

who outperforms  
in corrosive  
environments?

—  
**derakane™** resins

for FRP chemical process equipment



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# derakane™ resins outperform other resin systems and commonly used metals in corrosive environments

## high-performance fiberglass reinforced plastic (FRP) equipment provides:

- corrosion resistance
- excellent durability and toughness
- temperature resistance and flame retardance
- high strength-to-weight ratios
- low cost compared to metal alloys
- good thermal and electrical insulation properties
- low maintenance and long service life

## description

The material handling environment found in the chemical processing industry can be extremely corrosive. Traditional materials of construction such as carbon steel, stainless steel and masonry often break down shortly after being placed in service. Today, more and more design engineers and material specifiers are calling for FRP composites in both new and replacement equipment used in chemical processing operations.

Ashland corrosion resistant resins have been specified for more than 60 years for FRP process equipment used throughout the chemical industry. We strongly believe in this technology and use it in our own facilities around the globe.

## applications

- chemical storage tanks
- process vessels
- intermediate storage tanks
- process piping and headers
- scrubbers and stacks
- chlor alkali headers, cells and hoods
- dual laminates and linings

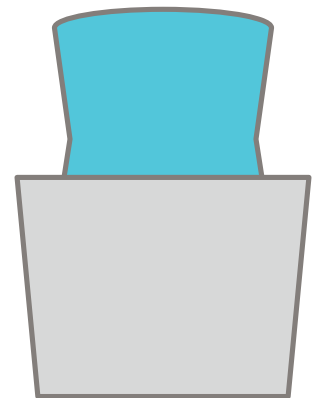
### other applications include

- ducting and fans
- pumps and valves
- cooling towers
- stairs, grating and ladders
- cladding, siding and roofing

# derakane™ epoxy vinyl ester resins for chemical processing

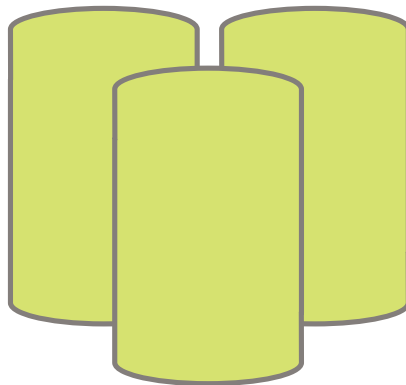
## cooling towers

FRP structural members, cladding and louvers provide outstanding resistance to corrosion in cooling tower environments and will not rot like wood. FRP piping, stacks and fans are considerably more durable than carbon steel when exposed to cooling water chemicals and process water.



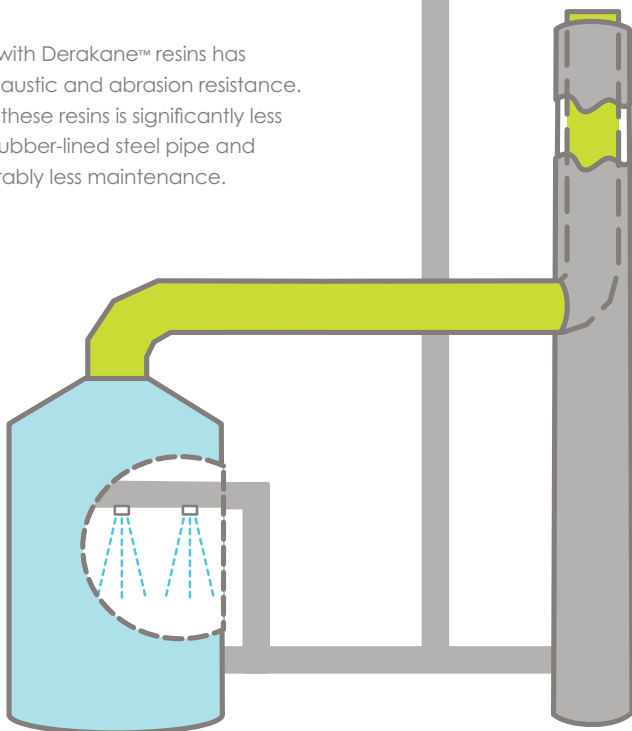
## reagent storage tanks

Tanks specified with Derakane™ resins provide excellent corrosion resistance to a wide range of chemical reagents. FRP storage tanks are much lighter than metal and are less expensive than rubber-lined steel or high nickel alloys.



## pipng

Piping specified with Derakane™ resins has excellent acid, caustic and abrasion resistance. Pipe made from these resins is significantly less expensive than rubber-lined steel pipe and requires considerably less maintenance.



## stairs, grating and cable tray

Stairs, grating, railings and cable tray made with Derakane™ resins are much more resistant to chemical splash and spray zones than carbon steel or even stainless. Moreover, FRP is 30–35% lighter than steel for equivalent load-bearing capacity saving costs in transport and erection both internally and externally.

## ducting and stack liners

When corrosion resistance and flame retardancy are required for ducts, stack liners or fume-handling equipment, Derakane™ 510A and Derakane™ 510B resins are often recommended. Properly fabricated laminates with these resins have met ASTM E 84 Class 1 requirements.

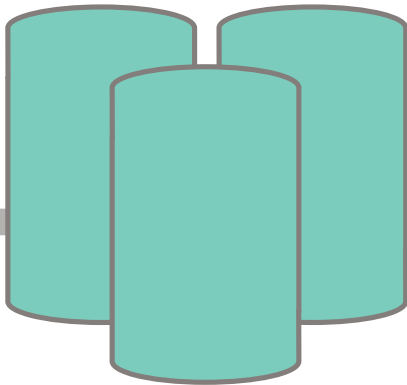
## scrubbers

Scrubber systems made from FRP based on Derakane™ resins have excellent resistance to wet acid gases and halogens recovered in the scrubbing process. FRP has proven to be more economical than specialty alloys used in corrosive, hot, wet scrubber environments.

## pumps and valves

Pumps and valves specified with Derakane™ resins deliver considerably longer life in corrosive environments. FRP's lighter weight makes it easier to transport and install. FRP's superior abrasion resistance makes it more durable than rubber lined alternatives.



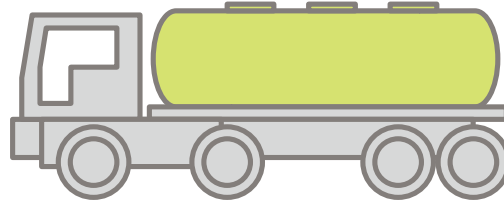


## finished product storage tanks

Tanks specified with Derakane™ resins provide excellent corrosion resistance to a wide range of finished chemicals. FRP made from select Derakane™ resins has also met food contact regulation.

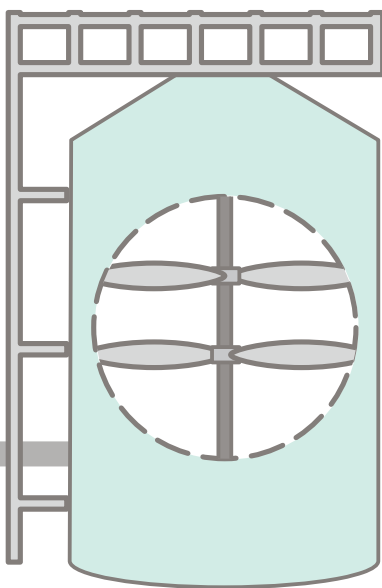
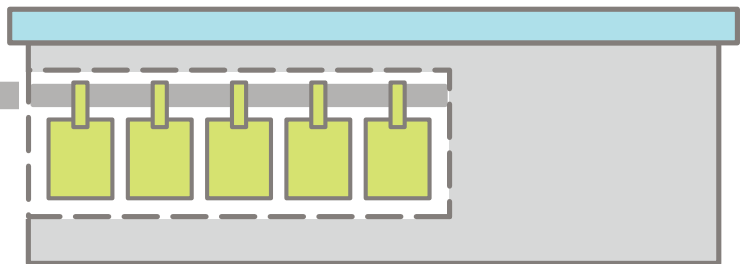
## bulk tank trucks

Bulk tank trailers fabricated with Derakane™ resins provide excellent corrosion resistance to a wide range of chemical reagents. FRP bulk tank trailers are much lighter than steel and less expensive than rubber-lined steel or high nickel alloys.



## cladding, roofing and siding

Cladding, roofing and siding made with Ashland resins are much more resistant to incidental chemical exposure and spray zones than carbon steel or even stainless. Chemically-resistant skylighting panels can also be made from FRP. Moreover, FRP is 30-35% lighter than steel for equivalent load-bearing capacity saving costs in transport and erection.

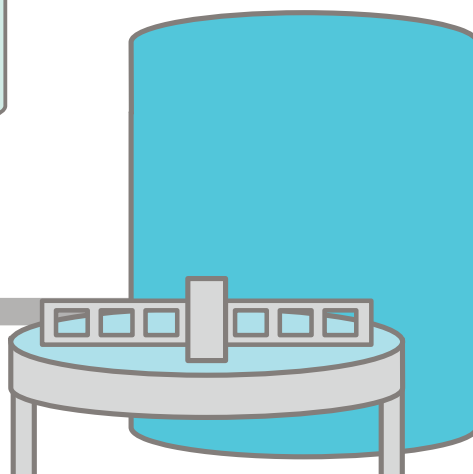


## process vessels

Process vessels and piping specified with Derakane™ resins deliver exceptional resistance to a wide variety of chemical intermediates and mixtures. Where acids, caustic or halogens are found, FRP is often your best bet.

## chlor alkali processes

Brine piping specified with Derakane™ resins provides outstanding service life in chlor alkali processes. Polymer concrete electrolytic cells specified with Derakane™ resins set the standard for the industry. Cell covers and headers made with Derakane™ Momentum™ 470-300 resins deliver outstanding resistance to hot, wet chlorine environments.



## wastewater treatment

Process water tanks and piping made from Derakane™ Signia™ 411 resin are very economical and can accommodate process water up to 175 °F (80 °C).

## tanks and vessels

**Storage tanks for reagents, chemical intermediates or finished goods specified with Derakane™ epoxy vinyl ester resins demonstrate:**

- the ability to handle a wide range of corrosive chemicals
- outstanding resistance to caustics and acids
- no corrosion under insulation (CUI) issues
- excellent durability and toughness
- chemically resistant interiors and exteriors
- good abrasion resistance
- easy installation — lightweight
- low maintenance costs

## pipng

**Piping specified with Derakane™ epoxy vinyl ester resins delivers:**

- resistance to a wide range of corrosive chemicals
- excellent durability and toughness
- superior abrasion resistance
- easy processing for filament-wound or hand lay-up piping

Derakane™ 411 series resins have been specified for both subsurface and above-ground process piping. These resins offer excellent resistance to acidic and caustic environments and can be specified for fittings, valves, pumps, and pump bases.

## chlor alkali processes

**Headers, cell covers, piping and storage tanks in chlor alkali processes specified with Derakane epoxy vinyl ester resin demonstrate:**

- excellent resistance to hot, wet chlorine, caustic, sodium hypochlorite, hydrochloric acid and brine
- outstanding compatibility with dual laminate designs



## scrubbers, ducts and fume-handling equipment

**Equipment specified with Derakane™ epoxy vinyl ester resin provides:**

- excellent corrosion resistance
- excellent heat resistance: properly fabricated laminates can be used in ducting and stacks up to 350 °F (117 °C) with occasional upsets up to 600 °F (315 °C).
- excellent resistance to oxidizing acid environments

When corrosion resistance and flame retardancy are required for ducts, scrubbers, or fume-handling equipment, Derakane™ 510 series resins are recommended.

## process equipment, covers, building panels and grating

**Equipment specified with Derakane™ epoxy vinyl ester resin demonstrates:**

- excellent weathering properties
- high strength-to-weight ratios
- outstanding corrosion resistance
- good flame retardance with appropriate resin selection
- easy installation and low maintenance

## Ashland derakane™ resins include:

epoxy vinyl ester resin series	characteristics <sup>1</sup>	suggested application <sup>2</sup>
derakane™ 411 derakane™ momentum™ 411 derakane™ signia™ 411	Corrosion resistant to both strong acids and bases. Inherent toughness and high tensile elongation provide fabrication advantages and resistance to impact and thermal-shock damage.	Equipment where strong acids and bases are encountered and where toughness is needed.
derakane™ 441	More heat resistant and often more corrosion-resistant than Derakane™ 411.	Equipment where even more temperature and/or chemical resistance is needed versus Derakane™ 411.
derakane™ 451	Outstanding thermal and chemical resistance to strong oxidizing acids.	Equipment where high temperature resistance and improved resistance to oxidizing environments are needed. Best hot water resistance of the epoxy vinyl ester resins.
derakane™ 470 derakane™ momentum™ 470	Exceptional thermal and chemical resistance. High retention of strength and toughness at elevated temperatures.	Equipment where high temperature resistance and improved resistance to oxidizing environments are needed. Best solvent resistance of the epoxy vinyl ester resins.
derakane™ 510C derakane™ momentum™ 510C	Flame-retardant version of the Derakane™ 411 series.  Class I or Class II flame retardance can be achieved.	Equipment requiring corrosion resistance and toughness, plus flame retardance.
derakane™ 515	Class I flame retardance can be achieved without antimony synergist.	Equipment requiring higher heat resistance, corrosion resistance and toughness versus Derakane™ 411, plus flame retardance.

<sup>1</sup> consult technical data sheets for each resin's flame spread rating

<sup>2</sup> consult the Derakane resin selection guide for temperature and concentration limits for your specific environment

**consult the Derakane resin selection guide for temperature and concentration limits for your specific environment**

## Ashland derakane™ resins

No single FRP resin can handle every kind of corrosion problem. That's why Ashland has the largest variety of premium, corrosion-resistant resins in the industry.

Ashland LLC is a leading, global supplier of corrosion-resistant resins for fiber reinforced plastics. We offer the most comprehensive line of heat-resistant and flame-retardant resins on the market today.

Reinforced plastic composites are used for chemical containment in many types of chemical processing operations. Each environment requires a specific type of resin to handle the corrosive conditions.

Please email our hotline for information, advice, and the correct resin recommendation for your specific application. More detailed application information is available from the Derakane™ chemical resistance guide available at [ashland.com/derakane](http://ashland.com/derakane).

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