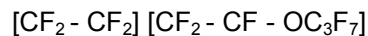


ECM Duro-Bond PFA Lining

Description

Duro-Bond PFA is a chemical resistant membrane produced from the copolymerization of tetrafluoroethylene and perfluoroalkoxy resin. The basic molecular structure of PFA is:



Duro-Bond PFA is designed for corrosion resistant and high purity applications in the chemical, semiconductor, and transportation industries. PFA is a fully fluorinated thermoplastic resin that is melt flow processible.

PFA resin has physical and chemical properties similar to those of other totally fluorinated polymers such as PTFE, MFA, and FEP. **Duro-Bond PFA** consists of a layer of PFA laminated onto a fiber knit backing that is readily bonded to steel, concrete, or FRP substrates. Duro-Bond PFA sheet lining is available in thicknesses of 60 mils (1.5 mm) and 90 mils (2.3 mm).

Uses

Duro-Bond PFA lined equipment is used in many ultra-high purity applications in the semiconductor, pharmaceutical, and chemical industries. The outstanding corrosion protection provided by **Duro-Bond PFA** broadens equipment service capabilities and extends its useful life. Its superior chemical resistance, together with its excellent adhesive bonding characteristics, makes **Duro-Bond PFA** a high performance lining material for almost any corrosive or high purity application.

Chemical Resistance and Other Advantages

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

Service Temperature

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

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 PFA** 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 PFA rod and PFA 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 10,000 volts. The tester is moved constantly and quickly over the lining surface to prevent a burn through.

Repair Procedure

Duro-Bond PFA 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 PFA Resin Characteristics and Physical Data

Chemical characterization	Thermoplastic fluorocarbon polymer
Color	Clear to translucent, depending on thickness
Odor	None
Melting point	300-310°C
Upper Service Temperature	260°C
Density (23°C)	2.15 g/cm ³
Tensile Strength (N/mm ²)	24-30
Elongation at Break	300%
Solubility in water	Insoluble
Explosion limits	None
Hardness Durometer	D 55
Water absorption	< 0.03
Oxygen Index (%)	> 95
Flammability	V-0
Thermal Expansion Coefficient	16 x 10 ⁻⁵
23 -150°C (mm/mm/°C)	

Thermal decomposition

- PFA starts to decompose at 260°C.

Hazardous decomposition products

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

Hazardous reactions

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

Transportation classifications

- PFA is not classified as a hazardous material. No special precautions or procedures need be followed to transport PFA resin or sheet lining.

Safety Issues

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

Additional Information

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

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