

1. Fire Protection Systems – The Options

The follow pages give an overview of the main systems Global Solutions offer for fire protection of ESD valves, actuators, flanges, cable trays, pipe work & vessels etc.

The following is a key to the performance ratings given:

Key	Description
A	Excellent / No Problems
B	Good / Above Average
C	Normal Expectation
D	Below Average
E	Poor

1.1. Flexible Jacket Systems

System Description	A system comprising of pre-formed blankets manufactured from Ceramic Fibre insulation enclosed within a fabric sheath. Often an additional outer shell of a high performance material is used to give further fire resistance - particularly from jet fire elements. Wide variation in quality and long-term environmental performance.			
Strengths	Tight fitting to component, capable of being fitted in confined/congested locations, relatively quick to fit and remove, for complex areas it is relatively cheap compared to rigid/pre-formed systems (typically $\frac{1}{2}$ to $\frac{1}{3}$ rd of the cost), fire tested in different configurations.			
Shortcomings	Some systems are prone to degradation with time when regular access required or exposed to the environment, some options offered have not been fully tested in the configuration, requires precise survey/geometry before manufacture - hence sometimes long lead-time for complex shapes.			
Certification & Testing	Generally well tested in as new condition, question mark over some systems performance once exposed to fair wear and tear or removal/reinstatement by untrained personnel. Some options/configurations not tested (e.g. inspection hatches) by certain manufacturers			
Performance	Operating Temperature	A	Environment Resistance	B - C
	Space Restriction	A	Corrosion Protection	D
	Inspection Access	B	Mechanical Damage	B
	Removability	B	Life Cycle	C

1.2. Pre-formed Intumescent Epoxy Systems

System Description	A pre-formed cast version of the two-pack epoxy coating material that is reinforced with a structural steel mesh. Components are bolted in place around object using the object as the support. The system is ridged and applied over a painted surface.			
Strengths	Long life, maintenance free, excellent corrosion resistance, capable of taking heavy mechanical knocks, easy access for routine inspections. Excellent access to weld and bend inspections and flange covers. Can be used in combination with Insulant epoxy for hot surfaces.			
Shortcomings	Complete removal of system when used on large or complex shapes can be time consuming, requires additional insulation for use on hot plant and equipment.			
Certification & Testing	Extensively tested against fire and blast.			
Performance	Operating Temperature	C	Environment Resistance	A
	Space Restriction	B	Corrosion Protection	B
	Inspection Access	A	Mechanical Damage	B
	Removability	B	Life Cycle	B

1.3. Rigid Enclosure Systems

System Description	<p>A GRP Enclosure system is an excellent purpose designed system that has excellent long-term performance capabilities. With an expected lifespan in excess of 40 years, the initial capex cost prove to be cost effective over the life of the facility.</p> <p>Panels are typically fabricated in high strength epoxy glass laminate with encapsulated phenolic insulation core fully sealed.</p> <p>The rigidity of this system allows it not only to provide the fire and blast protection but also the housing itself for the equipment such as electrical and pneumatic controls.</p>			
Strengths	<p>The Enclosure can be easily removed / reinstalled for inspection of the riser end fitting without the need for special tools or specialist labour. Strong, simple shapes, well-tested and proven life cycle. Easy to incorporate inspection hatches.</p>			
Shortcomings	<p>Bulky, awkward to fit and remove in confined spaces, increase blast loading in area, high initial cost.</p>			
Certification & Testing	<p>Well tested for fire and blast, rely on support frame to handle blast</p>			
Performance	Operating Temperature	A	Environment Resistance	A
	Space Restriction	D	Corrosion Protection	C
	Inspection Access	B	Mechanical Damage	B
	Removability	C	Life Cycle	A

1.4. Wet Applied Intumescent Epoxy Systems

System Description	A spray or trowel applied two pack epoxy coating material that is applied directly onto a clean, prepared steel surface. Once cured the system is ridged and bonded on place.			
Strengths	Very long life, maintenance free, excellent corrosion resistance, capable of taking heavy mechanical knocks			
Shortcomings	Once applied difficult to remove, no inspection access available, cannot be applied directly to hot plant and equipment, however can be used in combination with Insulant epoxy for hot surfaces. Not suitable for internal normally manned areas. Strict application controls required. Skilled operatives required for application.			
Certification & Testing	Extensively tested against fire and blast.			
Performance	Operating Temperature	C	Environment Resistance	A
	Space Restriction	A	Corrosion Protection	A
	Inspection Access	E	Mechanical Damage	A
	Removability	E	Life Cycle	A

1.5. Wet Applied Cementitious Systems

System Description	A spray or trowel applied coating material that is applied directly onto a clean, prepared steel surface. Once cured the system is ridged and bonded on place similar to a concrete finish			
Strengths	Long life, low cost material and application. Good track record in onshore petrochemical industry. Product has been widely used in the industry.			
Shortcomings	Once applied no inspection access available, Requires good topcoat and regular inspection to prevent water ingress. Topcoat requires to be maintained. Prone to cracking where there is substrate movement.			
Certification & Testing	Extensively tested.			
Performance	Operating Temperature	C	Environment Resistance	C
	Space Restriction	B	Corrosion Protection	C
	Inspection Access	E	Mechanical Damage	D
	Removability	E	Life Cycle	C

1.6. Wet Applied Syntactic Phenolic Foam Systems

System Description	A trowel applied cold curing, two-pack material that is applied directly onto a clean, prepared steel surface. The application is in two stages - first the insulation layer then the jet fire resisting top skin. Once cured the system is ridged and bonded on place.			
Strengths	Very long life, maintenance free, excellent corrosion resistance, capable of taking heavy mechanical knocks. Capable of being used on hot plant and equipment. Low smoke and fumes in fire conditions. Also provides thermal insulation.			
Shortcomings	Once applied the system is difficult to remove - requires UHP water cutting. No inspection access available. Greater film thickness than the Epoxy intumescent. Requires strict control on application environment.			
Certification & Testing	Limited independent testing against fire and blast.			
Performance	Operating Temperature	B	Environment Resistance	A
	Space Restriction	B	Corrosion Protection	A
	Inspection Access	D	Mechanical Damage	A
	Removability	E	Life Cycle	A