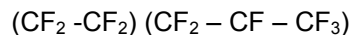


ECM Duro-Bond FEP Lining

Description

Duro-Bond FEP is a chemical resistant membrane utilizing a fluoroethylenepropylene (FEP) resin. The basic molecular structure of FEP is:



It consists of a layer of FEP laminated onto a fiber knit backing that is readily bonded to steel, concrete, and FRP substrates. Duro-Bond FEP sheet lining is available in thicknesses of 60 mils (1.5 mm) and 90 mils (2.3 mm).

Uses

Duro-Bond FEP lined equipment is used in many applications in the chemical and semiconductor industries. The outstanding corrosion protection provided by **Duro-Bond FEP** 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 FEP** an ideal lining material for almost any corrosive or high purity application.

Service Temperature

FEP fluorocarbon resins withstand continuous service temperatures as high as 205° C (400° F). When bonded to a substrate, the maximum recommended service temperature for **Duro-Bond FEP** sheet lining is 110° C (230° F) on a continuous basis, 120° C (250° F) on an intermittent basis.

Chemical Resistance and Other Advantages

Duro-Bond FEP linings provide a broad range of chemical resistance which far exceeds the corrosion protection of other plastic, glass, and high nickel alloy materials. FEP is resistant to virtually all corrosive chemicals and inorganic chemicals, including inorganic bases, oxidizing acids, mineral acids, metal salt solutions, and peroxides. It also exhibits excellent resistance to organic chemicals such as anhydrides, hydrocarbons, functional aromatics, esters, ethers, ketones and most amines.

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 FEP** 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 with **Duro-Bond FEP** rod and **Duro-Bond FEP** cap strip 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 1 0,000 volts. The tester is moved constantly and quickly over the lining surface to prevent a burn through.

Repair Procedure

Duro-Bond FEP 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 FEP Resin Characteristics and Physical Data

Chemical characterization	Thermoplastic fluorocarbon polymer
Color	Clear to translucent, depending on thickness
Odor	None
Melting point	275°C
Upper Service Temperature	205°C
Density (23°C)	2.15 g/cm ³
Tensile Strength (N/mm ²)	21 - 28
Elongation at Break	240 -350%
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)	14 x 10 ⁻⁵

Thermal decomposition

- FEP starts to decompose at 205°C

Hazardous decomposition products

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

Transportation classifications

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

Safety Issues

FEP resins are nonvolatile and safe at normal room temperatures. Good safety practice requires the use of adequate ventilation and respirators when processing FEP. Heating FEP 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 FEP Material Safety Data Sheet for detailed recommended procedures for the safe handling and use of FEP.

Additional Information

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

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