

ECM Duro-Bond PTFE-M Lining

Description

Duro-Bond PTFE-M is a chemical resistant membrane based on a modified polytetrafluoroethylene resin that is melt flow processible. It consists of a layer of modified PTFE (PTFE-M) laminated onto a fiber knit backing that is readily bonded to steel, concrete, or FRP substrates. **Duro-Bond PTFE-M** sheet lining is available in thicknesses of 80 mils (2.0 mm) and 120 mils (3.0 mm).

Uses

Duro-Bond PTFE-M lined equipment is used in many corrosive and High purity applications. The outstanding corrosion protection provided by **Duro-Bond PTFE-M** broadens equipment service capabilities and extends its useful life. Its broad range of chemical resistance, together with its excellent adhesive bonding characteristics, makes **Duro-Bond PTFE-M** an ideal lining material for almost any corrosive or high purity application.

Advantages

Duro-Bond PTFE-M linings provide a broad range of chemical resistance which far exceeds the corrosion protection of other plastic, glass, and high nickel alloy materials.

The glass knit fabric backing is partially imbedded into the PTFE-M film thus providing a strong integral bond and also providing a surface that can be successfully bonded to various substrates.

The weak attraction between PTFE-M and other molecules provides for a slick, smooth, non-sticking outer surface and thereby makes **Duro-Bond PTFE-M** an ideal choice for applications requiring good release characteristics.

PTFE-M, from which **Duro-Bond PTFE-M** sheet lining is produced, has FDA acceptance and can be used successfully in applications where a high level of purity is required.

Service Temperature

PTFE-M fluorocarbon resins withstand continuous service temperatures as high as 260 ° C (500° F). When bonded to a substrate, the maximum recommended service temperature for **Duro-Bond PTFE-M** sheet lining is 110 ° C (230° F) on a continuous basis, 120 ° C (250° F) on an intermittent basis.

Chemical Resistance

Duro-Bond PTFE-M glass backed sheet lining is chemically inert and solvent resistant to virtually all chemicals except molten alkali metals, fluorine and certain complex halogenated compounds such as chlorine trifluoride at elevated temperatures. The following table lists numerous representative chemical reagents and solvents with which **Duro-Bond PTFE-M** film is compatible. For resistance of **Duro-Bond PTFE-M** to chemicals not listed, contact contact us at 330-313-6372, knightmaterials.com, or info@knightmaterials.com.

Abietic Acid	Chormic Acid	Hydrazine	Phthalic Acid
Acetic Acid	Cyclohexane	Hydrochloric Acid	Pinene
Acetic Anhydride	Cyclohexanone	Hydrofluoric Acid	Piperidene
Acetone	Dibutyl Phthalate	Hydrogen Peroxide	Polyacrylonitrile
Acetophenone	Dibutyl Sebacate	Magnesium Chloride	Potassium Acetate
Acrylic Anhydride	Diethyl Carbonate	Mercury	Potassium hydroxide
Aldehydes	Diethyl Ether	Methyl Ethyl Ketone	Potassium Permanganate
Allyl Acetate	Di-isobutyl Adipate	Methacrylic Acid	Pyridine
Aluminum Chloride	Dimethylformamide	Methanol	Soap and Detergents
Ammonia, liquid	Dimethyl Hydrazine	Methyl Methacrylate	Sodium Hydroxide
Ammonium Chloride	Esters	Naphthalene	Sodium Hypochlorite
Amines	Ethyl Acetate	Naphtha's	Sodium Peroxide
Benzonitrile	Ethyl Alcohol	Nitric Acid	Solvents, Aliphatic
Benzoyl Chloride	Ethyl Ether	Nitrobenzene	Solvents, Aromatic
Benzyl Alcohol	Ethyl Hexoate	2-Nitro-butanol	Stannous Chloride
Borax	Ethylene Bromide	Nitromethane	Sulfur
Boric Acid	Ethylene Glycol	Nitrogen Tetroxide	Sulfuric Acid
Bromine	Ferric Chloride	2-Nitro-2 Methyl Propanol	Tetrabromoethane
n-Butly Amine	Ferric Phosphate	n-Octadecyl alcohol	Tetrachloroethylene
Butyl Acetate	Fluoronaphthalene	Oils, animal and vegetable	Trichloroacetic Acid
Butyl Methacrylate	Fluoronitrobenzene	Ozone	Trichlorethylene
Calcium Chloride	Formaldehyde	Perchloroethylene	Tricresyl Phosphate
Carbon Disulfide	Formic Acid	Pentachlorobenzamide	Triethanolamine
Cetane	Furane	Perflourooxylene	Vinyl methacrylate
Chlorine	Gasoline	Phenol	Water
Chloroform	Hexachloroethane	Phosphoric Acid	Xylene
Chlorosulfonic Acid	Hexane	Phosphorus Pentachloride	Zinc Chloride

The above information should be used as a guide only. All information is believed to be accurate, but is submitted without guarantee unless specifically sold and installed by Electro Chemical Manufacturing

Application

The method of application is as follows:

1. The surface to be lined is properly cleaned and grit blasted to a white metal finish to provide a suitable surface for bonding. (See [Electro Chemical Manufacturing Technical Bulletin #1](#), "Specification for Welded Steel Tanks, Stacks, Ducts or Other Fabricated Equipment for Protective Linings and/or Coatings".)
2. The **Duro-Bond PTFE-M** laminate is cut into panels to cover the entire area to be lined with a minimum amount of joints to be welded.
3. The panels are then cemented into position and the seams welded using a thermoplastic welding gun.
4. Suitable ventilation and respiration equipment must be used while working with this material.

Method of Testing

All lined surfaces are visually inspected for surface defects. Any special dimensional tolerances required after lining are also checked.

All lined areas are then spark tested for pinhole leaks using a dielectric spark tester adjusted to 10,000 volts. The tester is moved constantly and quickly over the lining surface to prevent a burn through.

Repair Procedure

Duro-Bond PTFE-M sheet lining can be shop or field repaired. The repairs to defective or damaged areas in the sheet lining are accomplished by cutting out the faulty area, grinding or grit blasting the substrate surface, preparing a piece of sheet of the same dimension, cementing it into position and subsequently welding the joints as described under Application. The repaired area is then inspected and spark tested to insure lining integrity.

Summary of PTFE-M Resin Characteristics and Physical Data

Chemical characterization	Thermoplastic fluorocarbon polymer
Color	Clear to translucent, depending on thickness
Odor	None
Melting point	-
Upper Service Temperature	260°C
Density (23°C)	2.12 g/cm ³
Tensile Strength (N/mm ²)	20 - 40
Elongation at Break	140 -400%
Solubility in water	Insoluble
Explosion limits	None
Hardness Durometer	D 55
Water absorption	< 0.03
Oxygen Index (%)	> 95
Flammability	V-0
Thermal Expansion Coefficient 23 -150°C (mm/mm/°C)	12-20 x 10 ⁻⁵

Thermal decomposition

- PTFE-M starts to decompose at 260°C

Hazardous decomposition products

- Gaseous fluorinated hydrocarbons (fluoro-olefins, carbonyl fluoride and hydrogen fluoride). Scrap PTFE-M must not be incinerated.

Hazardous reactions

- Traces of COF₂ are evident at around 350°C.

Transportation classifications

- PTFE-M is not classified as a hazardous material. No special precautions or procedures need be followed to transport PTFE-M resin or semi-finished products.

Safety Issues

PTFE-M resins are nonvolatile and safe at normal room temperatures. Good safety practice requires the use of adequate ventilation and respirators when processing PTFE-M. Heating PTFE-M may produce fumes and gases that are irritating or toxic. Care must be taken to avoid contamination of smoking tobacco or cigarettes.

Refer to the PTFE-M Material Safety Data Sheet for detailed recommended procedures for the safe handling and use of PTFE-M.

Additional Information

For additional technical or safety information, contact us at 330-313-6372, knightmaterials.com, or info@knightmaterials.com.

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