

FIBERBOND® Applications Guide

Chemical Process, Power, Pulp & Paper, and Petrochemical Applications

Application	Recommended Series	Notes
Brine	110FW	Up to 250F (121c); lower temperatures may allow the use of an epoxy vinyl ester resin without the novolac base.
Chlorine Dioxide, ClO ₂	Custom 110FW or Custom 110HLU	Double synthetic veil is very important. An ECTFE veil may also be considered. ECR-glass should also be considered. A heavier liner, either 0.200" or 0.250", may be required along with a hand layup structural cage for maximum corrosion resistance. You may wish to consider a brominated novolac epoxy vinyl ester resin in lieu of the novolac epoxy vinyl ester. A BPO/DMA liner may be considered, although some studies have shown no significant difference compared to a CoNap/MEKP liner.
Chlorine Gas (no liquid chlorine)	Custom 0.200" Liner	Normally at least a 0.200" or 0.250" liner. C-glass veil liner recommended. Chlorendic polyester may perform the best, but an epoxy vinyl ester (bis-A, novolac, or brominated) may be suitable. As with ClO ₂ , chlorine gas will attack FRP and gradually reduce the laminate thickness.
Cooling Water	20HV or 20FR-E	Excellent up to 150F (65c) for 20HV; up to 185F (85c) for 20FR-E.
Crude Oil, Sweet, Sour	20HV or 110FW	20HV up to 150F (65c); 110FW for higher temperatures and better corrosion resistance.
FGD Slurry	Custom 110FW	Requires abrasion-resistant liner; for applications inside the absorber, also requires an external abrasion-resistant surface
Pulp Mill Liquors, Green, Black	110FW	Typically carbon steel or stainless steel are used in these applications, but FRP may be considered where temperatures are acceptable. A post cure may be recommended to improve service life.
Pulp Mill Liquors, White	Custom 110FW	Very similar to caustic. A bis-A epoxy vinyl ester, such as Derakane 411 or Hetron 922, should be used. Good up to 180F (82c). Post cure recommended to improve service life. AR-glass will provide the best performance and may be necessary depending upon the concentration of NaOH.
Hydrochloric Acid, HCl	Custom 200mil Liner	C-Veil and ECR glass recommended for the 0.200" liner. AR-glass should also be considered, especially at higher temperatures. Above 30% concentration, temperature rating may be reduced to 180F (82c) or lower. Not recommended above 37% concentration.

No warranty is given.

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Hydrogen Peroxide, H ₂ O ₂	Custom 110FW	BPO/DMA cure system along with post cure recommended. A heavier liner, either 0.200" or 0.250", may be required. Temperature rating typically 150F (65c); will reduce to 100F (38c) above 30% concentration. Not recommended above 35% concentration. You may wish to consider a brominated epoxy vinyl ester resin in lieu of the novolac epoxy vinyl ester.
Seawater	20HV or 20FR-E	Excellent up to 150F (65c) for 20HV; up to 185F (85c) for 20FR-E.
Sodium Chlorate (no hypochlorous acid), NaClO ₃	Custom 110FW or Custom 110HLU	Excellent alternative to stainless steel up to 180F (82c), some applications to 210F (99c).
Sodium Hydroxide (Caustic), NaOH	Custom 110FW	Acceptable alternative to carbon steel or stainless steel. Bis-A epoxy vinyl ester, such as Derakane 411 or Hetron 922, will perform better than a novolac epoxy vinyl ester. Double synthetic veil and post cure also recommended. Good up to 180F (82c). AR-glass will provide the best performance and may be necessary depending upon the concentration of NaOH.
Sodium Hypochlorite (up to 15%), NaOCl	Custom 110FW	Bis-A epoxy vinyl ester, such as Derakane 411 or Hetron 922, will perform better than a novolac epoxy vinyl ester. Double synthetic veil, BPO/DMA cured liner, and post cure also recommended. Good up to 180F (82c). A dual-laminate (PVC, CPVC, or PTFE liner and FRP structure) may be better at concentrations of 10% or more.
Sulfuric Acid (H ₂ SO ₄)	110FW	Very common up to 10% concentration. At concentrations above 50%, temperature rating may be reduced to 180F (82c) or lower. Alloy 20 (Ni-Cr-Mo alloy) is an alternative.
Superphosphoric Acid	110FW	Either the standard novolac epoxy vinyl ester resin or another bis-A epoxy vinyl ester resin can be used, depending upon temperature.