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MATERIAL SAFETY DATA SHEET

SECTION I – PRODUCT IDENTITY

PRODUCT IDENTITY: TERA-GEM III CHEMICAL RESISTANCE SYSTEM (CRS) EPOXY RESIN
PRODUCT NO: RP 70A
CAS CHEMICAL NAME: MIXTURE
SYNONYMS: NONE
CHEMICAL FAMILY: EPOXIDE
PRODUCT TYPE: LIQUID RESIN
INTENDED USE: EPOXY RESIN
REVISED DATE: FEBRUARY 2005
REVISION NOTE: UPDATE MSDS

Emergency Overview:

HMIS RATING Health 2
 Flammability 1
 Reactivity 0
 Protective Equipment X

In case of fire: use carbon dioxide, foam, dry chemicals, and water spray with self-containing breathing apparatus.

WARNING: Skin sensitizes. Can cause allergic skin reaction.

Hazard Statement: IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200, THIS MATERIAL SAFETY DATA SHEET (9MSDS) HAS BEEN PREPARED. THIS MATERIAL IS CONSIDERED TO BE HAZARDOUS UNDER THIS REGULATION.

SECTION II – INGREDIENTS

<u>%</u>	<u>CAS NO</u>	<u>CHEMICAL NAME</u>
>87	25068-38-6	Phenol, 4,4-(1-methylethylidene) bis-, polymer with (chloromethyl) oxirane. (Bisphenol A diglycidyl ether polymer) OSHA PEL: None established ACGIH TLV: None Established Carcinogen Status: Not reviewed by NTP, IARC or OSHA.
< 4	3101-60-8	4-(1,1-Dimethylethyl) phenoxyethyl oxirane (p-tertbutyl phenyl

glycidyl ether)
OSHA PEL: None established
ACGIH TLV: None established
Carcinogen Status: Not reviewed by NTP, IARC or OSHA

< 4 26447-14-3 4-(methyl) phenoxyethyl oxirane (Cresyl glycidyl ether)
OSHA PEL: None established
ACGIH TLV: None established
Carcinogen Status: Not reviewed by NTP, IARC or OSHA

THE REMAINING COMPONENTS ARE TRADE SECRET

SECTION III – HEALTH HAZARDS

Primary Routes of Exposure:

- Ingestion
- Skin Absorption
- Eye Contact
- Inhalation

Exposure Standards:

- No standard has been established for this product. Keep air contaminant concentration in work area to lowest levels.

Health Hazard:

- **Skin** - A single prolonged exposure is unlikely to be absorbed through the skin in harmful amounts. Repeated exposure may cause irritation and/or allergic reaction in humans.
- **Eye** - A single contact may be moderately irritating to the eyes. Can result in thermal burns if the resin is at elevated temperature.
- **Inhalation** - Because of its low volatility, this material is not likely to be an inhalation hazard.
- **Overexposure Effects** - Irritation, sensitization and dermatitis medical conditions aggravated by exposure allergy, eczema or skin conditions.

SECTION IV – EMERGENCY AND FIRST AID

Ingestion: Give 3-4 glasses of water. Do not induce vomiting. If vomiting occurs, give more water. Get medical attention immediately. Have physician determine if emesis induction is necessary.

Skin Contact: Wash with running soap and water for at least 15 minutes. Remove contaminated clothing and shoes and discard or decontaminate before re-use. Seek medical advice immediately.

Eye Contact: Flush eyes with eyelids apart with running water for 15 minutes. Get immediate medical help.

Inhalation: If inhaled, remove person to fresh air. Get medical attention if breathing becomes difficult or irritating

SECTION V – SUPPLEMENTAL HEALTH INFORMATION

Carcinogenicity:

A recent two-year bioassay of mice receiving skin application of diglycidyl ether of bisphenol A, a similar resin to this product, “have yielded very limited evidence of weak carcinogenicity.” The published study concludes that diglycidyl ether of bisphenol A “is not a systemic carcinogen when applied to the skin of CF 1 mice,” and the tumor data “was of no biological importance.” Based on all available data, the International Agency for Research on Cancer (IARC) has concluded in 1988 that DGEBA is not classified as a carcinogen.

Reproductive Effects:

Diglycidyl ether of bisphenol A, a similar resin to this product, has been shown not to interfere with reproduction.

Mutagenicity:

Diglycidyl ether of bisphenol A, the main part of this product, has tested to be inactive when tested by vivo mutagenicity assay. In vitro mutagenicity studies were negative in some cases and positive in others. The significance of this information to man is unknown.

SECTION VI – FIRE AND EXPLOSION HAZARD

Properties:	Flash Point (Tag closed cup)	199 C (390 F)
	Upper Explosion Limit (UEL)	No Data
	Lower Explosion Limit (LEL)	No Data
	Auto ignition Temperature	No Data
	Fire Hazard Classification (OSHA/NFPA)	Class IIIB

Extinguishing Media: Use water fog, foam, dry chemicals or carbon dioxide.

Special Fire Fighting Procedures: Spray and cool fire exposed containers with water. In confined space fire area use NIOSH approved breathing apparatus.

Unusual Fire and Explosion Hazards: Decomposition and combustion products may be toxic.

SECTION VII – PERSONAL PROTECTION AND EXPOSURE

Respiratory Protection:

In most circumstances not required

Protective Equipment:

Use appropriate safety glasses, goggles or face shield for eye protection and protective clothing for skin protection. Wear impervious gloves for hand protection. Use of barrier cream is recommended.

Ventilation:

Good general mechanical ventilation with proper exhaust system, providing good air.

SECTION VIII – SPILL AND LEAK PROCEDURES

Protect people by keeping unnecessary people away and avoiding all personal contact. For large spill contain material by use of dikes or barrier. Keep out of sewers, storm drains, soil and surface water. Keep fire or spark producing equipments away. For clean-up, soak up with absorbent materials. Such as sand, clay or suitable materials. Residual material may be removed using soapy water. Placed absorbent material in a suitable container to be disposed in accordance with federal, state and local regulations.

SECTION IX – PHYSICAL PROPERTIES

Appearance: Slight, Pale Yellow Liquid
Odor: Faint epoxy odor
Vapor Pressure: Not applicable
Vapor Density: Not applicable
Boiling Point: Not applicable
Solubility in Water: None
Specific Gravity: (H₂O = 1) 1.15

SECTION X – REACTIVITY AND STABILITY

Chemical Stability: Stable at ambient temperature
Conditions to Avoid: Elevated temperature over long period
Incompatible Materials: Acids, bases and oxidizing agents
Hazardous Decomposition: Carbon monoxide and aldehydes
Hazardous Polymerization: Will not occur by itself

SECTION XI – STORAGE AND HANDLING

Storage: Keep away from acids, oxidizers and heat. Protect containers from physical abuse.
Handling: Avoid contact to eyes and skin. Avoid excessive breathing of vapor. Smoking and open flame is not permitted in the area.

SECTION XII – TOXICOLOGY INFORMATION

Acute Oral Effects (LD₅₀): (Rat) Greater than 5,000 mg/kg.
Acute Dermal Toxicity (LD₅₀): (Rabbit) Greater than 6,000 mg/kg.
Inhalation Toxicity (LC₅₀): (Rat) Greater than 3,466 mg/m³
Sensitization: (Guinea Pig) Skin sensitizes
Skin Irritation: (Rabbit) Mild irritation
Eye Irritation: (Rabbit) Not an irritant

SECTION XIII – ECOLOGICAL INFORMATION

No ecological information available.

SECTION XIV – TRANSPORTATION INFORMATION

DOT Shipping Name: Resin compound – Not DOT regulated
IMO SHIPPING DATA: Not DOT regulated
ICAO/IATA Shipping: Not DOT regulated

SECTION XV – REGULATORY INFORMATION

Federal:

- **Sara Title III Sec. 313**
Under this regulation this product does not contain a toxic chemical for annual Toxic Chemical release reporting under Sec 313 (40 CFR 372).
- **OSHA Hazard Communication Standard**
Under 29 CFR 1910.1200 this product is a “Hazardous Chemical”.
- **TSCA Inventory Status**
All chemical components of this product are listed on TSCA inventory.
- **Cercla Status**
Not Listed
- **RCRA:**
Not a hazardous waste under RCRA (40 CFR 372)

State:

- **California proposition 65 listed chemicals:** None

THIS INFORMATION IS PROVIDED IN GOOD FAITH AND IS CORRECT TO THE BEST OF REVOLAN’S KNOWLEDGE AS OF THE DATE HEREOF, AND REVOLAN MAKES NO REPRESENTATION AS TO ITS COMPLETENESS OR ACCURACY. REVOLAN DISCLAIMS RESPONSIBILITY FOR DAMAGES OF ANY KIND RESULTING FROM THE USE OF THIS INFORMATION.

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MATERIAL SAFETY DATA SHEET

SECTION I – PRODUCT IDENTITY

PRODUCT IDENTITY: TERA-GEM III CRS CURING AGENT
PRODUCT NO: RP 70 CRS - B
CAS CHEMICAL NAME: MIXTURE
SYNONYMS: NONE
CHEMICAL FAMILY: CYCLOALIPHATIC AMINE
PROUDCT TYPE: LIQUID RESIN
INTENDED USE: EPOXY CURING AGENT
REVISED DATE: FEBRUARY, 2005
REVISION NOTE: UPDATE MSDS

Emergency Overview:

HMIS RATING Health 3
 Flammability 1
 Reactivity 0
 Protective Equipment X

In case of fire: use carbon dioxide, foam, and dry chemicals, with self-containing breathing apparatus.

Hazards: Moderate eye, respiratory and skin irritant.
 May cause skin sensitization.

Hazard Statement: IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200, THIS MATERIAL SAFETY DATA SHEET 9MSDS) HAS BEEN PREPARED.

SECTION II – HAZARDOUS INGREDIENTS

<u>%</u>	<u>CAS NO</u>	<u>CHEMICAL NAME</u>
> 5	25620-58-0	Trimethylhexamethylenediamine (TMD) OSHA PEL: None established ACGIH TLV: None Established
< 6	1477-55-0	Benzene-1, 3-dimethylamine (MXDA) OSHA PEL-C: 0.1000 mg/m ³ skin ACGIH TLV-C: 0.1000 mg/m ³ skin

> 20	100-51-6	Benzyl Alcohol OSHA PEL: None established ACGIH TLV: None Established
< 10	98-54-4	Paratertiarybutylphenol OSHA PEL: None established ACGIH TLV: None Established
< 4	1761-71-3	4,4 Methylenebiscyclohexanamine OSHA PEL: None established ACGIH TLV: None Established

THE REMAINING COMPONENTS ARE TRADE SECRET

SECTION III – HEALTH HAZARDS

Primary Routes of Exposure:

- Ingestion
- Skin Absorption
- Eye Contact
- Inhalation

Exposure Standards:

- No standard has been established for this product. Keep air contaminant concentration in work area to lowest levels.

Target Organs:

- Eyes, skin and respiratory systems.

Sign and Symptoms of Exposure (Acute Effects):

- Material vapor in low concentration can cause lacrimation, conjunctivitis and corneal edema when absorbed into the tissue of the eye from the atmosphere. This may give rise to a perception of “Blue Haze” or “fog” around lights. The effect is transitory and has no know lasting effect. Inhalation of the vapor, mist or fog may cause irritation in the respiratory tract and other harms. Eyes and skin contact with the undiluted material will quickly cause sever irritation and pain and may lead to burns, necrosis and permanent injury. Ingestion may cause bleeding of the gastrointestinal tract and vomiting of blood.

Sign and Symptoms of Exposure (Possible Longer Term Effects)

- Repeated and prolonged exposure may cause allergic reaction/sensitization, adverse respiratory effects (cough, tightness of chest or shortness of breath), adverse eye effects (conjunctivitis or corneal damage) and/or adverse skin effects (defatting, rash, irritation). Prolonged or repeated vapor inhalation effects may be delayed and which may cause dryness of nasal passages and sore throat. **Medical Conditions Generally Aggravated by Exposure** Asthma, chronic respiratory disease, eye disease, skin disorders and allergies.

SECTION IV – EMERGENCY AND FIRST AIDS

Ingestion: Give 3-4 glasses of water or milk. Do not induce vomiting. If vomiting occurs, give more water. Get medical advice.

Skin Contact: Wash with running soap and water for at least 15 minutes. Remove contaminated clothing and shoes and discard or decontaminate before re-use. Seek medical advice.

Eye Contact: Flush eyes with eyelids apart with running water for 15 minutes. Get medical help.

Inhalation: If breathing is stopped or is labored, remove person to fresh air and give assisted respiration. Prevent person from vomiting. Get medical attention if breathing becomes difficult or irritating.

SECTION V – FIRE AND EXPLOSION HAZARD

Properties:	Flash Point (Tag closed cup)	104 C (219 F)
	Upper Explosion Limit (UEL)	No Data
	Lower Explosion Limit (LEL)	No Data
	Auto ignition Temperature	No Data
	Fire Hazard Classification (OSHA/NFPA)	Class IIIB

Extinguishing Media: Use water fog, foam, dry chemicals or carbon dioxide.

Special Fire Fighting Procedures: Spray and cool fire exposed containers with water. Fire fighters should be protected with butyl rubber gloves, boots and body suite. In confined space fire area use self-contained breathing apparatus.

Unusual Fire and Explosion Hazards: Decomposition and combustion products may be toxic. Sudden reaction and fire may result if the product is mixed with an oxidizing agent. Evacuate personnel in vicinity and downwind.

SECTION VI – PERSONAL PROTECTION AND EXPOSURE

Respiratory Protection: In poorly ventilated area A NIOSH approved organic vapor respirator is recommended.

Protective Equipment: Use approved splash proof safety glasses, goggles or face shield for eye protection. Wear protective clothing resistant to this product. Immediately remove contaminated clothing and wash exposed skin with soap and water.

Ventilation: Good general mechanical ventilation with proper exhaust system, providing good air flow.

SECTION VII – SPILL AND LEAK PROCEDURES

Protect people by keeping unnecessary people away and avoiding all personal contact. For large spill contain material by use of dikes or barrier. Keep out of sewers, storm drains, soil and surface water. Keep fire or spark producing equipments away. For clean-up soak up with absorbent materials such as sand, clay or suitable materials. Residual material may be removed using soapy water. Placed absorbent material in a suitable container to be disposed in accordance with federal, state and local regulations.

SECTION VIII – PHYSICAL PROPERTIES

Appearance: Dark brownish color liquid
Odor: Ammoniacal Odor
Vapor Pressure: No Data
Vapor Density: No Data
Boiling Point: 225 C (437 F)
Solubility in Water: Slight
Specific Gravity: (H2O = 1) 1.047
Evaporation Rate: No Data

SECTION IX – REACTIVITY AND STABILITY

Chemical Stability: Stable at ambient temperature
Conditions to Avoid: Not Applicable
Incompatible Materials: Acids, and oxidizing agents
Hazardous Decomposition: Carbon monoxide and nitrogen oxides in fire. Ammonia and hydrogen cyanide when heated. Under oxygen-starved conditions combustion products like nitrile, cyanic acid, isocyanates, cyanogens and carbamate are formed.

SECTION X – STORAGE AND HANDLING

Storage: Keep away from acids, oxidizers and heat. Protect containers from physical abuse.
Handling: Avoid contact to eyes and skin. Avoid excessive breathing of vapor. Smoking and open flame is not permitted in the area.

SECTION XI – TOXICOLOGY INFORMATION

Acute Oral Toxicity (LD50): (Rat) > 1,750 mg/kg.
Acute Dermal Toxicity (LD50): (Rabbit) > 2,000 mg/kg (Estimate)
Acute Inhalation Toxicity (LC50): (Rat) > 700 ppm/hr (Estimate)
Other Acute Effects: No Data
Irritation Effects Data: Corrosive to the skin of rabbit
Chronic/Subchronic Data: No delayed chronic or subchronic test data are known

SECTION XII – ECOLOGICAL INFORMATION

Ecotoxicity: No Data
Environmental Fate: No Data
Additional Information: No Data

SECTION XIII – DISPOSAL CONSIDERATIONS

Comply with all federal, state and local regulations. May incinerate in admixture with fuel equipped with scrubber to remove nitrogen oxide and carbon monoxide.

SECTION XIV – TRANSPORTATION INFORMATION

DOT Non-Bulk Shipping Name: Amine. Liquid. Corrosive. N.O.S. (Benzene-1, 3 Dimethaneamine/Trimethylhexamethylenediamine); 8; UN2735; PG II

IMO SHIPPING DATA: Amine. Liquid. Corrosive. N.O.S. (Benzene-1, 3 Dimethaneamine/Trimethylhexamethylenediamine); 8; UN2735; II; IMDG Page 8109-2; F.P.93.3 C; Placard Corrosive; HazMat STCC=4935601; EMS No 8-05;MFAG No 320

ICAO/IATA Shipping: Amine. Liquid. Corrosive. N.O.S. (Benzene-1, 3 Dimethaneamine/Trimethylhexamethylenediamine); 8; UN2735; II; F.P.93.3 C; Shipment per 49CFR 171.11

SECTION XV – REGULATORY INFORMATION

Federal:

- **Sara Title III Sec. 312 and Sec. 313**
Under this regulation this product is classified as an “immediate health hazard” and under sec. 313 there are no components above the “de minimis level.
- **OSHA Hazard Communication Standard**
Under 29 CFR 1910.1200 this product is a “Corrosive”.
- **TSCA Inventory Status**
All chemical components of this product are listed on TSCA inventory.
- **Cercla Status**
Not Listed

State:

- **California proposition 65 listed chemicals:**
None

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