

## High Performance Alternative to Fusion Bonded Epoxy: Carboline PolyClad® 975

For years, fusion bonded epoxy (FBE) has been a common choice for pipeline protection in the oil & gas market and for steel and ductile iron fittings in the water market. Other technologies utilized have included two- and three-layer polyolefin, either side-extruded or fused. The emergence of convertible coating technologies, such as co-reaction spray-applied epoxies, can offer performance advantages over FBE in physical properties and potentially better economics. For end-users looking for new alternatives to FBE, one such option is Carboline's PolyClad® 975.

### Fusion Bonded Epoxy (FBE):

FBE is a 100% solids epoxy powder coating. Application requires high temperatures (500°F) in order for co-reaction and polymerization to take effect and for the coating to exhibit true thermoset properties. The force heat cured coating is most commonly available in a single- or a two-coat system. Remedial field work, joint coatings, and tie-ins often require a spray-applied epoxy.

### Spray Applied Epoxies –PolyClad® 975:

PolyClad® 975 is an advanced 100% solids, hybrid epoxy pipeline coating. It offers physical properties designed for the corrosion protection of steel and ductile iron pipe exteriors, girth welds, or tie-ins. Excellent cathodic disbondment properties make it ideal for long-term protection of oil and gas pipelines, as well as water infrastructure lines. PolyClad® 975 epoxy technology can be applied by spray methods such as plural component airless or dual cartridge. Rapid cross-linking provides a tough, fast-curing epoxy that is compatible with other coatings such as FBE, coal tar, and tape systems. The companion product, PolyClad® 975 H, is ideal for hand application by brush or roller for field touch-up or repair.





<b>Competitive Comparisons of 100% Solids Epoxy Coating for Pipeline Exteriors</b>			
<b>Property</b>	<b>PolyClad® 975</b>	<b>Scotchkote™ 323 Liquid Epoxy</b>	<b>3M 6233™ FBE</b>
<b>Company</b>	<b>Carboline</b>	<b>3M</b>	<b>3M</b>
<b>Mix Ratio</b>	<b>4:1</b>	<b>2:1</b>	<b>1 component</b>
<b>Pot life</b>	<b>15 min</b>	<b>11 min</b>	<b>N/A</b>
<b>Cure to handle (dry hard)</b>	<b>2.5 hr. @ 75°F</b> <b>15 hr. @ 35°F</b>	<b>2.66 hr. @ 75°F</b> <b>8 hr. @ 41°F</b>	<b>Cure time at 450°F ranges between 30 and 110 seconds</b>
<b>Impact direct @ 24°C</b>	<b>45 in-lbs. or 5.2 J</b>	<b>2.75 J @ 20°C</b>	<b>59 in-lbs or 6.7 J</b>
<b>CD testing 24°C, -1.5 V, 28 days</b>	<b>2.5 - 3 mm</b>	<b>N/D</b>	<b>2.3mm</b>
<b>CD testing 65°C, -1.5 V, 28 days</b>	<b>3 - 4mm</b>	<b>7.5mm</b>	<b>4.9mm</b>
<b>CD testing 80°C, -1.5 V, 28 days</b>	<b>4 - 5mm</b>	<b>6.6mm</b>	<b>N/D</b>
<b>CD testing 65°C, +3.0 V, 7 days</b>	<b>&lt;5mm</b>	<b>4.9 mm, -3.5V, 24hrs</b>	<b>N/D</b>
<b>Chemical resistance, 7 days @ 25°C</b> <b>10% nitric acid, 5% sulfuric acid, 10% sodium hydroxide, toluene, fuel grade ethanol</b>	<b>Pass all</b>	<b>N/D</b>	<b>N/D</b>
<b>Shore D hardness, ASTM 02240</b>	<b>85</b>	<b>85</b>	<b>N/D</b>
<b>Flexibility, CSA Z245.20 At 23°C</b>	<b>1.0°/pd</b>	<b>0.7°/pd @ 20°C</b>	<b>&gt;3°/pd @ 0°F</b>
<b>Penetration Test</b>	<b>Pass</b>	<b>N/D</b>	<b>Pass</b>
<b>Abrasion Resistance 1000 Cycles</b>	<b>126 mg loss</b>	<b>325 mg loss, 5000 cycles</b>	<b>N/D</b>

*\*Supplied courtesy of Carboline*

As illustrated in the table above, PolyClad® 975 tests comparably to FBE in standardized tests. Naturally, one of the most important factors in coating effectiveness is the choice of an experienced applicator possessing experience with the coating system, a strong reputation, and a documented quality control system.