Perma-Lateral System

Product Bid Submittal

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Appendix A – Perma-Lateral System Overview

Appendix B – SDS

Appendix C – Specifications

Appendix A

Product Bid Submittal

ITEM 1.

Manufacturer Company Name: Perma-Liner Industries

Contact Individual(s) Pierre Balson – Director of Sales

Street Address: 13000 Automobile Boulevard, Suite 300

City, State, Zip Code: Clearwater, Florida 33762

Telephone: (727) 507-9749

Product Submittal: INSTALLATION PRACTICE FOR REHABILITATION OF A FULL-LENGTH SEWER SERVICE LATERAL USING A LATERAL CURED-IN-PLACE SCRIM LINER ASSEMBLY INSTALLED BY MEANS OF AIR INVERSION

Only Licensed and Trained Distributor-Contractors/Installers are authorized to install the Perma-Lateral

ITEM 2.

INTENT:

This specification covers material requirements, installation practices, and test methods for the reconstruction of a sewer service lateral pipe without excavation. The lateral pipe is remotely renovated from the cleanout or access point to a specified distance ranging from 3 to 600 feet. The pipe renovation shall be accomplished by the inversion and inflation of a resin impregnated, single-piece lateral liner. The liner is pressed against the lined lateral pipe by inflation of a bladder and held under pressure until the thermo-setting resin has cured. When cured, the liner extends over a predetermined length of the service lateral and forms a continuous, single-piece, tight fitting, corrosion resistant and verifiable non-leaking Lateral cured in-place pipe (CIPP) when outfitted with gasket seals. The Materials and Installation practices shall, at a minimum, adhere to the requirements of ASTM F2561-22 “Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube”.

The latest current test data is available upon request.

ITEM 3.

3.0 The Technique	The Perma-Lateral repair structurally renews the lateral. The repair consists of a scrim reinforced, one-piece, continuous lateral lining that is vacuum impregnated with thermo-setting resins, air inverted from the cleanout or access point up into the lateral by the action of a translucent bladder assembly; hereby referred to as a "Liner/Bladder Assembly".
3.1 A brief description of the operation and technique; including materials and methods of installation.	The reconstruction will be accomplished using a non-woven fabric tube of particular length and a thermo-setting resin with physical and chemical properties appropriate for the application. The lateral tube within a translucent inversion bladder is vacuum impregnated with the resin and then placed inside a protective launching device. When the launching device is properly positioned and aligned with the lateral connection, the main liner is inflated and the resin-saturated tube is inverted up through the old lateral pipe by the action of an inversion bladder. The resin saturated tube is cured and the inversion bladder and launching device are removed. The end result is a one-piece structural lateral lining that provides a verifiable non-leaking repair. The lateral tube length will be 3 to 600 feet The cured finished materials as described above will, upon installation inside the host pipe, exceed the minimum test standards specified by the American Society for Testing Methods F1216-22. <u>Minimum Test Standards for CIPP ASTM F1216</u> FLEXURAL STRENGTH - ASTM D-790 4,500 PSI FLEXURAL MODULUS - ASTM D-790 250,000 PSI
3.2 Intended use: Structural Repair Crack/Joint Sealing of Root Intrusion and Water Infiltration	The system is designed for fully and partially deteriorated pipe conditions. Typical installations are a direct result of ground water infiltration, root intrusion and structural defects such as open joints, offset joints, broken or missing pipe sections and hammer taps. The new pipe exhibits a smoothbore interior that typically increases flow rates.
3.3 Existing Sewer	When installed with hydrophilic O-rings that are compliant to ASTM-3240, the system is compatible with all pipe materials due to the use of the hydrophilic sealing O-rings embedded between the pipe and lining at each terminal end of the lateral lining.
3.4 Diameter Range	Lateral: 2 – 8 inch diameters.
3.5 Transitioning Diameters	The liner is not designed for transitions unless custom ordered
3.6 Circular and/or Non-Circular Capability	The system can accommodate pipe ovality up to -10%. Pipe ovality beyond 10% is not covered by the calculation of ASTM F1216

3.7 Material Limitations	This system is designed for gravity sewers and low pressure piping.
3.8 Lining Material Composition and Construction	Needle punched felt or proprietary kitted tubes coated with a chemically resistant impervious film. The tube is stitched using Nomex®, high-temp, high-strength thread. The tube is air-tight and flexible in design to reduce inversion pressures.
3.9 Resin System	Ambient Resin Heat Assist Resin Vinyl Ester Resin
3.10 Mechanical Properties	Excess resin migrates into pipe defects allowing a mechanical anchoring.
3.11 Physical Properties	Meets/Exceeds Minimum Test Standards for CIPP ASTM F1216 FLEXURAL STRENGTH - ASTM D-790 4,500 PSI FLEXURAL MODULUS - ASTM D-790 250,000 PSI
3.12 Corrosion attack	Chemical Resistance Testing. Test Method: ASTM D5813 and F1216. See Independent Laboratory Testing
3.13 Resin Saturation Method	The inverted liner (coating on the outside) is filled with the appropriate amount of thermosetting resin, sealed off at both ends and attached to a vacuum. Once sufficient vacuum is drawn, the resin is distributed throughout the liner by rolling it through a pinch roller or other suitable distribution method. The coating on the liner is translucent, allowing the installer and inspector to visually verify the lining tube has 100% resin saturation.
3.14 Gasket Seals	The lateral tube may include two ASTM F3240 compression O-ring gaskets attached six-inches from each end of the lateral tube.
3.15 Installed at one-time	The system allows only one (1) lateral at a time to be renewed. Conditions and number of laterals greatly determine the number of laterals that can be renewed in one-day, though a typical number of laterals renewed in one-day is five (5).
3.16 Missing Pipe Sections	The liner can span small missing sections of pipe.
3.17 Effects of Line and Grade	There are no effects caused by grade changes since air pressure is used to inflate the liner. The liner is flexible during insertion and can accommodate and negotiate 22, 45 and 90 degree bends. Installation is typically limited to 2 bends.
3.18 Protruding Lateral Pipes	It is recommended protrusions into the main pipe are limited to ½-inch.
3.19 Reduction in Pipe Diameter, and its Effect	The liner exhibits a slick and typically smooth interior with a co-efficient that increases flow-rate. Minor wrinkling may occur at bends of 45-degrees and greater and some wrinkling may occur based on actual inner pipe diameter, inner surface, pipe configuration and conditions.

ITEM 4.

4.0 Sewer preparation involves cleaning and a flow stoppage or diversion period.	The lateral is cleaned utilizing high-pressure water and mechanical cleaning tools. Pressures may range from 2,000 to 4,000 PSI removing all roots, debris, and obstructions. Any protruding service connections will be removed prior to liner insertion. The current condition of the pipe will be compared to the original designed condition to verify that design parameters have not changed. Normal mainline flows are plugged or by-passed during the process, depending on flow.
4.1 Installation Crew and Equipment	A typical crew consists of 2-4 technicians. The installation process is typically quick, efficient and non-disruptive when compared to open cut replacement methods.
4.2 Inversion/Inflation Method	Air pressure is applied to the Liner to invert into the lateral pipe and then the bladder follows. The bladder extends past each terminal end of the lining assembly so the ends remain open and no cutting is necessary.
4.3 Maximum Length	Maximum length for a continuous lateral lining is 600 feet.
4.4 Curing Method	The Resin/Catalyst packages are proprietary to Perma-Liner. The resin systems are cured at ambient or elevated temperatures. <u>Pot Life (depends on working environment/temperature):</u> • Vinyl Ester: 30-60 minutes • Epoxy: 30-60 minutes <u>*Ambient Cure Time (depends on working environment/temperature):</u> • Vinyl Ester: 2-3 hours • Epoxy: 3-5 hours **Cure times can be expedited by applying heat (steam or hot water)*
4.5 Removal of Inflation Device	The bladder is re-inverted peeling away from the new cured in-place pipe. During the removal process, the bladder is drawn back into the launching device.
4.6 Document Final Video and Testing Procedures	A final video inspection should be performed from the main or cleanout to see the termination point of the liner.
4.7 Design Life	Each product comes with a standard 10 year warranty. 50-Year Design Life must be verified by installers based on installation conditions and calculations defined in ASTM F1216 Appendix X1 and long-term creep as described in ASTM D2990.

Appendix B

SAFETY DATA SHEET
Safety Data Sheet
PERMA-LINER EPOXY RESIN PART A

Section 1. Product and company identification

GHS product identifier : PERMA-LINER EPOXY RESIN PART A
Product type : Epoxy Resin

Manufacturer/Supplier/Importer : Perma-Liner Industries, LLC
13000 Automobile BLVD Suite #300
Clearwater, FL 33762

Contact person : info@perma-liner.com

Telephone : For additional health and safety or regulatory information, call
727-507-9749

Emergency telephone number : For Emergency Medical Assistance

Call Health & Safety Information Services
1-866-303-6949

For Emergency Transportation Information
CHEMTREC US Domestic (800) 424-9300
CHEMTREC International (703) 527-3887
CANUTEC CA Domestic (613) 996-6666

Section 2. Hazards identification

Classification of the substance or mixture : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
SKIN SENSITIZATION - Category 1
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)
[Respiratory tract irritation] - Category 3

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : H315 Causes skin irritation.
H319 Causes serious eye irritation.
H317 May cause an allergic skin reaction. H335 May cause respiratory irritation.

Precautionary statements

General : Not applicable.

Prevention : Wear protective gloves. Wear eye or face protection.
Use only outdoors or in a well-ventilated area. Avoid breathing vapor.
Wash hands thoroughly after handling.
Contaminated work clothing should not be allowed out of the workplace.

Response : **IF INHALED:**
Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or physician if you feel unwell.
IF ON SKIN:
Wash with plenty of soap and water. Take off contaminated clothing.
Wash contaminated clothing before reuse. If skin irritation or rash occurs:
Get medical attention.
IF IN EYES:
Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists:
Get medical attention.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Other hazards which do not result in classification : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	% by weight	CAS number
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	90 - 100	25068-38-6

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting
in this section.
Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first aid personnel	:	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	:	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	None known.
Specific hazards arising from the chemical	:	In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	:	Decomposition products may include the following materials: carbon dioxide carbon monoxide halogenated compounds
Special protective actions for fire- fighters	:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	:	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	:	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	:	If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the
product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste
disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non- combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13 of SDS). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 of SDS for emergency contact information and section 13 of SDS for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see section 8 of
SDS). Persons with a history of skin sensitization problems should not
be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly
closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See

also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10 of SDS) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures
and/or the necessity to use respiratory protective equipment.

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust
ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or
engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations
and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gasses or dusts. If contact is possible, the following protection should

Skin protection

Hand protection	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection	:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	:	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	:	Viscous liquid.
Color	:	Clear.
Odor	:	Not available
Odor threshold	:	Not available
pH	:	Not available
Melting point/ Freezing point	:	Not available
Boiling point	:	260 °C (500.00 °F)
Flash point	:	Pensky-Martens Closed Cup: 249 °C (480.20 °F) (ASTM D 93)
Burning time	:	Not available
Burning rate	:	Not available
Evaporation rate	:	Not available
Flammability (solid, gas)	:	Not available
Lower and upper explosive (flammable) limits	:	**Lower:** Not available **Upper:** Not available
Vapor pressure	:	0.04 mbar @ 77 °C (170.60 °F)
Vapor density	:	Not available
Relative density	:	1.17
Solubility	:	Not available
Solubility in water	:	Negligible

Partition coefficient: n-octanol/water	:	Not available
Auto-ignition temperature	:	Not available
Decomposition temperature	:	Not available
SADT	:	Not available
Viscosity	:	**Dynamic:** Not available **Kinematic:** Not available

Other information

No additional information.

Section 10. Stability and reactivity

Reactivity	:	Stable under normal conditions.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Strong oxidizer, Extremes of temperature and direct sunlight.
Incompatible materials	:	Reactive or incompatible with the following materials: strong oxidizing agents, strong acids, strong alkalis,
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Other hazards		Reacts with considerable heat release with some curing agents.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer				
	LD50 Oral	Rat	11,400 mg/kg	-
	LD50 Dermal	Rat	2,000 mg/kg	-

Conclusion/Summary : Not available

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	Skin - Erythema/Eschar 404 Acute	Rabbit	1.5 - 2		-

	Dermal Irritation/Corrosion				
	Skin - Edema 404 Acute Dermal Irritation/Corrosion	Rabbit	1.0 - 1.5		-
	eyes - - 405 Acute Eye Irritation/Corrosion	Rabbit	0		-
	eyes - Redness of the conjunctivae	Rabbit	0.7		-
	Skin - Moderate irritant	Rabbit		24 hrs	-
	Skin - Severe irritant	Rabbit		24 hrs	-
	eyes - Mild irritant	Rabbit			-

Conclusion/Summary

Skin : Not available

eyes : Not available

Respiratory : Not available

Sensitization

Conclusion/Summary

Skin : Not available

Respiratory : Not available

Mutagenicity

Conclusion/Summary : Not available

Carcinogenicity

Conclusion/Summary : Not available

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	-	-	-	-	-	-
Remarks :	No adverse reproductive effects were observed in an O.E.C.D. Test Guideline no. 416 GLP two-generation rat oral gavage study conducted up to a high dose level of 750 mg/kg/day that resulted in adult body weight decrements.					

Conclusion/Summary : Not available

Teratogenicity
Conclusion/Summary : Not available

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	Category 3		Respiratory tract irritation

Specific target organ toxicity (repeated exposure)
Not available

Aspiration hazard
Not available

Information on the likely routes of exposure : Not available

Potential acute health effects

Eye contact : Causes serious eye irritation.
Inhalation : May cause respiratory irritation.
Skin contact : Causes skin irritation. May cause an allergic skin reaction.
Ingestion : Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following: pain or irritation
watering redness

Inhalation : Adverse symptoms may include the following: respiratory tract irritation
coughing

Skin contact : Adverse symptoms may include the following: irritation
redness

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available
Potential delayed effects : Not available

Long term exposure

Potential immediate effects : Not available
Potential delayed effects : Not available

Potential chronic health effects
Conclusion/Summary : Not available

General : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
reaction product: bisphenol-A-(epichlorhydrin); epoxy resin (number average molecular weight ≤ 700)			
	Acute LC50 1.3 mg/l - 203 Fish, Acute Toxicity Test	Fish - Fish	96 h
	Acute EC50 2.1 mg/l - 202 Daphnia sp. Acute Immobilization Test and Reproduction Test	Aquatic invertebrates. Water flea	48 h
	Acute NOEC 0.3 mg/l - 211 Daphnia Magna Reproduction Test	Aquatic invertebrates. Water flea	21 d
	Acute LC50 > 11 mg/l -	Aquatic plants - Algae	72 h

Conclusion/Summary : Not available

Persistence/degradability

Conclusion/Summary : Not available

Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
4,4'-Isopropylidenediphenol-Epichlorohydrin Copolymer	2.64 - 3.78	3 - 31 31.00	low

Mobility in soil

Soil/water partition coefficient (KOC) : Not available

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal
of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN/NA number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR		Non-regulated		
TDG		Non-regulated		
IMO/IMDG		Non-regulated		
IATA (Cargo)		Non-regulated		

*PG : Packing group

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.'

Section 15. Regulatory information

United States

U.S. Federal regulations : **United States - TSCA 12(b) - Chemical export notification:** None required.
United States - TSCA 5(a)2 - Final significant new use rules: Not listed **United States - TSCA 5(a)2 - Proposed significant new use rules:** Not listed
United States - TSCA 5(e) - Substances consent order: Not listed

California Prop. 65: : WARNING: This product contains less than 0.1% of a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Oxirane, 2-(phenoxymethyl)-	Yes.	No.	5 µg/day	No.

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada

WHMIS (Canada) : Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists

Canadian NPRI : None required.

CEPA Toxic substances : None required.

International regulations

International lists : **Australia inventory (AICS):** All components are listed or exempted.
Canada inventory: All components are listed or exempted.
Japan inventory: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Korea inventory: All components are listed or exempted.
New Zealand Inventory (NZIoC): All components are listed or exempted. **Philippines inventory (PICCS):** All components are listed or exempted. **United States inventory (TSCA 8b):** All components are listed or exempted.
Taiwan inventory (CSNN): All components are listed or exempted.

Section 16. Other information

Hazardous Material Information System III (U.S.A.) :

Health	*	2
Flammability		1
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA).
HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868. The customer is responsible for determining the PPE code for this material.

Full text of abbreviated H statements : Not applicable.

History

Date of printing	:	08/17/2015
Date of issue/Date of revision	:	02/04/2015
Date of previous issue	:	03/08/2012
Version	:	14.0
Prepared by	:	Product Safety Stewardship
Key to abbreviations	:	ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail UN = United Nations
References	:	Not available

Notice to reader

The information provided herein was believed by Perma-Liner Industries to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Perma-Liner are subject to Perma-Liner's terms and conditions of sale. PERMA-LINER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY
INFORMATION PROVIDED BY PERMA-LINER, except that the product shall conform to Perma-Liner's specifications. Nothing contained herein constitutes an offer for the sale of any product.

Section 1. Product and company identification

GHS product identifier : PERMA-LINER EPOXY RESIN PART
Product type : B1
Curing Agent

Manufacturer/Supplier/Importer : Perma-Liner Industries,
LLC 13000 Automobile
BLVD Suite #300
Clearwater, FL 33762

Contact person : info@perma-liner.com

Telephone : For additional health and safety or regulatory information, call
727-507-9749

Emergency telephone number : For Emergency Medical Assistance

Call Health & Safety Information Services
1-866-303-6949

For Emergency Transportation Information
CHEMTREC US Domestic (800) 424-9300
CHEMTREC International (703) 527-3887
CANUTEC CA Domestic (613) 996-6666

Section 2. Hazards identification

Classification of the substance or mixture :
SKIN CORROSION/IRRITATION - Category 1B
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
SKIN SENSITIZATION - Category 1
TOXIC TO REPRODUCTION - Category 2
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)
[central nervous system (CNS)] - Category 2
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) [bladder, kidneys, liver] - Category 2

GHS label elements

Hazard pictograms :

Signal word : Danger
Hazard statements : H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage.
H317 May cause an allergic skin reaction.

H361f Suspected of damaging fertility.
H371 May cause damage to organs (central nervous system (CNS)) H373 May cause damage to organs through prolonged or repeated exposure (bladder, kidneys, liver)

Precautionary statements

General : Not applicable.

Prevention : Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Use personal protective equipment as required. Wear protective gloves.
Wear eye or face protection. Wear protective clothing.
Do not breathe vapor.
Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.
Contaminated work clothing should not be allowed out of the workplace.

Response : Get medical attention if you feel unwell. IF exposed or if you feel unwell:
Call a POISON CENTER or physician.
IF INHALED:
Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Immediately call a POISON CENTER or physician.
IF SWALLOWED:
Immediately call a POISON CENTER or physician. Rinse mouth.
Do NOT induce vomiting.
IF ON SKIN (or hair):
Take off immediately all contaminated clothing. Rinse skin with water or shower.
Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. **IF ON SKIN:**
Wash with plenty of soap and water. If skin irritation or rash occurs:
Get medical attention.
IF IN EYES:
Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Other hazards which do not result in classification : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	% by weight	CAS number
1,3-Propanediamine, N1-[3-(tridecyloxy)propyl]-, branched	35 - 50	68479-04-9
4,4'-Isopropylidenediphenol	25 - 35	80-05-7
Poly(oxypropylene) diamine	25 - 35	9046-10-0

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.
Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

Inhalation Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must

be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments	No specific treatment.
Protection of first aid personnel	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	:	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	None known.
Specific hazards arising from the chemical	:	In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	:	Decomposition products may include the following materials: carbon oxides nitrogen oxides other organic compounds
Special protective actions for fire- fighters	:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	:	Fire-fighters should wear appropriate protective equipment and self- contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
For emergency responders	If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions	:	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and material for containment and cleaning up

Small spill	:	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill	:	Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non- combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13 of SDS). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 of SDS for emergency contact information and section 13 of SDS for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures	:	Put on appropriate personal protective equipment (see section 8 of SDS). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
Advice on general occupational hygiene	:	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
Conditions for safe storage, including any incompatibilities	:	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10 of SDS) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
4,4'-Isopropylidenediphenol	**ACGIH TLV ()** Time Weighted Average (TWA) 5 mg/m3 **OSHA PEL ()** Time Weighted Average (TWA) 5 mg/m3 Form: respirable particulate **Time Weighted Average (TWA)** 15 mg/m3 Form: total dust

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Appropriate engineering controls : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties.

		It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection	:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	:	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	:	Viscous liquid.
Color	:	Light
Odor	:	amine.
Odor threshold	:	Not available
pH	:	Not available
Melting point/ Freezing point	:	Not available
Boiling point	:	Not available
Flash point	:	Setaflash Closed Cup: 93.4 °C (200.12 °F) (ASTM D 3828)
Burning time	:	Not available
Burning rate	:	Not available
Evaporation rate	:	1 ((n-Butyl acetate=1))
Flammability (solid, gas)	:	Not available
Lower and upper explosive (flammable) limits	:	**Lower:** Not available **Upper:** Not available
Vapor pressure	:	1.33 mbar @ 20 °C (68.00 °F)
Vapor density	:	1 [Air = 1]
Relative density	:	0.96
Solubility	:	Not available
Solubility in water	:	Partial
Partition coefficient: n-octanol/water	:	Not available
Auto-ignition temperature	:	Not available

Decomposition temperature : Not available
SADT : Not available
Viscosity : **Dynamic:** Not available

Kinematic: Not available

Other information
No additional information.

Section 10. Stability and reactivity

Reactivity : Stable under normal conditions.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Strong oxidizer, Keep away from heat, sparks, flame and other ignition sources.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Other hazards Heating this substance above 300 deg. F in the presence of air may cause slow oxidative decomposition; above 500 deg. F polymerization may occur. Some combinations of resins and curing agents can produce exothermic reactions which in large masses can cause runaway polymerization and charring of the reactants
Fumes and vapors from the thermal and chemical decompositions vary widely in composition and toxicity.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
4,4'-Isopropylidenediphenol				
	LD50 Oral	Rat	3,250 mg/kg	-
	LD50 Dermal	Rabbit	3,000 mg/kg	-
Poly(oxypropylene) diamine				
	LD50 Oral	Rat	1,100 mg/kg	-
	LD50 Dermal	Rabbit	1,550 mg/kg	-

Conclusion/Summary : Not available

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation

4,4'-Isopropylidenediphenol	Skin - Erythema/Eschar 404 Acute Dermal Irritation/Corrosion	Rabbit	0	4 hrs	1 - 72 hrs
	Skin - Edema 404 Acute Dermal Irritation/Corrosion	Rabbit	0	4 hrs	1 - 72 hrs
	eyes - Cornea opacity 405 Acute Eye Irritation/Corrosion	Rabbit	1		-
	eyes - Iris lesion 405 Acute Eye Irritation/Corrosion	Rabbit	1		-
	eyes - Redness of the conjunctivae 405 Acute Eye Irritation/Corrosion	Rabbit	1		-
	eyes - Edema of the conjunctivae 405 Acute Eye Irritation/Corrosion	Rabbit	1 - 2		-
Poly(oxypropylene) diamine	eyes - Severe irritant	Rabbit			-

Conclusion/Summary

Skin : Not available
eyes : Not available
Respiratory : Not available

Sensitization

Conclusion/Summary

Skin : Not available
Respiratory : Not available

Mutagenicity

Conclusion/Summary : Not available

Carcinogenicity
Conclusion/Summary : Not available

Reproductive toxicity
Conclusion/Summary : See below for potential chronic health effects

Teratogenicity
Conclusion/Summary : Not available

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
4,4'-Isopropylidenediphenol	Category 3 Category 2 Category 3 Category 2		Respiratory tract irritation central nervous system (CNS) Respiratory tract irritation central nervous system (CNS)

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
4,4'-Isopropylidenediphenol	Category 2		bladder kidneys liver bladder kidneys liver

Aspiration hazard
Not available

Information on the likely routes of exposure : Not available

Potential acute health effects

Eye contact : Causes serious eye damage.
Inhalation : May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause
a health hazard. Serious effects may be delayed following exposure.
Skin contact : Causes severe burns. May cause an allergic skin reaction.
Ingestion : May cause burns to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following: pain
watering redness

Inhalation	:	No specific data.
Skin contact	:	Adverse symptoms may include the following: pain or irritation redness blistering may occur
Ingestion	:	Adverse symptoms may include the following: stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	:	Not available
Potential delayed effects	:	Not available

Long term exposure

Potential immediate effects	:	Not available
Potential delayed effects	:	Not available

Potential chronic health effects

Product/ingredient name	Result	Species	Dose	Exposure
4,4'-Isopropylidenediphenol	- -	-		-

Remarks: Bisphenol A (BPA) has been extensively tested in a wide variety of toxicological and biological tests, and has undergone many reviews internationally by a variety of governmental agencies. Many of these studies have focused on reproductive, developmental and endocrine endpoints. However, the human data is limited and insufficient to evaluate reproductive toxicity. While some studies show, or claim to show, target organ toxicity, fertility, or reproductive effects in humans; these studies lack internal and external validity as a result of flawed study design, multiple sources of bias, and lack of control for confounding factors.

Numerous animal studies have been conducted and report a range of potential reproductive effects from BPA exposure. Although some studies report reproductive effects, many of these studies suffer from design flaws and reported observations have not been confirmed in larger, more robust studies. Comprehensive reviews of the scientific literature on BPA have focused on several well designed animal studies as a robust foundation for assessing BPA reproductive toxicity (e.g., NTP 1985; Ema et al. 2001; Tyl et al. 2002a, 2002b; Tyl et al. 2008; Delclos et al. 2014). In these studies, BPA was administered to rats and/or mice by the oral route of exposure including doses that far exceed those potentially experienced by humans, including workers. In these studies, either no reproductive toxicity was reported, or treatment-related reproductive effects were reported only at doses where maternal toxicity was observed. Maternal toxicity was manifest as liver toxicity, kidney toxicity, and overall depressions in body weight or body weight gains. The presence of these clear toxic effects was consistent with the role of stress and general systemic toxicity in the development of the reproductive effects at these high doses of BPA. The authors of these studies all concluded that systemic toxicity played a role in the observation of the reproductive effects.

By letter dated April 6, 2015, the U.S. Food and Drug Administration (“FDA”) of the U.S. Department of Health & Human Services reported that FDA’s National Center of Toxicological Research (“NCTR”) “recently completed a large scale rodent toxicity study designed to characterize potential effects of BPA in a wide
range of endpoints, including reproductive toxicity…. The results from the large

	extent of reproductive, sperm and hormone parameters evaluated in the NCTR study do not support BPA as a reproductive toxicant." Based on the total weight of evidence of the experimental animal data, including the lack of robust epidemiological data for reproductive effects, well-established pharmacokinetic data and the results of FDA's recent large scale toxicity study and using expert judgment, there is insufficient scientific support to associate reproductive toxicity with BPA exposure in the absence of systemic toxicity. Because experimental animal studies have indicated potential for reproductive effects in association with maternal toxicity at high doses, BPA has been classified as a Category 2 suspected human reproductive toxicant as required by OSHA.

Conclusion/Summary : Not available

General : May cause damage to organs through prolonged or repeated exposure
Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : Suspected of damaging fertility.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	2,739.5 mg/kg
Route	**ATE value**
Dermal	3,406.6 mg/kg

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
bisphenol A			
	Acute LC50 4.6 mg/l Fresh water	Fish - Fathead minnow	96 h
	Acute NOEC 0.016 mg/l Fresh water Chronic ecotoxicity	Fish - Fathead minnow	444 d
	Acute EC50 1 - 16 mg/l Fresh water	Aquatic invertebrates. Water flea	48 h
	Acute NOEC 1.8 mg/l Fresh water	Aquatic invertebrates. Water flea	48 h
	Acute EC50 2.73 mg/l Fresh water	Aquatic plants - Microalgae	96 h
	Chronic NOEC 0.016 mg/l Fresh water	Fish - Fathead minnow	444 d
	Chronic NOEC 1.8 mg/l Fresh water	Aquatic invertebrates. Water flea	-

Conclusion/Summary : Not available

Persistence/degradability

Conclusion/Summary : Not available

Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
4,4'-Isopropylidenediphenol	3.4	73	low
Poly(oxypropylene) diamine	1.34	-	low

Mobility in soil

Soil/water partition coefficient (KOC) : Not available

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN/NA number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR	2735	POLYAMINES, LIQUID, CORROSIVE, N.O.S. (TRIDECYLOXYPROPYL-1,3-PROPANEDIAMINE, BRANCHED, POLYOXYPROPYLENEDIAMINE)	Class 8 III	

TDG	2735	POLYAMINES, LIQUID, CORROSIVE, N.O.S. (TRIDECYLOXYPROPYL-1,3-PROPANEDIAMINE, BRANCHED, POLYOXYPROPYLENEDIAMINE)	Class 8 III
IMO/IMDG	2735	POLYAMINES, LIQUID, CORROSIVE, N.O.S. (TRIDECYLOXYPROPYL-1,3-PROPANEDIAMINE, BRANCHED, POLYOXYPROPYLENEDIAMINE)	Class 8 III
IATA (Cargo)	2735	POLYAMINES, LIQUID, CORROSIVE, N.O.S. (TRIDECYLOXYPROPYL-1,3-PROPANEDIAMINE, BRANCHED, POLYOXYPROPYLENEDIAMINE)	Class 8 III

*PG : Packing group

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident
or spillage.'

Section 15. Regulatory information

United States

U.S. Federal regulations : **United States - TSCA 12(b) - Chemical export notification:** None required.
United States - TSCA 5(a)2 - Final significant new use rules: Not listed **United States - TSCA 5(a)2 - Proposed significant new use rules:** Not listed
United States - TSCA 5(e) - Substances consent order: Not listed

SARA 313

		Product name	CAS number
Form R - Reporting requirements	:	Phenol, 4,4'-(1-methylethylidene)bis-	80-05-7
Supplier notification	:	Phenol, 4,4'-(1-methylethylidene)bis-	80-05-7

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS

shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

California Prop. 65: : WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Phenol, 4,4'-(1-methylethylidene)bis-	No.	Yes.	No.	No.

United States inventory (TSCA 8b) : All components are listed or exempted.

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic). Class D-2B: Material causing other toxic effects (Toxic). Class E: Corrosive material

Canadian lists

Canadian NPRI : The following components are listed: Phenol, 4,4'-(1-methylethylidene)bis-

CEPA Toxic substances : None required.

International regulations

International lists : **Australia inventory (AICS):** All components are listed or exempted.
Canada inventory: All components are listed or exempted.
Japan inventory: Not determined.
China inventory (IECSC): All components are listed or exempted.
Korea inventory: All components are listed or exempted.
New Zealand Inventory (NZIoC): All components are listed or exempted. **Philippines inventory (PICCS):** All components are listed or exempted. **United States inventory (TSCA 8b):** All components are listed or exempted.
Taiwan inventory (CSNN): All components are listed or exempted.

Section 16. Other information

Hazardous Material Information System III (U.S.A.) :

Health	*	3
Flammability		1
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA).
HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868. The customer is responsible for determining the PPE code for this material.

Full text of abbreviated H : Not applicable.

statements History

Date of printing	:	08/17/2015
Date of issue/Date of revision	:	05/31/2015
Date of previous issue	:	03/08/2012
Version	:	9.0
Prepared by	:	Product Safety Stewardship
Key to abbreviations	:	ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail UN = United Nations
References	:	Not available

Notice to reader

The information provided herein was believed by Perma-Liner Industries to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Perma-Liner are subject to Perma-Liner's terms and conditions of sale. PERMA-LINER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY
INFORMATION PROVIDED BY PERMA-LINER, except that the product shall conform to Perma-Liner's specifications. Nothing contained herein constitutes an offer for the sale of any product.

SAFETY DATA SHEET
PERMA-LINER EPOXY RESIN PART B2

Section 1. Product and company identification

GHS product identifier : PERMA-LINER EPOXY RESIN PART
Product type : B2
Curing Agent

Manufacturer/Supplier/Importer : Perma-Liner Industries,
LLC 13000 Automobile
BLVD Suite #300
Clearwater, FL 33762

Contact person : info@perma-liner.com

Telephone : For additional health and safety or regulatory information, call
727-507-9749

Emergency telephone number : For Emergency Medical Assistance

Call Health & Safety Information Services
1-866-303-6949

For Emergency Transportation Information
CHEMTREC US Domestic (800) 424-9300
CHEMTREC International (703) 527-3887
CANUTEC CA Domestic (613) 996-6666

Section 2. Hazards identification

Classification of the substance or mixture : ACUTE TOXICITY:oral - Category 4 ACUTE TOXICITY:dermal - Category 3 ACUTE TOXICITY:inhalation - Category 4
SKIN CORROSION/IRRITATION - Category 1B
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
RESPIRATORY SENSITIZATION - Category 1
SKIN SENSITIZATION - Category 1 TOXIC TO REPRODUCTION - Category 2
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)
[eyes, central nervous system (CNS), nervous system] - Category 2 SPECIFIC TARGET ORGAN TOXICITY (REPEATED
EXPOSURE) [skin, kidneys, lungs, liver] - Category 1

GHS label elements

Hazard pictograms :

Signal word	:	Danger
Hazard statements	:	H302 Harmful if swallowed. H311 Toxic in contact with skin. H332 Harmful if inhaled. H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage. H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled. H317 May cause an allergic skin reaction. H361f Suspected of damaging fertility. H371 May cause damage to organs (eyes, central nervous system (CNS), nervous system) H372 Causes damage to organs through prolonged or repeated exposure: (skin, kidneys, lungs, liver)

Precautionary statements

General	:	Not applicable.
Prevention	:	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Wear protective clothing. In case of inadequate ventilation wear respiratory protection. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace.
Response	:	Get medical attention if you feel unwell. IF exposed or if you feel unwell: Call a POISON CENTER or physician. **IF INHALED:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician. If experiencing respiratory symptoms: Call a POISON CENTER or physician. **IF SWALLOWED:** Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. **IF ON SKIN (or hair):** Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. **IF ON SKIN:** Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell.

If skin irritation or rash occurs:
Get medical attention.
IF IN EYES:
Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Other hazards which do not result in classification : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Ingredient name	% by weight	CAS number
Diethylenetriamine	50 - 70	111-40-0
4,4'-Isopropylidenediphenol	25 - 35	80-05-7

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.
Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses.
Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

Inhalation Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. In the event of any complaints or symptoms, avoid further exposure.

Skin contact Get medical attention immediately. Call a poison center or physician.

		Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	:	Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	:	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments	:	No specific treatment.
Protection of first aid personnel	:	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	:	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing media	:	None known.
Specific hazards arising from the chemical	:	In a fire or if heated, a pressure increase will occur and the container may burst.
Hazardous thermal decomposition products	:	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides
Special protective actions for fire- fighters	:	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	:	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and material for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non- combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13 of SDS). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 of SDS for emergency contact information and section 13 of SDS for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see section 8 of SDS). Persons with a history of skin sensitization problems or asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10 of SDS) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Diethylenetriamine	**ACGIH TLV (1994-09-01)** Time Weighted Average (TWA) 4.2 mg/m3 1 ppmForm: Skin **NIOSH REL (1994-06-01)** Time Weighted Average (TWA) 4 mg/m3 1 ppm **OSHA PEL 1989 Vacated (1989-03-01)** Time Weighted Average (TWA) 4 mg/m3 1 ppm
4,4'-Isopropylidenediphenol	**ACGIH TLV ()** Time Weighted Average (TWA) 5 mg/m3 **OSHA PEL ()** Time Weighted Average (TWA) 5 mg/m3 Form: respirable particulate **Time Weighted Average (TWA)** 15 mg/m3 Form: total dust

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
Eye/face protection	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	:	Liquid
Color	:	Reddish-brown
Odor	:	amine.
Odor threshold	:	Not available
pH	:	Not available
Melting point/ Freezing point	:	Not available

Boiling point	:	207 °C (404.60 °F)
Flash point	:	Setaflash Closed Cup: 93.4 °C (200.12 °F) (ASTM D 3828)
Burning time	:	Not available
Burning rate	:	Not available
Evaporation rate	:	1 ((n-Butyl acetate=1))
Flammability (solid, gas)	:	Not available
Lower and upper explosive (flammable) limits	:	**Lower:** 1.4 %(V) **Upper:** Not available
Vapor pressure	:	0.13 mbar @ 20 °C (68.00 °F)
Vapor density	:	1 [Air = 1]
Relative density	:	1.02
Solubility	:	Not available
Solubility in water	:	Partial
Partition coefficient: n-octanol/water	:	Not available
Auto-ignition temperature	:	Not available
Decomposition temperature	:	Not available
SADT	:	Not available
Viscosity	:	**Dynamic:** Not available **Kinematic:** Not available

Other information

No additional information.

Section 10. Stability and reactivity

Reactivity	:	Stable under normal conditions.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Keep away from heat, sparks, flame and other ignition sources.
Incompatible materials	:	strong oxidizing agents,
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Other hazards	Heating this substance above 300 deg. F in the presence of air may cause slow oxidative decomposition; above 500 deg. F polymerization may occur. Some combinations of resins and curing agents can produce exothermic reactions which in large masses can cause runaway polymerization and charring of the reactants Fumes and vapors from the thermal and chemical decompositions vary widely in composition and toxicity.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Diethylenetriamine				
	LD50 Oral	Rat	1,080 mg/kg	-
	LD50 Dermal	Rabbit	675 mg/kg	-
	LD50 Dermal	Rabbit	1,090 mg/kg	-
4,4'-Isopropylidenediphenol				
	LD50 Oral	Rat	3,250 mg/kg	-
	LD50 Dermal	Rabbit	3,000 mg/kg	-

Conclusion/Summary : Not available

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Diethylenetriamine	Skin - Moderate irritant	Rabbit			-
4,4'-Isopropylidenediphenol	Skin - Erythema/Eschar 404 Acute Dermal Irritation/Corrosion	Rabbit	0	4 hrs	1 - 72 hrs
	Skin - Edema 404 Acute Dermal Irritation/Corrosion	Rabbit	0	4 hrs	1 - 72 hrs
	eyes - Cornea opacity 405 Acute Eye Irritation/Corrosion	Rabbit	1		-
	eyes - Iris lesion 405 Acute Eye Irritation/Corrosion	Rabbit	1		-
	eyes - Redness of the conjunctivae 405 Acute Eye Irritation/Co	Rabbit	1		-

	rrosion				
	eyes - Edema of the conjunctiva e 405 Acute Eye Irritation/Corrosion	Rabbit	1 - 2		-

Conclusion/Summary

Skin : Not available

eyes : Not available

Respiratory : Not available

Sensitization

Conclusion/Summary

Skin : Not available

Respiratory : Not available

Mutagenicity

Conclusion/Summary : Not available

Carcinogenicity

Conclusion/Summary : Not available

Reproductive toxicity

Conclusion/Summary : See below for potential chronic health effects

Teratogenicity

Conclusion/Summary : Not available

Specific target organ toxicity (single exposure)

Product/ingredient name	Category	Route of exposure	Target organs
Diethylenetriamine	Category 2		eyes nervous system

Product/ingredient name	Category	Route of exposure	Target organs
Diethylenetriamine	Category 1		kidney s skin lungs

4,4'-Isopropylidenediphenol	Category 3 Category 2 Category 3 Category 2		Respiratory tract irritation central nervous system (CNS) Respiratory tract irritation central nervous system (CNS)

			liver
4,4'-Isopropylidenediphenol	Category 2		bladder kidneys liver bladder kidneys liver

Aspiration hazard

Not available

Information on the likely routes of exposure : Not available

Potential acute health effects

Eye contact : Causes serious eye damage.

Inhalation : Harmful if inhaled. May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Causes severe burns. Toxic in contact with skin. May cause an allergic skin reaction.

Ingestion : Harmful if swallowed. May cause burns to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following: pain watering redness

Inhalation : Adverse symptoms may include the following: wheezing and breathing difficulties asthma

Skin contact : Adverse symptoms may include the following: pain or irritation redness blistering may occur

Ingestion : Adverse symptoms may include the following: stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available

Potential chronic health effects

Product/ingredient name	Result	Species	Dose	Exposure
4,4'-Isopropylidenediphenol	- -	-		-

Remarks: Bisphenol A (BPA) has been extensively tested in a wide variety of toxicological and biological tests, and has undergone many reviews internationally by a variety of governmental agencies. Many of these studies have focused on reproductive, developmental and endocrine endpoints. However, the human data is limited and insufficient to evaluate reproductive toxicity. While some studies show, or claim to show, target organ toxicity, fertility, or reproductive effects in humans; these studies lack internal and external validity as a result of flawed study design, multiple sources of bias, and lack of control for confounding factors.

Numerous animal studies have been conducted and report a range of potential reproductive effects from BPA exposure. Although some studies report reproductive effects, many of these studies suffer from design flaws and reported observations have not been confirmed in larger, more robust studies. Comprehensive reviews of the scientific literature on BPA have focused on several well designed animal studies as a robust foundation for assessing BPA reproductive toxicity (e.g., NTP 1985; Ema et al. 2001; Tyl et al. 2002a, 2002b; Tyl et al. 2008; Delclos et al. 2014). In these studies, BPA was administered to rats and/or mice by the oral route of exposure including doses that far exceed those potentially experienced by humans, including workers. In these studies, either no reproductive toxicity was reported, or treatment-related reproductive effects were reported only at doses where maternal toxicity was observed. Maternal toxicity was manifest as liver toxicity, kidney toxicity, and overall depressions in body weight or body weight gains. The presence of these clear toxic effects was consistent with the role of stress and general systemic toxicity in the development of the reproductive effects at these high doses of BPA. The authors of these studies all concluded that systemic toxicity played a role in the observation of the reproductive effects.

By letter dated April 6, 2015, the U.S. Food and Drug Administration ("FDA") of the U.S. Department of Health & Human Services reported that FDA's National Center of Toxicological Research ("NCTR") "recently completed a large scale rodent toxicity study designed to characterize potential effects of BPA in a wide range of endpoints, including reproductive toxicity…. The results from the large extent of reproductive, sperm and hormone parameters evaluated in the NCTR study do not support BPA as a reproductive toxicant."

Based on the total weight of evidence of the experimental animal data, including the lack of robust epidemiological data for reproductive effects, well-established pharmacokinetic data and the results of FDA's recent large scale toxicity study and using expert judgment, there is insufficient scientific support to associate reproductive toxicity with BPA exposure in the absence of systemic toxicity.
Because experimental animal studies have indicated potential for reproductive effects in association with maternal toxicity at high doses, BPA has been classified as a Category 2 suspected human reproductive toxicant as required by OSHA.

Conclusion/Summary : Not available

General : Causes damage to organs through prolonged or repeated exposure: Once sensitized, a severe allergic reaction may occur when
subsequently exposed to very low levels.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : Suspected of damaging fertility.

Numerical measures of toxicity
Acute toxicity estimates

Route	ATE value
Oral	1,385.4 mg/kg
Route	**ATE value**
Dermal	907 mg/kg
Route	**ATE value**
Inhalation (vapors)	16.42 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
2,2'-iminodiethylamine			
	Acute LC50 16 mg/l	Aquatic invertebrates. Daphnia	48 h
	Acute LC50 53,500 µg/l Fresh water	Aquatic invertebrates. Water flea	48 h
	Acute EC50 1,164 mg/l	Aquatic plants - Green algae	72 h
	Acute EC50 345,600 µg/l Fresh water	Aquatic plants - Green algae	96 h
bisphenol A			
	Acute LC50 4.6 mg/l Fresh water	Fish - Fathead minnow	96 h
	Acute NOEC 0.016 mg/l Fresh water Chronic ecotoxicity	Fish - Fathead minnow	444 d
	Acute EC50 1 - 16 mg/l Fresh water	Aquatic invertebrates. Water flea	48 h
	Acute NOEC 1.8 mg/l Fresh water	Aquatic invertebrates. Water flea	48 h
	Acute EC50 2.73 mg/l Fresh water	Aquatic plants - Microalgae	96 h
	Chronic NOEC 0.016 mg/l Fresh water	Fish - Fathead minnow	444 d
	Chronic NOEC 1.8 mg/l Fresh water	Aquatic invertebrates. Water flea	-

Conclusion/Summary : Not available

Persistence/degradability

Conclusion/Summary : Not available

Bioaccumulative potential

Product/ingredient name	LogPow	BCF	Potential
Diethylenetriamine	-1.3	0.65 2.80	low

4,4'-Isopropylidenediphenol	3.4	73	low

Mobility in soil

Soil/water partition coefficient (KOC) : Not available

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal
of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

International transport regulations

Regulatory information	UN/NA number	Proper shipping name	Classes/*PG	Reportable Quantity (RQ)
CFR	2735	POLYAMINES, LIQUID, CORROSIVE, N.O.S. (DIETHYLENETRIAMINE)	Class 8 II	
IMO/IMDG	2735	POLYAMINES, LIQUID, CORROSIVE, N.O.S. (DIETHYLENETRIAMINE)	Class 8 II	
IATA (Cargo)	2735	POLYAMINES, LIQUID, CORROSIVE, N.O.S. (DIETHYLENETRIAMINE)	Class 8 II	

*PG : Packing group

Special precautions for user : Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage

Section 15. Regulatory information

United States

U.S. Federal regulations : **United States - TSCA 12(b) - Chemical export notification:** None required.
United States - TSCA 5(a)2 - Final significant new use rules: Not listed **United States - TSCA 5(a)2 - Proposed significant new use rules:** Not listed
United States - TSCA 5(e) - Substances consent order: Not listed

SARA 313

		Product name	CAS number
Form R - Reporting requirements	:	Phenol, 4,4'-(1-methylethylidene)bis-	80-05-7
Supplier notification	:	Phenol, 4,4'-(1-methylethylidene)bis-	80-05-7

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

California Prop. 65: : WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Phenol, 4,4'-(1-methylethylidene)bis-	No.	Yes.	No.	No.

United States inventory (TSCA 8b) All components are listed or exempted.

Canada
WHMIS (Canada) : Class D-2B: Material causing other toxic effects (Toxic). Class E: Corrosive material

Canadian lists

Canadian NPRI : The following components are listed: Phenol, 4,4'-(1-methylethylidene)bis-

CEPA Toxic substances The following components are listed: Phenol, 4,4'-(1-methylethylidene)bis-

International regulations
International lists : **Australia inventory (AICS):** All components are listed or exempted.
Canada inventory: All components are listed or exempted.
Japan inventory: All components are listed or exempted.

China inventory (IECSC): All components are listed or exempted.
Korea inventory: All components are listed or exempted.
New Zealand Inventory (NZIoC): All components are listed or exempted. **Philippines inventory (PICCS):** All components are listed or exempted. **United States inventory (TSCA 8b):** All components are listed or exempted. **Taiwan inventory (CSNN):** All components are listed or exempted.

Section 16. Other information

Health	*	3
Flammability		1
Physical hazards		0

Hazardous Material Information System III (U.S.A.) :
Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA).
HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868. The customer is responsible for determining the PPE code for this material.
Full text of abbreviated H statements : Not applicable.

History

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Version	10.0
Prepared by	Product Safety Stewardship
Key to abbreviations	ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail UN = United Nations
References	Not available

Notice to reader

The information provided herein was believed by Perma-Liner Industries to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Perma-Liner are subject to Perma-Liner's terms and conditions of sale. PERMA-LINER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY PERMA-LINER, except that the product shall conform to Perma-Liner's specifications. Nothing contained herein constitutes an offer for the sale of any product.

Appendix C

Product Name: Scrim Liner 3mm
Product Description: Liner used for horizontal pipe rehabilitation.
Typical Applications:

Material typical used in a straight horizontal shot for pipe rehabilitation. Materials strength and flexibility allow it to be inverted and allows material to mold to host pipe leaving little to no void. Installation typically limited to two bends.

Performance Limits *** If product is utilized outside the limits defined below, warranty coverage is voided ****

Characteristic	Spec	Comments
General		
Typical Dry Thickness (mm)	3.9 - 5.0	
Typical Finished Thickness (mm)	3.2 - 3.8 mm	Depends on installation pressures, pipe diameter, and number of bends (45° & 90°)
Sizes Available (in.)	3, 4, 6, 8	Custom sizes are available. Contact your local sales representative to determine product suitability for your application
Resins		
PLI Epoxy (2:1)	YES	Compatible with cold, warm, hot and heat assist variants of resin
PLI Epoxy (4:1)	YES	Compatible with cold variant of resin
PLI Vinyl Ester	YES	Compatible with Vinyl Ester resin
Install Design		
Maximum Depth of Install (ft)	3" –> 22' 4" –> 12' 6" –> 5' 8" –> 1'	Depth assumes flooded conditions with fully deteriorated pipe and 10% ovality, if install expected to exceed recommended max depth, product may still work however **requires PLI approval prior to installation.**
Can be used across Transitions?	YES	This material must be made to order for specific pipe transitions. **Contact PLI representative to discuss specific application.**
Remote Start Allowed?	YES	Tab cal tube to liner using tabbing adhesive **HH-66**. Refer to training manual for correct tabbing procedure.
Install with Infiltration Allowed?	Situational	Thin material may not retain enough resin in high INI situations to form structurally sound liner. **Contact PLI representative to discuss specific application.**
Resin per FT	Varies by size, resin type	**Epoxy Resins**: 3"- 0.65 lbs/FT, 4" - 0.85 lbs/FT, 6" – 1.25 lbs/FT, 8" – 2.05 lbs/FT **Contact PLI representative for Poly Vinyl Ester values.**
Installation		
Wet Out Gap Setting	6.5 mm	When using the WRT Wet Out Roller System ****DO NOT USE FLOOR ROLLER FOR RISK OF RESIN SHY FINAL PRODUCT****
Typical Inversion Pressures (psi)	5-12	Depends on installation pressures, pipe diameter, and number of bends (45° & 90°)
Maximum Inversion Pressure (psi)	20	Pressures exceeding this limit run the risk of tearing the liner or excessive "thinning" around bends
Stretch Factor (at recommended inversion pressures)	1%-1.5%	Highly dependent on inversion pressure, length of install, and pipe diameter. Stretch will be limited to about 1% if the inversion rate is well controlled (slow). The larger the diameter and the longer the run, the more the material will stretch with speed.
Max Curing Pressures (psi)	15	Pressures exceeding this limit run the risk of tearing the liner or excessive "thinning" around bends
Maximum Heat Assist Temperature (°F)	220°F	Liner can be cured ambient, hot water or Steam (Do Not exceed 220°F at the liner)