

# EC Duro-Bond MFA Lining

## Description

**Duro-Bond MFA** is a chemical resistant membrane produced from the copolymerization of tetrafluoroethylene and perfluoromethyl vinyl-ether. The basic molecular structure of MFA is:



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

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

## Uses

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

## Chemical Resistance and Other Advantages

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

MFA is also recommended for applications requiring a fabricated part with high chemical resistance and an extremely smooth surface.

## Service Temperature

MFA fluorocarbon resins withstand continuous service temperatures as high as 250 ° C (480 ° F). When adhesively bonded to a substrate, the maximum recommended service temperature for **Duro-Bond MFA** 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 Technical Bulletin #1, "Specification for Welded Steel Tanks, Stacks, Ducts or Other Fabricated Equipment for Protective Linings and/or Coatings".)
2. The **Duro-Bond MFA** 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 MFA rod and MFA 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 MFA** 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 MFA Resin Characteristics and Physical Data

Chemical characterization	Thermoplastic fluorocarbon polymer
Color	Clear to translucent, depending on thickness
Odor	None
Melting point	280-290°C
Upper Service Temperature	250°C
Density (23°C)	2.15 g/cm <sup>3</sup>
Tensile Strength (N/mm <sup>2</sup> )	24-30
Elongation at Break	300 - 360%
Solubility in water	Insoluble
Explosion limits	None
Hardness Durometer	D 59
Water absorption	< 0.03
Oxygen Index (%)	> 95
Flammability	V-0
Thermal Expansion Coefficient	12-20 x 10 <sup>-5</sup>

## Electro Chemical Duro-Bond MFA Lining

23 -150°C (mm/mm/°C)

### Thermal decomposition

- MFA starts to decompose at 250°C

### Hazardous decomposition products

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

### Hazardous reactions

- Traces of COF<sub>2</sub> are evident at around 350°C.

### Transportation classifications

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

## Safety Issues

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

## Additional Information

For additional technical or safety information, contact us at 1-800-235-1885, [www.electrochemical.net](http://www.electrochemical.net), or [inquiry@electrochemical.net](mailto:inquiry@electrochemical.net).

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