



Sermatech's Guide to Choosing Fluoropolymer Coatings Over Sheet Linings

What Fluoropolymer resin systems are available as high-build coatings for industrial processing?

Today, virtually every advanced Fluoropolymer resin system is available as a thick, fused coating, up to 100 mils thick. PFA, FEP, Halar®-ECTFE, and Kynar®-PVDF are routinely applied on large industrial equipment. Process vessels, for example, up to 15 x 15 x 30 ft. in size are being coated by Sermatech and "clean room" spray booths and ovens are available for high purity applications.

Why are coatings bonded better than sheet linings?

Everybody knows that fluoropolymers are great non-stick surfaces, but it's difficult to get adhesives to stick to them. It's for this reason that glued-on sheet linings don't work well under full vacuum or aggressive thermochemical or thermomechanical cycling. Fused coatings, by contrast, work well under such conditions and advanced, welded-mesh bonding systems for fused coatings are available today that allow them to work under process conditions where liners fail rapidly.

Why are coatings superior to sheet linings in aggressive service?

Fused coatings adhere better than glued-on sheet linings, and they are free of troublesome seams. Sophisticated multi-layer coatings with embedded absorbers, permeation barriers, hard phases for abrasion resistance, and other advanced features are available only as coatings. A coating "engineered" to solve your particular processing problem will always outperform an off-the-shelf sheet lining.

What Fluoropolymer coatings, not available as sheet linings, work best in aggressive service?

SermaShield™ PFA is the most versatile coating system available today. PFA is the most chemically-resilient resin, good to over 450°F, and coating options are available with permeation barriers and welded stainless steel mesh-bonding. Blue Armor®, an ECTFE-Halar-based coating system, is the time-tested solution for most industrial applications. Hard Coat (HC) variants of both of these systems, e.g., SermaShield™-HC and Blue Armor-HC, are available for abrasive applications.

Why are coatings superior to sheet linings for high purity applications?

Sheet linings consist of a number of pieces of extruded sheets "hot welded" together. There is always the worry that these welds will become a source of permeation-induced contamination, and the rough weld surfaces may trap contaminants. Smooth, seamless

coatings, on the other hand, are totally free of these problems, and they have become the method of choice for containment of high-purity water and chemicals.

What coating systems are being used for high purity service?

SermaShield™ PFA has become the coating of choice for high-purity chemicals for Microelectronics and Pharmaceutical applications. Halar-based coatings such as MegaPure™, with a microsmooth surface finish, are being used for high purity water applications. FDA compliant coating options are available as well.

When can coatings be used where sheet lining is difficult or impossible?

Generally, fused coatings can be applied on just about any surface, no matter how complex. Even agitators, centrifuge baskets, screens and other harshly contoured shapes that can't be sheet lined can be readily coated.

What advantages do coatings offer sheet linings for transportation equipment, such as tank containers?

Advanced Fluoropolymer coatings can meet the ever increasing needs for transportation of high-purity chemicals. Many containers must also meet severe vacuum and high temperature requirements related to filling and off-loading, not readily achievable with sheet linings. SermaShield™ meets these needs. Epoxy-bonded sheet linings, on the other hand, are subject to roadway-induced mechanical fatigue and failure due to the brittleness of the epoxy bondments.

Can coated equipment be repaired more readily than glued-on sheet linings?

In practice, sheet linings can't be effectively repaired since the fluoropolymer weld temperature exceeds the thermal decomposition limit of epoxy. Fusion-bonded coatings don't suffer from this constraint and repairs can be successfully made provided the damage is not too extensive.

What conclusions can be drawn from the above Questions and Answers?

Advanced fluoropolymer coatings such as SermaShield™ offer many advantages over glued-on sheet linings for aggressive or high purity service including:

- seamless barrier
- fusion-bonded to shell
- smooth surface finish
- abrasion resistance
- good for full vacuum and continuous service to 450°F.