



PRODUCTS CATALOG

**INDUSTRIAL AND ENVIRONMENTAL PIPING SYSTEMS
PERMA-PIPE®/ RICWIL®**

WHY FACTORY MANUFACTURED PIPING SYSTEMS?

Over the past few years, factory manufactured piping systems have become the perfect solution for new construction as well as for existing piping system upgrades. These systems are cost effective both during initial installation and over the life of the system due to low long term maintenance costs. They also comply with OSHA safety regulations and environmental laws. The United States Environmental Protection Agency has issued the CFR 40 parts, 112, 260, 261, 262, 263, 264 and Subpart D-Release Detection, 280.40 in 1988. These regulations require secondary containment for regulated substances contained in underground tanks and pipe systems. All tanks and piping systems must prevent release of these substances and must be checked on a regular basis. Most importantly, all underground piping systems with regulated substances under pressure must have automatic line leak detection. OSHA has also issued regulations for piping systems that would require a secondary containment to comply with hazardous chemical transfer.

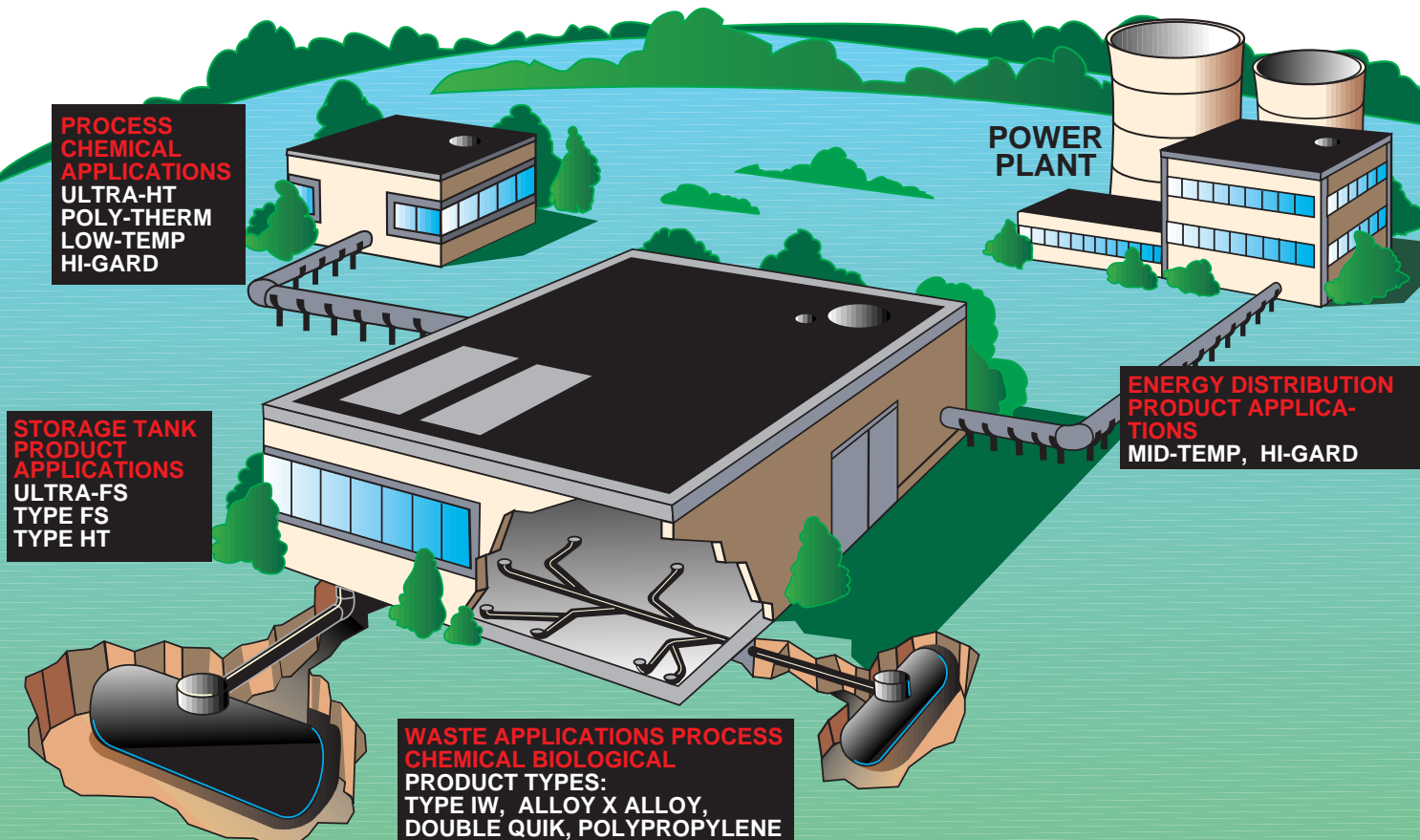
WHY PERMA-PIPE/RICWIL?

PERMA-PIPE/RICWIL's years of experience has allowed us to design and engineer our industrial and environmental piping systems to safely transport a wide variety of liquids both hazardous and nonhazardous.

Each system is designed to provide an economical and efficient way to meet our clients exacting standards and help them comply with all federal, state and local requirements.

Because PERMA-PIPE/RICWIL's capabilities are not material specific, all of our factory manufactured piping products are designed to address specific client applications.

PERMA-PIPE/RICWIL offers the appropriate solution for your project, whether it requires a piping system for steam, hot water, fuel, process chemicals, process sewers, lethal service chemicals, nuclear waste, landfill leachate, or other liquids. PERMA-PIPE / RICWIL offers the appropriate solution.





POLY-THERM® is a prefabricated, preinsulated piping system for above grade distribution of liquids from -320°F to 750°F and below grade from -320°F to 250°F. The filament wound fiberglass jacket is durable and maintenance free. This design eliminates corrosion under insulation. It outperforms traditional insulated systems for steam, high temperature hot water, process chemicals, fuel and heavy oil distribution. As an option, this system can be equipped with the PERMA-PIPE/RICWIL electric heat tracing or steam tracing systems

INDUSTRIAL



MID-TEMP HI-GARD® piping systems provide for the distribution of fluids aboveground at temperatures of 250°F and higher. The composite insulation design offers superior energy savings over conventional insulated systems. The outer jacket can be supplied with a variety of alloys, including aluminum, stainless and galvanized steel. Prefabricated and preinsulated, this piping system provides maximum Btu efficiency. It is applicable for aboveground distribution of steam, hot water, sulphur, asphalts and other high temperature liquids. As an option, this system can be equipped with the PERMA-PIPE/RICWIL electric heat tracing or steam tracing systems.



LOW-TEMP HI GARD® piping systems provide for the distribution of all fluid types aboveground at temperatures up to 250°F. Prefabricated and preinsulated, this piping system is thermally efficient for use indoors and outdoors with a .16 K-factor polyurethane foam. Jacket types are available in aluminum, galvanized steel or stainless steel. This system is suited for low and medium temperature distribution of oil, low temperature hot water, condensate, process chemicals, chilled water and other low temperature fluids. As an option, this system can be equipped with any PERMA-PIPE/RICWIL electric heat tracing systems.



CRYO PIPE is a polyurethane foam insulated cryogenic piping system that is a cost effective and maintenance free alternative to vacuum jacketed pipe systems. Using single or dual layer insulation designs, depending on temperature, our cryogenic piping systems offer extremely low heat gains. Typical cryogenic liquid applications include air, ammonia, argon, krypton, nitrogen and oxygen. Gas applications are ammonia, argon, nitrogen and oxygen.



ULTRA-HT is the most thermally efficient product offered for environmentally sensitive media distribution that must maintain a critical temperature. It can combine any type of steel alloy for the inner and outer containment piping that is best suited for your exact applications. The insulated outer pipe provides the necessary temperature maintenance. Ultra-HT can be designed to accommodate multiple pipes to reduce pipe rack space or reduce trench width. The option of PERMA-PIPE/RICWIL electric heat tracing for fluid temperature maintenance can be utilized.



ULTRA PIPE answers the call for an alloy pipe resistant to corrosion. It is designed with a .100 inch thick filament wound fiberglass cladding that eliminates the need for cathodic protection. Applications for Ultra Pipe include chilled water, condenser water and hydrocarbon products.

ULTRA-FS is the best piping system available in the market today. The system consists of carbon steel product pipe(s) inside of a steel outer containment pipe that is clad with .100 inch thick fiberglass. This design eliminates the need to install and maintain a cathodic protection system. Applications include all types of fuels, such as No. 2 diesel for backup generators, gasoline distribution pipelines and fuel tank farms. In addition, this system can be used in commercial or military airports for jet fuel hydrant piping systems. Options include the PAL-AT or FluidWatch leak detection and the PERMA-PIPE/RICWIL electric heat tracing systems.



ULTRA IW is an all stainless, nickel or duplex alloy piping system consisting of product pipe(s) with .100 inch thick fiberglass cladding on the alloy containment. Its applications include high temperature corrosive fluids, Category M fluids, biologic waste, low level radioactive material, pharmaceutical and industrial process waste. This piping system is intended for applications that require the utmost in environmental protection. Options include the PAL-AT or FluidWatch leak detection and the PERMA-PIPE/RICWIL electric heat tracing systems.



TYPE FS utilizes any type of product pipe(s) for maximum service pipe integrity inside a Vynlester FRP containment. The Type FS/EP (Emergency Power) piping system is constructed with both a supply and return line in a single containment for emergency power generation systems. Additional applications include jet hydrant fuel and industrial waste drain piping systems. Options include the PAL-AT or FluidWatch leak detection and the PERMA-PIPE/RICWIL electric heat tracing systems.



TYPE IW is an all alloy steel piping system used where fluid is corrosive and temperature limits do not allow the use of thermoplastic or theroset materials. The piping system can be furnished with a variety of pipe coatings on the outer containment. Applications include low level radiation waste lines, elevated temperature and/or pressure chemical services, chemical or biological process waste systems. Options include the PAL-AT or FluidWatch leak detection and PERMA-PIPE/RICWIL electric heat tracing systems.



TYPE HT is designed for high temperature containment applications where carbon steel pipe is the appropriate product and containment selection. The outer containment is protected from corrosion with a urethane coating for below grade installations. For above grade installations any common industrial coating can be supplied. Applications for this system include fuel oil, diesel, gasoline, high temperature process sewers and petroleum refinery "NESHAP" compliance. Options include the PAL-AT or FluidWatch leak detection and the PERMA-PIPE/RICWIL electric heat tracing systems.



ENVIRONMENTAL

DOUBLE QUIK™ is a thermoplastic secondary contained piping system using polypropylene, polyethylene or PVDF. Utilizing pressure rated fitting assemblies and a fusion welding process provides complete system integrity. Applications for DOUBLE QUIK include process chemical, process sewers, acid waste, land fill leachate collection, groundwater recovery systems, solvent recovery, acid and caustic transfer pipe systems and waste waterlines. Options include the PAL-AT or FluidWatch leak detection and the PERMA-PIPE/RICWIL electric heat tracing systems.



Preinsulated piping types, POLY-THERM®, Type HT, Ultra-FS, Ultra-IW and Ultra-HT are engineered for process lines, where temperature control is critical. Since they are watertight, corrosion under insulation is eliminated resulting in long term uninterrupted operation. The design and testing of these systems are in compliance with all client specifications.

The piping systems are analyzed per ANSI B31.3 or B31.1 as appropriate. The design also is reviewed for thermal expansion and compatibility with cable or probe leak detection systems.

DOUBLE-PIPE™ is a completely factory assembled and tested system, not a field fabricated system. Each system arrives on site with fittings and straight sections assembled and ready for installation.

In addition, PermAlert's PAL-AT®, LiquidWatch® and FluidWatch® leak detection products and PERMA-PIPE/RICWIL's Electric Heat Tracing Systems provide state-of-the-art performance to meet all your monitoring requirements.

PIPING SYSTEM USERS

American Airlines
Applied Micro Devices
Auburn University
BASF
B.F. Goodrich
Boeing / Douglas Aircraft
Bristol-Myers Squibb Company
Cargil
Carolina Power & Light
Caterpillar Tractor Company
Chevron
Conoco Inc.
Ciba-Geigy
Dayton Power and Light
Delta Air Lines
D.O.E. Los Alamos/ Oak Ridge National Lab.
DOW Chemical
Eli Lilly
Eveready
Exxon
First Chemical
Florida Power and Light
Ford Motor Company
General Electric
General Motors
Hershey Foods
Hewlett Packard
Honeywell
IBM
Intel
International Paper
Kimberly Clark
Lockheed / Martin Corporation
Merck & Co.
Miami International Airport
Motorola
O'Hare International Airport
PCS Nitrogen
Sony Corporation
Syntex Pharmaceutical
Tampa International Airport
Tropicana

ADDITIONAL PRODUCTS AND SERVICES

ELECTRIC HEAT TRACED SYSTEMS

PERMA-PIPE provides a complete line of heat traced process piping systems for freeze protection, temperature maintenance, heat up and reheat. Our electric, steam and hot fluid traced systems can also be utilized with our containment piping systems.

Heat traced systems ensure the cost effective, continuous flow of product through your pipeline. These systems supply only the heat necessary for the efficient flow of the product. Because variance is minimized, operating costs are significantly reduced and time consuming costly purging of lines is also eliminated.

PERMA-PIPE's designs incorporate the use of heat traced tubes attached to the product pipe. Maintenance of the heat traced system is minimal; removal of the insulation and jacket is only required at a minimum number of field joint locations.

ELECTRIC HEAT SYSTEMS INCLUDE:



SKIN EFFECT

Skin Effect Current Tracing

Electrical heat tracing method for uniform heat on long pipelines. One power supply can trace up to 16 miles. Factory Mutual approved for hazardous environments.



IMPEDANCE

Stereo Heat®

Electric impedance heat tracing method for uniform high temperature heat on short runs and branch piping applications.



HEAT TAPE

Heat Taped Systems

Prefabricated economical heat tracing provides maximum efficiency of heat tape.

LEAK DETECTION / LOCATION SYSTEMS

PermAlert offers a variety of state of the art leak detection systems. These systems can be configured to provide continuous line sensing and/or discrete point leak monitoring.

- **PAL-AT®** cable and probe leak detection/location technology is designed to operate within a secondary containment or conduit in less than bone-dry conditions.
- **LiquidWatch®** is a multi-probe discrete point leak detection system which can monitor a maximum of sixty-four different probes from one alarm panel. The system is designed for secondary contained pipe and storage tank systems, which require a less sophisticated leak detection system.
- **FluidWatch®** is an economical leak detection system designed for applications around chemical storage tanks and areas which require a quality leak monitoring system, such as unmanned equipment rooms and small raised floor areas.

CATHODIC PROTECTION

PERMA-PIPE offers corrosion prevention technology that deters corrosion from coated metallic structures buried in moist soil and redirects it to an expendable material.

With a cathodic protection system, a voltage potential force (greater than the coated structure's voltage potential force) is impressed upon the surface of the coated metallic structure from the anodes. This prevents the current discharge into the soil by transferring the corrosion reaction to the anodes.

The use of properly designed, properly maintained cathodic protection systems can extend the life of buried, coated metallic structures fifteen years or longer. The cost is minimal when compared to the expense of maintaining or replacing a deteriorated system and the disruption of service.

PERMA-PIPE®

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