

Use of Fiberglass Reinforced Plastic (FRP) Equipment in Flue Gas Desulfurization

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FRP Equipment Applications in FGD

- **Chimney Liners & Breeching**
- **Scrubbers**
 - **Tank**
 - **Tank Top/Cover**
 - **Inlet / Outlet**
 - **Internals/Structural Components**
- **Duct**
 - **Gas Cooling Duct**
 - **Mist Eliminator Housing**
- **Pipe**
 - **Slurry Piping**
 - **Utility Water Piping**



Technical Considerations

- **Review Environment**
 - **Chemical Environment**
 - **Temperature Exposure**
 - **Mechanical Environment**
 - **Upset Conditions**
 - **Duration of Upset Conditions**

Type of Potential Degradation

- **Potential Degradation Type**
 - **Chemical Attack to the Resin**
 - **Chemical Attack to the Glass**
 - **Potential for Mechanical or Thermal Damage**
 - **Potential for Osmotic Damage**
 - **Potential for UV Damage to External Surfaces**

Laminate Construction to Meet Environment

- **Environmental Review Determines:**
 - **Choice of Resin(s)**
 - **Corrosion barrier Laminate Construction**
 - **Structural Laminate Construction**
 - **Treatment of External surface**

Epoxy Vinyl Ester Elevated Temperature Properties

Temperature		Fire Resistant		Fire Resistant Novolac	
		Casting Values	ASME RTP-1 Type II Laminate	Casting Values	ASME RTP-1 Type II Laminate
75°F / 25°C	Tensile Str (psi)	12,000	21,500	13,400	23,500
	Tensile Mod (psi)	520,000	1,770,000	540,000	1,860,000
	Elong (%)	4.6	1.7	3.6	2.0
150°F / 25°C	Tensile Str (psi)	9,900	21,500	11,600	21,500
	Tensile Mod (psi)	436,000	1,650,000	482,000	1,860,000
	Elong (%)	5.1	1.8	4.8	1.5
200°F / 93°C	Tensile Str (psi)	7,200	21,000	8,900	24,500
	Tensile Mod (psi)	415,000	1,480,000	450,000	1,660,000
	Elong (%)	6.1	1.7	5.1	1.8
250°F / 121°C	Tensile Str (psi)	1,200	13,000	7,200	22,000
	Tensile Mod (psi)	128,000	800,000	443,000	1,560,000
	Elong (%)	>10	2.0	5.5	1.7
275°F / 135°C	Tensile Str (psi)	210	9,500	4,000	19,000
	Tensile Mod (psi)	1,900	850,000	240,000	1,450,000
	Elong (%)	>10	2.0	7	2
300°F / 149°C	Tensile Str (psi)	-	7,100	2,000	20,000
	Tensile Mod (psi)	-	630,000	88,000	1,100,000
	Elong (%)	-	1.2	10	2

Resin Supplier Support Activities

- **Provide companies assistance as they consider using FRP equipment.**
- **Provide companies with case histories of prior uses of FRP equipment in similar situations.**
- **Provide technical information about FRP performance capabilities.**