers at temperatures below 75 degrees F (25 degrees C). Copper or copper containing alloys should be avoided as containers.

### **VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION**

#### **EXPOSURE GUIDELINE(S):**

Styrene, monomer: ACGIH TLV is 20ppm TWA, 40 ppm STEL, skin. ACGIH classifies as A4. OSHA PEL is 50 ppm TWA, 100 ppm STEL. The styrene PEL and STEL are in accordance with the OSHA-industry agreement dated March, 1996.

#### **PEOPLE P : PROTECTIVE GLOVES:**

Wear resistant gloves such as: neoprene, nitrite rubber.

#### **EYE PROTECTION:**

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses (consult your safety equipment supplier).

#### **OTHER PROTECTIVE EQUIPMENT:**

Normal work clothing covering arms and legs.

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## IX. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	BROMN-YELLOW VISCOS LIQUID
ODOR	The low concentration has sugariness, The high concentration has to irritate the nose.
ODOR THRESHOLD	0.017-1.9ppm(DETECT)
MELTING POINT	-30.6
BOILING POINT	145.2°C
FLASH POINT	87.8 / 31
EXPLOSIVE LIMITS	1.1%~6.1%
VAPOR PRESSURE	4.3 mmHg@20°C
VAPOR DENSITY	3.6 g/l
SPECIFIC GRAVITY	1.04 ± 0.02 / 25
EVAPORATION RATE	slow than ether

## X. STABILITY AND REACTIVITY

### HAZARDOUS POLYMERIZATION:

May occur.

### STABILITY:

Stable at room temperature.

### INCOMPATIBILITY:

Strong alkalis, strong mineral acids and oxidizing agents.

### CONDITIONS TO AVOID:

Exposure to excessive heat or direct sunshine or open flame; storage in open containers; storage above 38oC (100oF). Contamination with oxidizing agents.

### HAZARDOUS DECOMPOSITION PRODUCTS:

Carbon Monoxide, Carbon Dioxide, Low Molecular Weight Hydrocarbon, Organic Acids.

## XI. TOXICOLOGICAL INFORMATION

### SKIN CONTACT:

The LD<sub>50</sub> for skin absorption in rabbits is >2,000 mg/kg.

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Fax #: (02) 519-1552 ; 553-2551

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**INGESTION:**

The oral LD<sub>50</sub> for rats is >4,000 mg/kg The oral LC50 for rats is >5,000 ppm/4H

#### **MUTAGENICITY (EFFECTS ON GENETIC MATERIAL):**

For styrene: In vitro mutagenicity studies were inconclusive. Animal mutagenicity studies were inconclusive

### **XII. ECOLOGICAL INFORMATION**

#### **ENVIRONMENTAL FATE :**

LC50 : 25.1-74.8mg/1/96H

EC50 : ----

BCF : 13.5

#### **DEGRADATION & PERSISTENCE :**

Based on information for styrene. Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable. Reaches more than 70% mineralization in OECD test(s) for inherent biodegradability.

### **XIII. DISPOSAL CONSIDERATION**

#### **DISPOSAL:**

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER.

All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator

### **XIV. TRANSPORT INFORMATION**

UN NO : 1866

UN TRANSPORT NAME : RESIN SOLUTION

Hazard Class: 3 PG : III

SEA POLLUTANTS: (YES / NO) : NO

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Bagumbayan, Taguig City  
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837-0708  
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## TECHNICAL DATA SHEET

### R99-400 RESIN-GP CHEMICAL RESISTANCE ISO

#### I. IDENTIFICATION AND DESCRIPTION

**Product Name:**

**Product Description:**

R99-400 RESIN-GP CHEMICAL RESISTANCE ISO  
R99-400 RESIN-GP CHEMICAL RESISTANCE ISO is a thixotropic, quick-curing unsaturated polyester resin of Isophthalic grade for general laminating purposes. It is nonwaxed and preaccelerated, especially for gun spray-up. A non-wax type is needed for laminating between top and bottom. For an unaccelerated resin, accelerator must be added by users R99-400 RESIN-GP CHEMICAL RESISTANCE ISO in accordance with their requirements.

#### II. APPLICATIONS

R99-400 RESIN-GP CHEMICAL RESISTANCE ISO is used for making a variety of high quality glass fiber reinforced plastic products such as boats and canoes, water, oil and petroleum storage tanks, water and oil pipes, cooling towers, bus shelters, stadium seat, bath tubs, telephone booths, car body, septic tanks, safety helmets, dust bins, models, FRP molds, containers, bath unit, plant and flower pots, sporting equipments, concrete framings, tables and chairs and other household articles.

Glass fiber reinforced laminates made with this resin possess excellent mechanical strength and have good rigidity and outstanding durability.

R99-400 RESIN-GP CHEMICAL RESISTANCE ISO have been examined in accordance with the requirements of Lloyd's Register of Shipping and is approved for use in the construction of reinforced plastic craft molded under the society's survey.

#### III. SPECIFICATIONS

*Liquid R99-400 RESIN-GP CHEMICAL RESISTANCE ISO polyester has the ff. characteristics:*

Appearance	: Pink
Viscosity at 30°C	: 5 - 7 poises
Gel Time at 30°C	: 10 - 15 minutes
Cure Time at 30°C	: 14 - 25 minutes
Peak Exothermic Temperature	: 60°C - 175°C
Stability in the Dark below 25°C	: 6 months

*\*Above gelation characteristics determined using 1% v/w of MEKP catalyst (Butanox M-50) on 20g of resin.*

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TAGUIG  
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Bagumbayan, Taguig City  
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#### IV. PROPERTIES

R99-400 RESIN-GP CHEMICAL RESISTANCE ISO polyester resin pure casting has the following properties:

	Result	Test Method
Water Absorption (7 days value)	0.27%	ISO-62-1980
Barcol Hardness	45	ASTM D2583-67
Heat Distortion	103 °C	ASTM D648-82(88)
Elongation at Break	4.4%	ASTM D638-72
Specific Gravity of Liquid Resin at 25 °C	1.08 kg/litre	ASTM D1475
Volume Shrinkage on Cure	10%	Specific Gravity
Volatile Content	39.6%	ASTM D3030
Flexural Strength	8.2 kgf/mm <sup>2</sup>	ASTM 790
Flexural Modulus	435.4 kgf/mm <sup>2</sup>	ASTM 790
Tensile Strength	3.0 kgf/mm <sup>2</sup>	ASTM D638
Impact Strength	3.8 kgf-cm/cm	ASTM D256

Mat Laminates (34.4% glass content) cured with R99-400 RESIN-GP CHEMICAL RESISTANCE ISO polyester resin have 0.06% water absorption for 24 hours and 0.19% for 7 days according to ISO 62- 1980 Test Method and exhibit the following physical properties:

	In Dry Laminates	In Wet Laminated	Test Method
Flexural Strength	207.6	229.0	ASTM D790-71
Flexural Modulus	10.47	9.08	ASTM D790-71
Tensile Strength MPa	131.5	143.0	ISO 3268-1978
Tensile Modulus GPa	10.52	8.96	ASTM D638-72

#### V. USAGE

R99-400 RESIN-GP CHEMICAL RESISTANCE ISO performs best when it is completely cured. To do so, a proper combination of catalyst and accelerator must be used at room temperature for a sufficient period of time. Generally, 1 percent of catalyst (BUTANOX M-50 MEKP) is used for R99-400 RESIN- GP CHEMICAL RESISTANCE ISO

Adjustments for shorter or longer gel time can be achieved by ranging the quantities of catalyst and/or accelerator used. As a rule, however, the amount of catalyst used should not be more than 2% or less than 0.5% while that of accelerator should range between 0.4% and 1%. Be sure to measure accurately.

Ensure that the accelerator must be completely mixed into the resin before catalyst is added in order to avoid a direct blending which due to a violent reaction may result in an EXPLOSION.

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**Poly Klear**  
FIBERGLASS + RESIN

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Since the viscosity increased as the storage period of resin lengthens, Styrene Monomer can be added to lower it to a desired level.

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However owing to difficulties in presenting information applicable to all situations, no warranty is expressed or implied and users are recommended to carry out their own tests to determine the applicability of the above information and the suitability of SHCP resin for their particular requirements.

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## VI. STORAGE

R99-400 RESIN-GP CHEMICAL RESISTANCE ISO polyester resin will remain stable for about six months if stored in the dark and at temperatures below 25°C. Their stability however deteriorates markedly at higher temperatures, especially when they are directly exposed to sunlight. Hence they should be kept in a cool, dark place. It is advisable to finish it within three months.

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## VII. PACKING

R99-400 RESIN-GP CHEMICAL RESISTANCE ISO polyester resin is packed in steel drums of standard size (containing 220 kilos in net weight), 16-liter tins, galloons, and liters.

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### LUZON:

REGIONAL OFFICE  
TAGUIG  
1st Avenue, Sta. Maria Industrial Subd,  
Bagumbayan, Taguig City  
Tel.#: (02) 506-8519 ; 837-0710  
837-0708  
Fax #: (02) 519-1552 ; 553-2551

### VISAYAS:

HEADQUARTERS  
CEBU  
2F SEA Olympus Building, AC Cortes Ave.  
Trunkline #: (032) 421-7777  
Tel.#: (032) 346-7137 ; 421-7800 to 06  
421-7817 to 18 ; 421-7823  
Fax #: (032) 421-7789 ; 346-1817

### MINDANAO:

REGIONAL OFFICE  
DAVAO  
Unit A16 J.King Warehouse Complex  
Km.3 Maa Road, Davao City 8000  
Telefax #: (082) 244-1206 ; 302-2711

[inquiry@olympus.com.ph](mailto:inquiry@olympus.com.ph)