

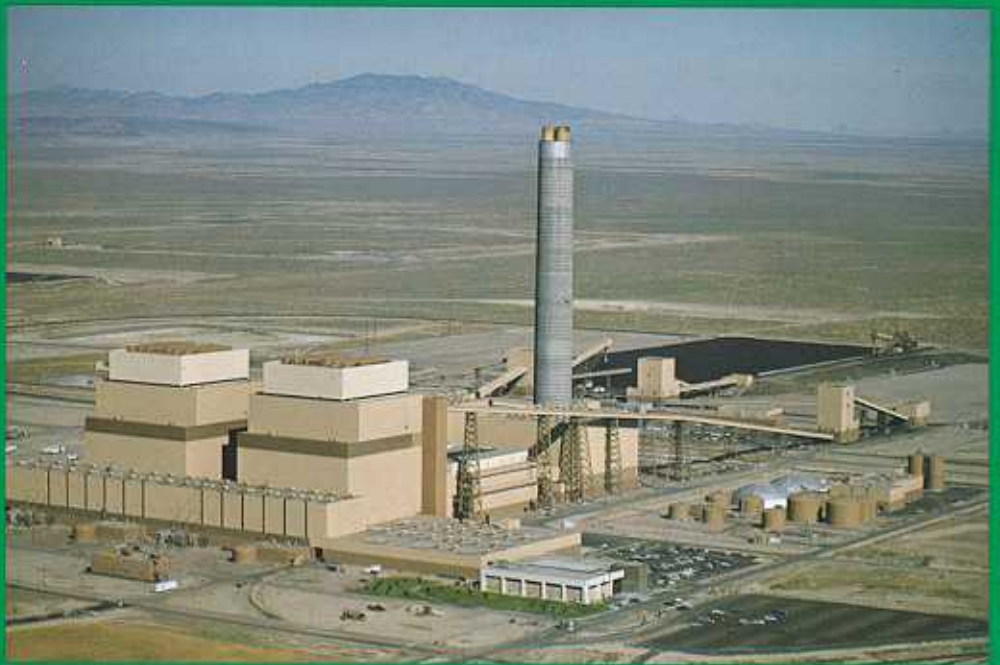


ERSHIGS
INCORPORATED

RTP-1
RTP
Certified

Ershigs, Inc. is accredited by the American Society of Mechanical Engineers to certify the Reinforced Thermoset Plastic (RTP) vessels it builds meet ASME's RTP-1 standard.

Fiberglass Reinforced Plastic Composites For the Power Industry



"The leader in FRP systems..."

Ershigs, Inc.

The leader in FRP systems

Ershigs, Inc. has been providing quality products and dependable service to their customers since 1921.

In 1960, the Company pioneered the development of Fiberglass Reinforced Plastic (FRP) products for corrosion resistant applications and has become the nation's leader in designing, manufacturing and installing FRP systems.

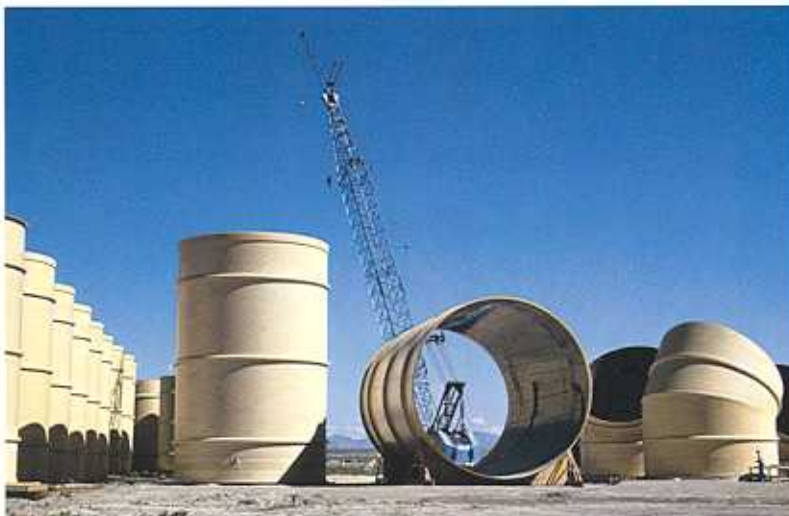
The corrosion resistance and physical strength characteristics of Ershigs' FRP products lend themselves to many applications in the power industry. Flue gas treatment, cooling water transmission and distribution, and waste water containment are but a few of the proven power plant applications.

Engineering & design

FRP composites are custom designed by our professional engineers to meet the required design conditions. State-of-the-art computer programs including finite element analysis, laminate theory, pipe stress analysis and customized programs combined with the technical expertise of engineers who are also experienced in the manufacture and installation of FRP composites provide efficient, cost effective designs that perform...long term!



Finite element design programs



28 ft. dia. x 45 ft. long chimney liner sections



Support grillage

Stacks & Chimney Liners

Ershigs' FRP stacks and chimney liners have been providing reliable performance to the power industry since 1979. Other installations in the pulp and paper and mining industries date back to the early 1960's.

A number of our installations have operated continuously at 325 degrees F., with even higher excursion temperatures. However, careful analysis is required when operating temperatures exceed the heat deflection temperature of the laminate resin. Water spray quench systems are recommended to ensure that maximum temperatures are maintained within the design parameters.

FRP chimney liners are normally suspended from steel grillage in lengths to 300 ft. Connections between sections are made with flexible joints to allow for expansion and contraction of the FRP which is about 2-1/2 times that of mild steel.

Breeching & Outlet Duct

Ershigs Inc. manufactures breeching and outlet duct in a variety of sizes, shapes and configurations. Round and rectangular cross-sections can be made as well as transitions to match equipment.

Large sections, to 16 ft. dia., can often be shipped with specially designed low-boy trailers depending on the ultimate destination. When the required configurations are too large to ship Ershigs will manufacture on the job site. Massive FRP structures, measuring 38 ft. x 34 ft. transitioning to 28 ft. dia., were manufactured and installed in 1986. These units connected the FGD absorber to 28 ft. dia. FRP outlet duct. A water spray quench system was installed to protect against high temperature up-set conditions in the system.

Expansion is accommodated with slip joints or elastomeric bellows-type expansion joints.

Round cross-sections are the most structurally efficient shapes for FRP duct, and they are also the most cost effective to manufacture. It is the ideal material to connect FGD absorbers to stacks and chimney liners.

FRP equipment provides both interior and exterior corrosion protection and there is no need for troublesome and expensive coatings and linings. Maintenance is minimal.



Transition and horizontal breeching



14 ft. dia. breeching (retro-fit)



14 ft. dia. breeching on specially designed trailer

Absorbers



28 ft. dia. FGD reactor/absorber and mist eliminator



24 ft. dia. absorber tower

Flue Gas Desulfurization scrubbers and absorbers have used FRP internal components for many years. The corrosion resistance and dependability of FRP has been proven in such applications as piping, weirs, baffles, troughs and mist eliminators.

In 1985, Ershigs, Inc. designed, manufactured and installed an all-FRP system for a 40 MW coal fired power plant. The components included a 17 ft. dia. pre-scrubber, a 28 ft. dia. reactor and an 11 1/2 ft. x 13 1/2 ft. rectangular mist eliminator. A gypsum slurry tank, water tank and miscellaneous piping was also provided. Periodic inspections have shown the corrosion resistance and abrasion resistance of the FRP to be excellent, and maintenance has been minimal.

In 1991 a similar system was designed, manufactured and installed for a 100 MW power plant. In this application the reactor was 42 ft. dia. A 28 ft. dia. storage tank and a 13 ft. dia. x 258 ft. high FRP cage-supported stack were also included within the scope of this work.

FRP is the ideal material of construction for large diameter absorbers in diameters to 120 ft. Counter-flow spray towers as well as jet-bubbling reactors with complicated tube-sheets and gas risers are easily manufactured by Ershigs' skilled craftsmen using unique construction methods.

Ershigs... "The Leader in FGD Systems".

Large Diameter Tanks

Ershigs' proven on-site manufacturing technology for large diameter FRP tanks provides industry with effective solutions for the storage and processing of corrosive fluids.

FRP waste neutralization tanks to 65 ft. dia. are in service in many industries including power plants. These vessels are constructed by a unique slip-form method that eliminates joints and seams in the shell. Double wall and double bottom configurations are available for secondary containment and/or leak detection. Ershigs' large diameter tanks are manufactured on-site and installed without sidewall deformation.

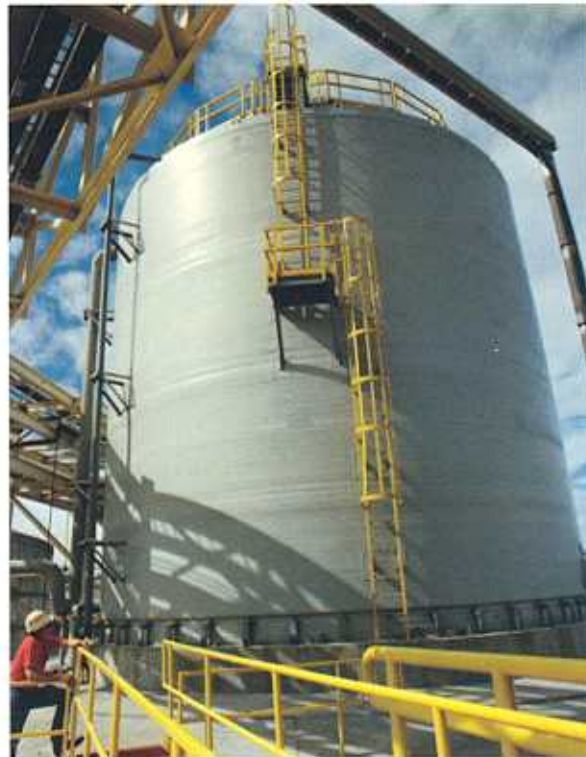
Tanks can be provided with FRP covers suitable to withstand snow and wind loads as well as man loads. Open top tanks are also available with FRP or steel wind rings depending on diameter.

Ladders, platforms, catwalks and stairs are available in FRP, mild steel or stainless steel construction.

FRP piping is used for spargers, eductors and distributors within the tank since it is corrosion resistant inside and out.



65 ft. dia. neutralization tanks



40 ft. dia. storage tanks

Slurry Pipe



Stopline™ slurry pipe

Limestone slurry is commonly used in FGD systems for control of power plant emissions. This abrasive slurry often contains small amounts of chlorides and fluorides which cause severe corrosion problems with metallic materials in addition to the abrasive conditions caused by particles of limestone and gypsum.

Ershigs' specially formulated Stopline™ FRP pipe and fittings withstand the rigors of this environment and systems have been in service for over ten years.

Yard piping and manifolds for supply to the absorber and return piping from the absorber is manufactured with abrasion resistant filler throughout the laminate for maximum wear resistance. It's also protected with an exterior UV and weather resistant resin.

Absorber piping and spray headers for service inside the absorber vessels have an additional abrasion resistant exterior laminate layer identical to the inside surface for resistance to erosion caused by slurry spray.

All branch outlets on spray headers are molded with radiused bell-mouth intersections to minimize wear in this critical area.

Rules of good piping practice should be followed when designing and installing Ershigs' Stopline™ slurry pipe. Consideration must be given to expansion, contraction and thermal forces caused by temperature change as well as pressure and vacuum. Normal operating temperatures are usually 140 degrees F., but continuous operation at 212 degrees F. is easily accommodated with Stopline™ piping. Proper supports must be provided to maintain piping stress levels within parameters established by the pipe stress analysis.

Ershigs' metal fabrication division can supply hangers, supports, anchors and guides specially made to match the outside diameter of FRP piping and to meet the system design requirements.

For more complete information on the design of FRP piping please refer to Ershigs' catalog EPS-07.



Stopline™ slurry spray headers

Cooling Water Pipe

Ershigs' FRP piping is used for cooling tower distribution systems and risers. Inherently corrosion resistant inside and out, FRP is used in counter-flow, cross-flow and hyperbolic natural draft towers.

Below-ground FRP supply and return piping is also used and is available with gasketed bell and spigot O-ring joints for ease of installation. Double O-rings can be provided to allow testing the gasket seal prior to burial. Thrust blocks must be provided for axial restraint with O-ring joined piping.

FRP is lightweight and requires less costly construction equipment to complete an installation. Piping can be furnished in 40 ft. lengths or in pre-fabricated spools to minimize installation time and costs.

Large diameter systems to 120 in. dia. have been providing maintenance-free service for many years and can be designed to accommodate live loads, back-fill loads and operating pressures and vacuum.

The smooth, seamless interiors of FRP piping systems resist sludge and mineral deposit build-up minimizing pumping costs and maintenance. A Williams and Hazen C factor of 150 is used for Ershigs' FRP piping.

Complete system analysis by engineers experienced in FRP composite design and manufacture is important for all FRP piping systems and buried pipe in particular. Ershigs' staff of professional engineers and designers is available to assist in the design process to help ensure a trouble-free installation.



Cooling water distribution pipe



7 ft. dia. buried circulating water pipe

Partial Client List

American Electric Power Co.
Asea Brown Boveri (ABB)
Associated Electric Power Cooperative, Inc.
Babcock & Wilcox
Basin Electric Power Cooperative
Bechtel Power Corp.
Boston Edison Co.
Chiyoda Corp.
Colorado Ute
Cooperative Power Association
Delmarva Power & Light Co.
Florida Power & Light
General Electric Environmental Services, Inc.
Georgia Power
Hawaiian Electric
Hoosier Energy
Indianapolis Power & Light Co.
Intermountain Power Agency
Iowa Electric Light & Power Co.
Kansas Power & Light Co.
Louisville Gas and Electric Co.
Lower Colorado River Authority
Maui Electric
Michigan South Central Power Agency
Minnkota Power Cooperative, Inc.
Nevada Power Co.
Noell Corp.
Orlando Utilities Commission
Pacific Gas and Electric Co.
Pacific Power
Plains Electric Co-op
Salt River Project
Sierra Pacific Power Co.
South Carolina Public Service Authority
Southern Company Services
Sunflower Electric Co-op
Tampa Electric
Tennessee Valley Authority
Texas Municipal Power Agency
Texas Power and Light Co.
Texas Utilities Co.
Union Electric Co.
University of Illinois
Utah Power & Light Co.
Westinghouse Electric

**When it comes to FRP,
the Ershigs label is your best guarantee!**



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