



PIPING TECHNOLOGY & PRODUCTS, INC.



U.S. Bellows, Inc.



SWECO Fab, Inc.



Pipe Shields, Inc.



Frank Anchor/Darling
Enterprises, Inc.



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“Product of the Week” Showcase Vol. 3





PIPING TECHNOLOGY & PRODUCTS, INC.

ISO 9001:2008 CERTIFIED

MEMBER OF MSS, SPED, APFA

WIDE VARIETY OF HIGH-QUALITY, COMPETITIVELY PRICED ENGINEERED PRODUCTS

“FOR ALL YOUR ENGINEERING & CONSTRUCTION NEEDS”

ENGINEERED PIPE SUPPORTS

VARIABLE SPRINGS, CONSTANT SUPPORTS AND BIG TON SPRINGS
VIBRATION CONTROL DEVICES: SNUBBERS AND SWAY STRUTS
SUPPORT ASSEMBLY COMPONENTS: CLAMPS AND HARDWARE
FABRICATED PIPE SHOES, GUIDES AND ANCHORS

PRE-INSULATED PIPE SUPPORTS

FOR CRYOGENIC & HIGH TEMPERATURE APPLICATIONS

SLIDE BEARING PLATES

ANCHOR BOLTS AND EMBEDS

U.S. Bellows, Inc.

- STOCK BELLOWS
- THIN-WALL: SINGLE, HINGED, GIMBAL, UNIVERSAL, ELBOW
- PRESSURE BALANCED, IN-LINE
- PRESSURE BALANCED, EXTERNALLY PRESSURIZED & TOROIDAL
- THICK-WALL: FLANGED & FLUED
- FABRIC EXPANSION JOINTS
- RECTANGULAR EXPANSION JOINTS
- SLIP-TYPE EXPANSION JOINTS

MEMBER OF EJMA



SWECO Fab, Inc.

- PRESSURE VESSELS & TANKS
- PIG LAUNCHERS AND RECEIVERS
- SWEEPER PIGS & SCRAPERS
- SPECTACLE & LINE BLINDS
- CONICAL STRAINERS: LINE, TEE TYPE, PERFORATED PLATES, STANDARD DESIGN
- INSTRUMENT SUPPORTS
- ORIFICE PLATES & FLANGES
- DUCT & TRANSITION PIECES
- BELLMOUTH REDUCERS

ASME CERTIFIED & U-STAMP



Pipe Shields, Inc.

- INSULATED PIPE SUPPORTS
- COMMERCIAL & LIGHT INDUSTRIAL
- HEAVY INDUSTRIAL - BASE MOUNTED TYPES
- PIPE ANCHORS
- PIPE HANGER TYPES
- PIPE RISER CLAMPS
- PIPE GUIDES

ISO-9001-2008



Fronex Anchor/Darling Enterprises, Inc.

- HYDRAULIC SNUBBERS: SHORT STRUT
- ADJUSTABLE STRUT
- MECHANICAL SNUBBERS
- DYNA/DAMP COMPENSATING STRUT

ASME NUCLEAR QUALIFIED



Developing a Business



Invention of the Big Ton Spring...

Innovation and customer service enabled PT&P to carve out a niche in the pipe support industry. The development of the “big ton” provides an interesting illustration of this. Andre Hydell of Total Petroleum contacted PT&P and asked for a way to support a large vessel that would be both stable and economical. Ben Tatum and Randy Bailey responded by designing the big ton, essentially a table atop muscle springs. Total Petroleum was so pleased with the design that they gave more business to PT&P and found other uses for the big ton.

As PT&P became better known to the major engineering and construction companies, it was able to submit competitive bids and acquire lucrative contracts during the late 1970s and early 1980s. While increasing the flow of business brought a corresponding increase in the company’s revenues, it also brought a wave of growing pains that challenged the resourcefulness of the entire staff. PT&P refused to be overwhelmed by the tasks and challenges of a very competitive marketplace. In this way, more by process than by design, PT&P grew into a major supplier of pipe supports and related products. All this did not just happen, of course, but in meeting the challenges and crisis that ultimately face most small businesses, PT&P took advantage of the booming economy to augment its share of the market and in the process, reinvented itself as a viable business organization.

The first crucial step was to create a niche for the company in the piping industry. For PT&P, this meant finding ways to improve the quality of key products and provide faster and better service to customers than the competition. Second, the company had to hire additional personnel, both in the shop and in the front office, qualified people who could organize the various functions of the business and keep the company growing and maturing as a reliable manufacturer of pipe supports and products. Third, PT&P had to purchase equipment to expand its manufacturing capabilities. All of these developmental steps took place more or less simultaneously. One of the first and clearly most significant steps involved the development of a new kind of engineered spring hanger.

An Early Version of the Bolted Spring Hanger...

This product helped PT&P in its quest to carve out a specialized niche and compete effectively with older more established firms. The bolted spring hanger became one of the company’s most important products and a mainstay of the PT&P catalog. As the name suggests, a spring hanger is used to suspend piping, to hang it from steel beams in a



manufacturing plant, refinery, or other location. Each spring support is individually calibrated to the various pipe loads and movements specified. During the early 1970s, spring hangers were “like gold” to piping engineers, in part because of their vital role in the piping system, but also because they took a painfully long time to manufacture. Orders for spring hangers required a “lead time” of as long as six to eight weeks, because they had to be customized to meet the buyers’ specifications and then individually manufactured.

Thriving Through Diversification



Survived Energy Recession...

The Bayou City suffered through five years of economic contraction with some areas feeling effects more traumatic than during the Great Depression of the 1930s. Although it may have seemed like it at the time, all of Houston did not fold during the economic downturn of 1982-87. Many companies survived the energy recession and some found themselves in better condition by the time the Houston economy began to turn around in 1988. One of those companies was Piping Technology & Products. The company was strong enough to weather the most severe downturn in the recent history of the oil, gas and petrochemical industries without the “downsizing” that many firms endured during those difficult days.

PT&P opted out of mortgaging its future by borrowing heavily to finance expansion or capital improvements; and saw the need to diversify the company’s customer base and to expand their product line. Consequently, the company continued to book jobs and continued to grow throughout the period of the downturn. By the time that both the local and national economies began to recover somewhat in the late 1980s, PT&P had moved to a larger facility, acquired a new subsidiary,

SWECO Fab. Inc., and added new manufacturing capabilities while, during the same time, many of their competitors had been forced to close their doors. PT&P continued to pursue work but in reality, there was not much work to pursue. Terry McCormick, PT&P’s long-time Sales Manager, utilized this slow period to bolster his contacts and keep in touch with the people and the companies that PT&P had done business with previously. He dropped in at the engineering companies to chat with the piping and stress engineers who still remained. All of this generated good will and would pave the way for PT&P to be assured of receiving inquiries once the economy picked up and the engineering and construction companies began getting new projects.

In addition to shoring up PT&P’s contacts with the engineering and construction companies, McCormick began putting together a network of sales agents to represent PT&P in other parts of the country. Usually these agents were independent businessmen, manufacturers’ agents who represented three or more companies. PT&P was willing to try almost anything to keep the business going and to keep its employees working. As a result, the company not only survived, the expanding capabilities actually helped propel the firm into a new growth cycle.



New Era of Expansion



Houston Museum of Natural Science...

In 1993, the Houston Museum of Natural Science presented PT&P with one of their most unusual challenges. The Museum planned to add an exhibit on pipelines and asked PT&P to fabricate an exhibit that allowed visitors to experience what it was like to flow inside a pipe. The resulting museum piece is still on display.

The Modernization of the 90's...

Piping Technology & Products, Inc. found itself in a time of profound change as the 1980s flowed into the 1990s. The company had survived the difficult economic slump of the 1980s through continually reinventing itself. By the end of the decade PT&P had a new home and was poised to embark on the greatest period of expansion in the firm's history. But first, PT&P would have to address a number of administrative and systematic growing pains that threatened the company. In particular, PT&P needed to incorporate the latest developments in computer

technology to standardize procedure in a way that would streamline the firm's operations. Also, it had become necessary for the company to reinvigorate its marketing ability with an update of its catalog and brochures.

As time progressed, a series of "manager meetings" was implemented into the business strategy of PT&P. The meetings were held to provide a forum in which PT&P officials could raise issues, express concerns, and offer suggestions that would address the needs of the company. These meetings spawned a number of subcommittees to look into issues facing the company and to formulate strategic plans for the future. Issues raised included the acquisition of new computer technology to help manage more efficiently the growing company. In addition, the company embarked on a process of streamlining, standardizing, and modernizing that would make PT&P more efficient and even more competitive. Central to this was the company's embrace of computer technology for every department.



Leading the Industry into the Next Century



Piping Technology & Products has accomplished a lot during the last twenty years of its history and looking back, there are many reasons for the firm to be proud. Over the years, the people of PT&P have continued to demonstrate versatility, innovation, and determination, which helped them build the firm into a thriving manufacturing business. The company survived strong competition and industrial slump to establish its own niche and become one of the world leaders in the manufacture of pipe supports and other piping products. PT&P developed new manufacturing procedures and customized designs that enabled the companies to lower costs, improve its products, and compete with better-established rivals. By 1997, PT&P had an impressive record on which to build as the company prepared for an era of international business in the 21st century.

Today, Piping Technology & Products, Inc., and its wholly owned subsidiaries, U.S. Bellows, Inc., Sweco Fab, Inc., Pipe Shields, Inc., and Anchor Darling, Ent., are committed to the continuous improvement of our products and services. Durga D. Agrawal and his management team: V.P. Rakesh Agrawal, V.P. of Engineering Randy Bailey, Manager of Administration and Material Control David Smith, Manager of Manufacturing Courtney Chadwell, Engineering Manager Ram Garg, Engineering Manager, Alan Cooper, Sales Manager David Baker, Q.C. Manager Jerry Godina, and Controller Ray Walker work as part of a team which includes customers and suppliers, to understand PT&P's role in meeting the team's goal. As a company, we plan and execute our work to meet our customers' specifications. Working together, we strive to "DO IT RIGHT THE FIRST TIME."



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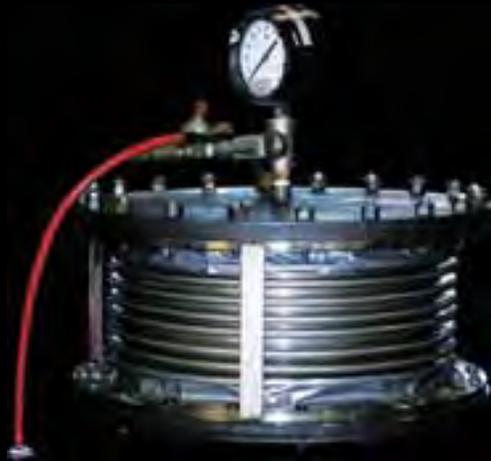
EXPANSION JOINTS

A-304 Stainless Steel 18" Expansion Joints Required Helium Leak Testing

This order required custom engineering to design and manufacture these 304 stainless steel expansion joints due to their critical service condition requirements. PT&P manufactured and tested these expansion joints to the customer specifications, EJMA Standards and U.S. Bellows, Inc. Quality Standards.

Design Condition:

- » 176 PSIG at 500°F
- » .5" Axial Extension and 1.5" Axial Compression
- » Machined Flange Faces with a Specially Designed Gasket Groove
- » Special Customer Welding Requirements to A.W.S. Standards
- » Critical Spring Rate Requirements
- » Stringent Testing Requirements:
 - 100% X-Rayed and Dye Penetrant Examined
 - Helium Leak Tested to a Leak Rate of 1×10^{-7}



 **U.S. BELLOWS, INC.®**
EXPANSION JOINTS

63" In-line Pressure Balanced Expansion Joints with Refractory Lining for a Clean Fuels Project



These 63" diameter in-line pressure balanced expansion joints were manufactured for a clean fuels project in India. They are fabricated with Inconel 625 LCF bellows and ASTM A516 GR 70 carbon steel was used for the shell. The inside is lined with insulating and abrasion resistant refractory. The expansion joints were pressure tested with air at 15 PSIG prior to shipment.



84" Long Rectangular Expansion Joint with Mitered Corners

This rectangular metallic expansion joint measures 22" x 84" x 11" face-to-face and is fabricated from 316 stainless steel bellows and carbon steel flanges. It is designed to absorb axial compression in a hot air duct system to a fan inlet. The bellows have three convolutions with mitered corners. The expansion joint was 100% dye-penetrant examined and soap and air tested prior to being shipped to a power plant.



30" Spent Standpipe Catalyst Metallic Expansion Joint

This 30" spent standpipe catalyst metallic expansion joint lined is with resistant refractory to prevent erosion. The pentographic linkage is designed to distribute the axial compression between the two bellows and support the weight of the center pipe between the bellows.

- » Overall installed length is 89"
- » 321 stainless steel and carbon steel flanges
- » Design pressure: 19 PSIG
- » Design temperature: 1050°F
- » 100% x-rayed and pneumatically tested at 55 PSIG

55' Long by 14'-6" Wide Rectangular Metal Expansion Joint



Expansion Joints Assembled in the Field

U.S. Bellows, Inc. fabricated two metallic expansion joints on an expedited schedule. The expansion joints were fabricated from COR-TEN ASTM 588 carbon steel and were designed for 1.2 PSI at temperatures up to 748°F. The expansion joints were designed for an axial compression of 1.5" and a lateral resultant movement of 1.84". The entire expansion joint was shipped to the job site in one piece. This avoided having to splice weld it into one piece, which saved the customer countless assembly man hours in the field.



Fabric Expansion Joints with a Three Layer Belt



U.S. Bellows, Inc. designed and fabricated 128" x 229" rectangular fabric expansion joints. These expansion joints were fabricated with a three layer belt. The three layers consist of an inner layer of silica cloth, a middle layer of mineral wool and an outer layer of PTFE/coated fiberglass. The frame includes an insulation blanket of mineral wool and stainless steel wire mesh. The frame and liner are fabricated from $\frac{3}{8}$ " thick 304 stainless steel and each expansion joints' frame and liner welds were dye penetrant tested before shipping.

Design:	Design Movements:
Pressure: 1 PSIG	2" Axial Displacement
Temperature: 1010°F	$\frac{3}{4}$ " Lateral Displacement



72" Tied Universal Thick Wall Expansion Joint

This 72" diameter, 30' long tied universal thick wall expansion joint is fabricated from carbon steel with 316 stainless steel bellows. The bellows are fabricated from $\frac{1}{4}$ " thick flanged and flued heads. It is designed for an axial movement rate of $\frac{1}{2}$ " with a lateral movement rate of $1\frac{3}{16}$ ". The expansion joint was 100% x-ray tested and air and soap bubble tested prior to shipping.

42" Dia. Hinged Universal Expansion Joint Designed with Pantographic Linkage

This 42" dia. hinged universal expansion joint was designed with pantographic linkage flue gas application in a Columbian refinery. The redundant two-ply testable bellows are fabricated from Inconel 625 LCF and the remainder of the assembly was fabricated with refractory lined carbon steel. It is designed for an axial movement of 1.1" at 1,000°F and 50 psig. All welds were 100% dye penetrant examined, the bellows longitudinal seam and pipe seams were 100% X-ray examined. The complete assembly was pneumatically tested to 50 psig due to the internal insulation. All the pressure bearing components such as the hinge plates, pantographic linkage, gimbal ring and hinge support rings were designed and engineered per latest EJMA, ASME B31.3 codes.



6" Dia. Single Expansion Joints

The expansion joints were designed with a rectangular plate flange and a weld end. They are 6" in diameter and have an overall length of 15 3/8". The design temperature was 525°F and the design pressure was 1 PSIG. Each expansion joint was 100% dye-penetrant tested and air & soap bubble tested. They will be installed in a heater for a delayed coker unit.



32" Dia. Elbow Pressure Balanced Expansion Joint

U.S. Bellows designed and manufactured a 64" diameter custom elbow pressure balanced expansion joint for an exhaust duct in a power plant in Alberta, Canada. It is 386" in overall length and is fabricated from carbon steel with 321 stainless steel bellows. This expansion joint is designed for 1 1/8" axial movement, 1/2" lateral movement at 482°F and 174 psig. Tests performed on the unit include 100% dye penetrant, x-ray, and ultrasonic on pressure bearing welds. The unit was also hydrotested at 291 psig prior to shipment.



64" Dia. Elbow Pressure Balanced Expansion Joint

U.S. Bellows designed a 64" diameter custom elbow pressure balanced expansion joint for an exhaust duct in a power plant in Alberta, Canada. It is 386" in overall length and is fabricated from carbon steel with 321 stainless steel bellows. This expansion joint is designed for 1 1/8" axial movement, 1/2" lateral movement at 482°F and 174 psig. Tests performed on the unit include 100% dye penetrant, x-ray, and ultrasonic on pressure bearing welds. The unit was also hydrotested at 291 psig prior to shipment.



36" Pressure Balanced Elbow Expansion Joints



U.S. Bellows, Inc. designed and fabricated 36" pressure balanced elbow expansion joints that weigh approximately 4,300 lb. each. The pressure balanced design does not exert pressure thrust on the equipment in the piping system. The expansion joints are designed with Inconel 625 grade LCF bellows and include a liner provided with drain holes to prevent accumulation of corrosive condensation. The design movements are $\frac{1}{2}$ " axial compression and $\frac{3}{4}$ " lateral movement. The bellows were 100% x-rayed before forming and dye penetrant examined after forming.

119" Expansion Joints, Duct Work and Supports



U.S. Bellows provided the total engineering, design and fabrication package for this project that included: expansion joints, elbows, duct work, saddle supports, F-type variable spring supports, slide plates and pipe anchors.

A total of twelve, 119" dia. double slotted hinged expansion joints, thirty-six, 72" dia. elbows and twelve, 119" dia., 55" long header ducts were fabricated for a power plant in Mississippi. The expansion joint assemblies were designed for $.5^\circ$ angular movement, $\frac{3}{8}$ " lateral, $1\frac{1}{2}$ " axial compression. The design conditions were 5 psig at 300°F . The duct work was fabricated from A-36 carbon steel material and the bellows were fabricated from 304 stainless steel. A dye penetrant exam, soap and air test and spot x-ray on all duct seam welds was performed prior to shipping.

Universal Expansion Joint with 5" Thick Refractory Lining for a Styrene Plant

This universal expansion joint is designed with 5" thick refractory-lining for a 52" pipe in a Styrene Plant in Thailand. It measures 154" long and is fabricated with ASTM A 304H stainless steel pipe ends and Incoloy 800H bellows. The expansion joint is designed for a lateral movement of 6.982" with a design pressure of 30 psig at 1085°F. The bellows and pipe longitudinal seams and the pipe circumferential welds were x-rayed. All welds were also dye penetrant examined. A pneumatic test between the plies at 15 psig and the complete expansion joint at 45 psig was performed. The carbon steel surfaces were coated with a special three-coat paint system after testing and prior to shipment.



59" Dia. Single Hinged Expansion Joint Refurbished in Two Weeks

Within a two week deadline, U.S. Bellows refurbished a 59 1/4" diameter single hinged expansion joint for a refinery in Louisiana. The expansion joint is 119 3/4" in overall length and designed for .82" angular rotation at 1380°F and 35 psig. The bellows are fabricated from Inconel 625 LCF, and the entire assembly is 304H stainless steel. Before shipment, the bellows were x-rayed and the assembly was 100% dye penetrant and air tested to 52 psig.



54" Dia. Refurbished Custom Crossover Expansion Joint

U.S. Bellows refurbished a 54" dia. custom crossover expansion joint for a power plant in Kansas. The flow end and balancing end bellows were replaced. The pressure balanced expansion joint was designed for 1" axial movement at 700°F and 150 psig. The bellows longitudinal weld seams were 100% x-rayed and the assembly was hydro-tested at 180 psig prior to shipment. The refurbishment was completed in three weeks to meet the customer's outage requirements.





Refurbished Expansion Joint

This universal expansion joint was refurbished for a manufacturing facility in Tennessee. The bellows were fabricated from 304 stainless steel. The expansion joint was designed for an operating temperature of 475°F and a pressure of 127 psig. The unit is 16" diameter by 123" long and it is capable of ¾" lateral movement. A dye penetrant exam and hydro-test was conducted prior to shipment.



Fabric Expansion Joints for an Exhaust Duct in a Gas Turbine

These fabric expansion joints were custom designed for an exhaust duct in a gas turbine facility in Europe. The 81" x 18" x 16" face to face expansion joints have a integral stainless steel frame and liner with a reinforced red silicone fabric belt. The assemblies were manufactured for a 400°F operating temperature at +/-100 inches of water column pressure. The expansion joints were 100% dye pen tested before being shipped to the customer.



Fabric Expansion Joint

These fabric expansion joints were custom designed for an offshore oil extraction and natural gas project. They are 105" dia. x 24" O.A.L. 309 stainless steel was used for the duct, 310 for the liners, 316 for the covers, 321 for the studs, 309 for the flanges. The fabric belt was a three layer belt with an inner layer of glass cloth, a layer of KO wool and an outside layer of reinforced PTFE. The expansion joints were designed for 1 psig at a temperature of 1100°F. They were designed for 4" axial compression, a 1" extension, and a 0.5" lateral offset. All welds were dye penetrant examined.

Refractory Lined Expansion Joint Designed for a Clean Fuels Project

This refractory lined expansion joint is composed of 321 stainless steel bellows and A588-A Corten angle flanges. It is lined with a 4" thick refractory lining and measures 7'-2" x 4'-6" x 134" F-F. The expansion joint was dye penetrant tested and will be utilized in flue gas service associated with a clean fuels project at an oil refinery.



32" Dia. Externally Pressurized Expansion Joint Designed for an Oil Refinery

US Bellows custom designed this single externally pressurized expansion joint for an oil refinery in Saudi Arabia. The bellows are fabricated completely from 316 stainless steel. The expansion joint is 32" in diameter and 61 1/4" in length. It is designed for 8" axial movement and 150 psig at 176°F, with a spring rate of 1096 lb./in. The unit had the stainless steel alloy material PMI examined. It was also dye penetrant examined and hydrotested prior to shipment.

Hinged Universal Expansion Joint and Duct Work Assembly Custom Designed for an Exhaust Duct Application



PT&P custom designed a hinged universal expansion joint and duct work assembly for an exhaust duct application in a power plant in Kenya. The hinge hardware was fabricated from carbon steel, while the rest of the unit was fabricated from 316 stainless steel with Inconel 625 bellows. An F-type variable spring was also provided for this project and will be used to support the center spool between the two elbows. The duct work with expansion joint is 36" in diameter and the distance between the centerline of the two 90 degree elbows is 240". It is designed for 20 psig at 115°F and ½ degree of angular movement. The entire assembly was 100% dye penetrant tested and a soap and air test was performed prior to shipment.

72" Double Gimbal and Single Hinged Flanged and Flued Head Expansion Joints



U.S. Bellows designed and fabricated a 180" long double gimbal expansion joint with a 90° elbow and flanged and flued head bellows, and a 114" long single hinged expansion joint with flanged and flued head bellows. After performing a pipe stress analysis on the line, it was determined that spring supports were necessary, so F-Type variable spring supports were also provided for this project and shipped with the expansion joints.

All material in contact with the service fluid is fabricated from 304 H stainless steel and all external hardware is 304 stainless steel. The expansion joint bellows is designed for 5° angular movement and 1100°F at 10 psig. A spot x-ray test, soap and air test, and 100% dye penetrant examination on all welds were performed prior to shipment.

Tied Universal Expansion Joint with a 45 Degree Mitered Elbow for a Flue Gas System in an Oil Refinery

This tied universal expansion joint with a 45 degree mitered elbow was installed in a flue gas system. The assembly is 60" in diameter and 215" long. The pipe is fabricated from A 516 GR 70 carbon steel and the bellows are Inconel® 625 LCF. The bellows were 100% x-rayed and hydro-tested to 15 PSIG prior to shipping.



84" Diameter Duct Work and Fabric Expansion Joint Assemblies



The two assemblies shown, a mitered elbow duct work and fabric expansion joint and duct work assembly, are designed for a sulfuric acid plant. Both assemblies are fabricated from $\frac{1}{4}$ " thick 304L stainless steel. They are designed for a 15" water column with a temperature of 180°F, axial compression of $\frac{3}{4}$ ", and lateral movement of $\frac{3}{4}$ ". A dye penetrant examination is performed on all welds prior to shipment.

78 Inch Fabric Expansion Joint and Duct Work Assembly with a 90° Elbow for a Sulphuric Acid Plant



U.S. Bellows designed and fabricated a 78" fabric expansion joint and duct work assembly with a 90° elbow for a sulphuric acid plant in Louisiana. A stress analysis was performed to determine thermal movements and spring supports, loads and travel. The ducts are fabricated from carbon steel and are 30" long. The expansion joint is designed for 750°F at 5 PSIG with 2.5" lateral deflection (cold preset) and 2" axial compression. Cradle supports and a "big ton" spring support were also fabricated for this project.

Duct Work Custom Designed with Turning Vanes



U.S. Bellows custom designed duct work with turning vanes in the elbows for a dry tower leading to a main gas blower inlet. The duct work assemblies are fabricated from 316L stainless steel and designed for temperatures up to 150°F. The total assembly is 66" diameter and 749 $\frac{5}{8}$ " long. The units were x-rayed, dye penetrant tested and hydro-tested prior to shipment.



92" Double Hinged Reinforced Expansion Joint for Water Service in Canada

U.S. Bellows, Inc. designed a double hinged reinforced expansion joint for a 92" diameter pipe in a water treatment plant located in Canada. The bellows, root rings and collars are fabricated from 321 stainless steel. The weld ends and hinge hardware are fabricated from carbon steel. This expansion joint was designed for 100 PSIG at 300°F with 4° angular movement for each bellows. The bellows long seams and longitudinal pipe welds were 100% x-ray examined, and a hydro-test at 150 PSIG, along with a 100% dye penetrant test for all welds was performed prior to shipment.



Expansion Joint Components for a Pressure Balanced Expansion Joint in a Nuclear Facility

These expansion joint components were fabricated for a pressure balanced expansion joint in a nuclear power facility in Pennsylvania. They are 46" square, fabricated from carbon steel duct with Inconel 625 bellows, and 321 stainless steel liner. The design conditions were +/- 0.875" axial compression, 1,346 lb./in. lateral spring rate and 15 psig at 250°F. All welds were 100% dye penetrant examined and a pneumatic pressure test at 15 psig was conducted prior to shipping.



Double Arched PTFE-lined Rubber Expansion Joints for a Polysilicon Plant

These expansion joints have PTFE-lined rubber convolutions with Inconel® 625 liners and stainless steel covers. They measure 10" I.D. x 5 ¼" OAL. The expansion joints are designed for 46 psig and temperatures up to 210°F, with ½" axial compression.

Thick Wall Flanged and Flued Head Expansion Joints



U.S. Bellows, Inc. designed and fabricated two 78" I.D. x 110" O.D. and two 36" I.D. x 68" O.D. thick wall flanged and flued head expansion joints. All four expansion joints were fabricated from 1/4" thick ASTM A516 grade 70 carbon steel plate. The expansion joints were cold formed and heat treated to customer requirements. The external surface of the expansion joint was painted with one coat of shop primer. The weld ends of the expansion joint are beveled, and drainage plugs are installed in the crest of the bellows. The bellows long weld seams were 100% dye penetrant and 100% x-ray tested. U.S. Bellows provides 100% customer satisfaction in terms of quality and delivery.



ENGINEERED SPRING SUPPORTS

G-Type Constant Spring Supports

PT&P custom designed 16 G type constant spring supports for a power plant in Mississippi. The constants are comprised of two standard constant spring housing sub-assemblies joined together with an intermediate bridge assembly. They also include welded beam attachments, rods and hex nuts. The assemblies are designed to support pipes ranging from 80" – 96" in diameter. Standard load and travel tests were performed prior to shipment.



Stainless Steel Constant Springs

PT&P custom designed C-type constant spring supports for an oil refinery in the Virgin Islands. They are fabricated entirely from 304 stainless steel to support piping in a highly corrosive environment. The design loads are 7,000 lb., 9,500 lb., and 11,000 lb. with movements of 2 ½" and 3". The constants measure 29" L x 22" W x 20" H. Standard load and travel testing was conducted prior to shipment.



Special E-Type Constant Springs

Special PTP-100 E-Type constant spring supports were custom designed to support boiler trim piping for steam generating in an upper thermal power unit. The constants measure 5 ¾" W x 16 ¾" L x 23 ½" H. They are highly customized to meet the customer's space requirements and operating method to eliminate the hanger rod from shifting, allowing it to move only vertically while going from cold to hot position. Standard constant assemblies of this size, are about 50% larger and the hanger rod would shift horizontally as the travel reaches the hot position. These constants are designed for loads ranging from 72 lb. to 92 lb. and movements ranging from 10" to 11 ½" downward. Standard load and travel tests were conducted prior to shipment.

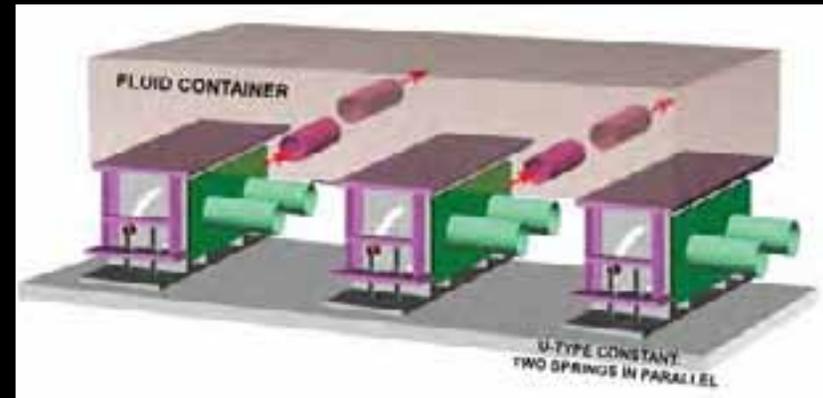


Special U-Type Constant Spring Supports with Slide Plates



PT&P designed a constant load support system for a fluid tank with a load of 105,000 lb. over an area of 5' W x 20' L. To prevent twisting of the fluid container, the support system is designed to allow for "level" vertical movement. This was achieved by using a special system composed of three U-Type constant units. Each unit employs two springs working in parallel with a common large base plate and a load flange to support the entire 5' width of the container.

The constants will support loads of 39,000 lb., 36,000 lb., and 30,000 lb., with a total travel of 4" in the "upwards" direction. The spring coils were coated in neoprene, and all the other major components were hot-dip galvanized to inhibit corrosion. These constants were constructed primarily from carbon steel with the use of stainless steel and PTFE, 25% glass filled slide plates.



U-Type Upthrust Constant Supports

Piping Technology & Products, Inc. designed and fabricated U-Type upthrust constant supports designed to handle 6" of total travel and loads of 5,677 lb. and 4,956 lb. The load flange is modified to hold six ball transfer units for each support. The ball transfer units are used to decrease the coefficient of friction to 0.05 compared to using the standard PTFE, 25% glass filled slide plate which is 0.15.

Gussets are added under the load flange to maintain a leveled surface and an equal load transfer to all ball transfer units. These custom designed constant supports are manufactured for steam power plant superheaters.



12' x 4' Constant Supports with 46" of Travel



Piping Technology & Products, Inc. designed and fabricated upthrust constant supports for a geothermal plant in Hawaii. These constants measure 3' x 1'- 12' x 4' and are composed of A36 carbon steel. The customer required a constant load from 2,500 lb.-15,000 lb. and design travel of 5" to 46". The constant load test and cell travel tests were conducted on these constants.

Constant Spring Supports with Corrosion Resistant Coating Manufactured on a Rush Basis for Off-shore Drilling in Malaysia

A "U-Type" and 6 "C-Type" constant spring supports were designed to support piping in a corrosive environment located off-shore in Malaysia. The U-Type measures 21" x 25" x 57" and C-Types range in size from 11 5/8" x 17" x 4" to 18 3/4" x 32" x 80". The constants are fabricated from A36 carbon steel with a fluorocarbon coating on the pins. The frame, housing, and all components were coated with a 3-coat paint system to resist corrosion. Standard load and travel tests were performed prior to shipping the constants on a rush basis.



Big Ton Variable Spring Supports with Rollers

These are custom designed big ton variable spring assemblies manufactured for a chemical plant in Brazil. They are fabricated from A-36 carbon steel, with monel rods, nuts and hardware. They measure 18" L x 26" H x 26 1/2" W and are capable of supporting loads up to 60,000 lb. with down travel of .52". These big tons employ the use of rollers for adequate mobility and are painted to protect against corrosion.

600,000 lb. Load Mega Ton Spring Support with Bronzphite® Slide Plates



A total of eight big ton spring supports, “mega tons” were designed and manufactured to support two reactors in a power plant weighing approximately three million pounds each. The mega ton pictured incorporated eighteen individual spring coils to produce a load capacity of approximately 602,000 lb. and a spring rate of 112,500 lb./in. It was designed with eight Bronzphite® slide plates that measured 12" x 12". The 12" x 12" slide plate selection was based upon the ability to position individual squares across the load flange surface while simultaneously providing the total slide plate surface area required to support the operating loads.

By using individual slide plate squares, the fabrication and assembly time was reduced because a standardized mounting procedure could be incorporated and repeated as necessary for each big-ton load flange subassembly. Overall, the slide plates were incorporated into the design to reduce the horizontal forces which would be imparted onto the big-ton spring's load flange during lateral deflection (movement) of the reactor.

Bronzphite® slide plates, in particular, were selected because these big-tons will be used in a location which will see continuous “cold-to-hot” operating cycles and as a result, the robust nature of Bronzphite® proved more advantageous than other types of slide plates. The other two designs used nine slide plates, one with fifteen individual coils to produce a operating load of 594,000 lb. and a spring rate of 250,050 lb./in. The other design had an operating load of 300,000 lb. and a spring rate of 106,000 lb./in.

12 Big Tons with Low Friction Rollers

PT&P fabricated several big ton spring assemblies consisting of two different models for a refinery expansion project in India. The larger model has an operating load of 25,590 lb. and a design travel of .420" up. The smaller model has an operating load of 12,100 lb. and a design travel of .443" up. The big tons will be used to support substantial vertical loads while simultaneously providing a large platform to accommodate axial movement of the piping system across the load flange. Low friction rollers are installed to reduce the sliding friction between the load flange and the bottom section of a pipe shoe.



Big Ton Spring Supports with a Custom 3-Coat Paint System

PT&P fabricated big ton spring supports for an expedited delivery of six weeks from conceptual design to final delivery. The big tons measure 26" long x 26" deep x 34 5/8" tall and will be used to support substantial vertical loads while simultaneously providing a base support structure. They are designed for operating loads of 36,000 lb. with a travel of .5625" down. Due to the harsh and corrosive environment, the exposed metal surfaces were finished with a three-coat urethane paint while the threaded components were cadmium plated with a blue Fluorocarbon coating. The big tons were also salt water spray tested according to ASTM B117 standards, and load tested to verify the springs' functionality throughout the entire travel range.



63" x 63" Big Ton Spring Supports

The base measures 63" square while the top load flange measures 55" square. The overall height is 28 5/8" and both big tons were custom designed and fabricated from carbon steel with a hot-dip galvanized finish. The top of the load flange is covered by a stainless steel slide plate. The big ton springs will be used to support heavy (in excess of 100,000 lb.) loads where a standard variable spring would be undersized. One of the big tons was designed with an operating load of 126,000 lb. and the other with an operating load of 225,000 lb. Prior to fabrication, all of the coils were individually tested to insure correct spring rate and load capacity. After the units were fabricated, the entire assembly was tested throughout the entire load/travel range.





C-Type & F-Type Variable Springs with Fully Adjustable Travel Stops

The F-type variable springs were designed with loads ranging from 526 lb. to 33,723 lb. These variable springs are fabricated from a combination of carbon steel and A193-B7 CroMoly steel with A304 stainless steel slide plates. The variables are modified to include fully adjustable travel stops. The first purpose of the adjustable travel stops is to aid by distributing the load evenly during the installation process. The second purpose is to allow spring adjustment to any load within the operating range.



120 $\frac{3}{8}$ " Long Variable Springs

These variable springs are custom designed from carbon steel and fabricated with an extra long housing to allow for a pre-compression lower than the standard. This ensured that the starting (cold) load of 26,745 lb. could be achieved. The springs are designed for a movement of 5.55" downward, which would produce an operating load for each assembly of 38,305 lb. These springs are to be utilized in pairs together with a 22" riser clamp to produce a 407" total assembly length and an overall combined operating load of 76,610 lb.



5' 7 $\frac{1}{2}$ " Tall F-Type Variable Springs

PT&P designed and fabricated F-type variables for an oil refinery in California. The variable springs are designed for an operating load of 49,771 lb. and a 43,000 lb. installed load. Two coils are used in tandem to achieve a vertical movement of 1 $\frac{5}{8}$ " downward. The variables are fabricated from hot-dip galvanized carbon steel and are customized with an extended load column to reach an installed height of 67 $\frac{1}{2}$ ". The variables for this project are the largest standard double springs offered; however, PT&P can customize to any load specification. Standard load testing was performed prior to shipment.

Variable Spring Supports for an Offshore Oil and Gas Refinery



The C-Type variable spring assemblies range in overall length from 3' 2 1/2" to 3' 5/8", and the F-Type measures 1' 1 1/2". The C-Type variables are designed with an operating load of 1653 lb. and a spring rate of 680 lb./in. The F-Type variable is designed with an operating load of 1511 lb. and a spring rate of 340 lb./in. The variable supports will be utilized in a highly corrosive environment; therefore, Grade 316 stainless steel was used with a unique 3-coat paint system applied to the can housing.

232 Variables for a Natural Gas Processing and Separation Plant



A total of 232 variable spring supports were custom designed for a natural gas processing and separation plant. This project included various spring sizes from PTP-1 30 C-type to PTP-4 160 F-type assemblies. The variables are fabricated from carbon steel, galvanized and coated with a special 3-coat paint system to protect against corrosive byproducts such as sulphur. The F-types include 304 stainless steel and PTFE, 25% glass filled slide plate assemblies.

Variable Spring Supports Custom Designed for a Furnace Application in an Ammonia Plant



PT&P custom designed variable spring supports for catalyst tubes in a furnace for an ammonia plant in Canada. The furnace springs are fabricated from carbon steel and painted with a red-oxide primer to help prevent corrosion. This project required special coils that were within $\pm 5\%$ of the calculated spring rate. Over 245 springs underwent calibration test prior to shipment. PT&P has been supplying furnace springs for over 25 years and can customize them to meet your specifications.

F-type Variable Spring Support with a Stainless Steel Wire Rope Isolator

This F-type variable spring support was customized with a wire rope isolator for a facility located in Canada. The variable spring was designed for a load of 12,000 lb. The wire rope isolator is essentially a 1.25" diameter stainless steel rope looped eight times between two chemically conversion coated aluminum alloy retaining bars. The wire rope isolator is effective in vibration isolation and energy absorption.



112 Variable Spring Supports for a Furnace Application

PT&P designed and fabricated 112 variable spring supports for a furnace application at an oil refinery in California. The spring cans are fabricated from carbon steel, vary from 36" to 54" in height and designed to operate at 400°F. The furnace cans are designed for operating loads ranging from 180 lb. to 1,400 lb. and movements from 1" to 5". The customer specified a custom paint system of two part iron oxide blue finish for the cans to comply with refinery conditions. Load tests were performed on the assemblies prior to shipment to determine the operating load and variability.



Variable Spring & Graphite Slide Plate Assemblies

In eight weeks, PT&P provided a gasoline production plant in Dubai with two custom designed variable assemblies. Each assembly includes load columns, four variable spring cans, four channels, 12 plates, nine graphite slide plates and a custom designed frame. The frame allows the variable springs to work in unison to support large pipe trunnions. The top plates measure 45" in width and 25" in height. The variables are designed for an operating temperature of 750°F and an operating load of 3,150 lb. The assemblies are capable of 1/8" upward movement and 1/4" downward movement. A load test was conducted prior to shipment.



SHOCK & VIBRATION CONTROLS, RESTRAINTS & SUPPORTS

Custom Sway Brace and Variable Spring Assemblies Designed for an Aerospace Development Facility



These custom designed sway braces and variable spring assemblies were designed for hanger duct work in an aerospace development facility. The assemblies measure 67 ½" long with a 14 ⅝" O.D. The variables are a modified F-type spring with a pivoting base and non-standard coil combination, including a nested spring design. The assemblies include fully adjustable travel stops and custom end brackets. They are fabricated from carbon steel and designed for load ranges between 1100 lb. and 9250 lb. with a spring rate of +/- 2.78".

26'-9" Custom Designed Sway Struts with Ball Joints

These 26' 9" long custom designed sway struts with ball joints were supplied for a power generating facility. There were 4 total assemblies that included 4" diameter schedule 80 pipe with one ball joint and one extension piece on each end measuring 3" in diameter and 6" long. The sway struts, designed to support a load of 29,000 lb., will be used in the facility to allow movement between two structures along a parallel plane.



114" Diameter, 3-Piece Pipe Clamp and Sway Strut Assembly



The 114" diameter, 3-piece pipe clamp is fabricated from A36 carbon steel and the pins are stainless steel. The sway strut is also fabricated from carbon steel and measures 24'-8" long. This assembly can support loads up to 27,200 lb. and will be used in an oil refinery in Louisiana.



Hydraulic Snubbers Designed for a Geothermal Facility

Fronek Anchor/Darling Enterprises, a division of PT&P designed and fabricated hydraulic snubbers for a geothermal facility in California. The Fig. 510 AD snubbers ranged in size from 34 $\frac{3}{4}$ " to 37 $\frac{7}{8}$ " piston-to-piston and were designed for a 50,000 lb. maximum load, 5" cylinder size and a 6" stroke. The Fig. 511 AD snubbers ranged in size from 56 $\frac{1}{16}$ " to 59 $\frac{15}{16}$ " P-P and were designed for a 20,000 lb. maximum load, 2 $\frac{1}{2}$ " cylinder size and a 6" stroke. Hydraulic snubbers are designed to protect the piping system when a sudden, heavy load is applied (such as an earthquake of high intensity), which can cause serious vibrations leading to complete destruction. A custom three-bolt pipe clamp fabricated from carbon steel was designed to fit in a limited space. A cycle test throughout the full stroke from zero to fully extended was performed prior to shipment.

140,700 lb. Load Adjustable Type Hydraulic Snubbers



Fronек Anchor/Darling
Enterprises, Inc.

Fronек Anchor/Darling Enterprises, Inc., a wholly owned subsidiary of Piping Technology & Products, Inc. designed and fabricated these hydraulic snubbers for a power plant in Turkey. They are adjustable type snubbers with two rear brackets. The hydraulic snubbers can absorb loads up to 140,700 lb.

Design Temperature:	375°F
Design Pressure:	1750 PSIG
Design Stroke:	6"

140,700 lb. Load Adjustable Type Hydraulic Snubbers



Fronек Anchor/Darling, a division of PT&P, designed and manufactured hydraulic snubbers with protective boots for a hydro-sulfuric acid environment in a geothermal power plant. They measure 53 5/8" pin-to-pin with a 3 1/4" cylinder bore size and 6" stroke. The snubbers are designed for an actual load of 15,400 lb., but have a rated load capacity of 20,000 lb. They are fabricated from carbon and alloy steel, and include two coats of epoxy-based paint. An activation velocity test was performed, along with a release rate and drag characteristics test.

Hydraulic Snubber with 225,000 lb. Load Capacity



Piping Technology & Products, Inc. recently designed and manufactured a hydraulic snubber weighing 4,000 lb. for an oil refinery in Mexico. The snubber is fabricated from carbon steel with dimensions of 17" x 101". It supports a maximum load of 225,000 lb. The purpose of the hydraulic snubber is to reduce shock loading created by events such as hydraulic hammer or an earthquake. To meet customer specifications, the hydraulic snubber was coated with a three-coat paint system.

8,000 lb. Sway Braces with Ball Joints



These special sway braces that are subject to the banana effect were designed to specific requirements for a Coker Plant in Texas. With deflection capability of up to plus or minus 9° in all directions, these sway braces are used to stabilize tall stacks. Five springs in tandem prevent binding during operation, and are necessary due to extreme length. The sway braces ranged from 70" to 144" in length and are able to absorb a piping load of up to 8,000 lb. The precision machined pivoting ball joints positioned at each end allow for freedom of movement in any unpredictable direction.

Drag Force Test Proves Mechanical Snubber's Durability



**Lifting Load Test (Pull Test)
30" Diameter Base Insulated Support**



**Temperature Gradient Check
Through the Pipe to the Insulation and Phenolic Block**

Piping Technology & Products, Inc., recently performed its snubber cycle test to prove the durability of a MSA 35 mechanical snubber manufactured for an engineering and construction company in Arkansas.

The cyclic test, performed using PT&P's in-house, horizontal, hydraulic press, is designed to test snubbers at their two modes of operation. At high rates of loading, especially impact, the snubber is expected to provide very high resistance to movement. At low speeds snubbers are to provide very low resistance to movement. Testing a snubber at a low speed displays the normal wear and tear over an extended period of time.

In this case, a cyclic test was performed, in which the MSA 35 mechanical snubber with a load rating of 50,000 lb. and design travel of 6" was measured at a slow speed response. The low speed force remained at a fairly constant 500 lb. for the 50 hours and 5,000 cycles it sustained. This value meets the common criteria that the drag force should be 2% or less than the rated load.

In addition to the snubber cycle drag test, Piping Technology & Products, Inc. has administered other tests such as the burst test for expansion joints. The tests executed by PT&P allow companies to attain the most precise and reliable data available to them. Using this to their advantage, customers will be able to compare data about the recently ordered products, to their individual standards of dependability and durability.

Sway Braces with Adjustable Ends for a 72" Cooling Tower Supply

These sway braces will be used in pairs to support a 72" diameter cooling tower supply line via a common attachment point. The internal components and housing are fabricated from carbon steel and A-5160 spring steel was used for the coil. Each sway brace has a spring rate of 10,100 lb./in. with an overall available travel of 3". The adjustable ends are configured so that one end bracket is interlocked with the mating end bracket of its sister sway brace; thus, enabling them to be connected to the pipe by a single lug.



Carbon Steel and Stainless Steel Limit Stops for a Refinery

These limit stops are fabricated from carbon steel with stainless steel inner components and range in size between 20 7/8" and 22 7/8" from pin to pin. These supports function to prevent excessive stress on the pipe by limiting motion due to earthquakes or other similar events. The loads range between 12,500 lb. and 21,100 lb. The limit stops are passive restraints designed for a maximum thermal expansion of 5", but can be preset for any specified amount of movement. These particular limit stops will be used in an oil refinery overseas.



Sway Strut and 3-Bolt Pipe Clamp Assemblies for a LNG Plant

These sway strut assemblies are designed in conjunction with custom three-bolt clamps to prevent movement on the pipeline. The sway struts ranged in length from 25" to 70" from pin to pin. The operating load ranges between 8,000 lb. to 15,000 lb. The clamps are designed for pipe sizes ranging from 8" to 24". The sway strut assemblies are fabricated entirely from carbon steel with a hot-dip galvanized finish. The completed assemblies also include a custom 2-coat paint system that was applied over the galvanize finish before being shipped to a LNG plant overseas.



126" Long Sway Braces with 10 ½" of Travel for a Power Plant



These PT&P sway braces are fabricated from carbon steel and measure 126" from pin to pin. They use an integral piston assembly with guide to eliminate any buckling and/or misalignment during extension and compression. The sway braces are designed for 10 ½" of travel and a load of 1500 lb. A combination of standard spring coils is used to achieve the required spring rate of 150 lb./in. Prior to shipment, a test was performed using a hydraulic ram. This test simulated actual field conditions and allowed the sway brace to move through the entire travel range in both compression and extension modes.

Mechanical Snubbers Designed for an Oil Refinery in California



These mechanical snubber assemblies are custom designed for an oil refinery in California. This project included twenty mechanical snubber assemblies with load ratings from 16,000 lb. to 40,000 lb. and lengths ranging from 65 ½" to 103 ½". Some of the snubbers were designed to double the standard stroke (up to 12") by using two MSA-10 sized snubbers back-to-back. All the assemblies were custom designed by adding a carbon steel pipe extension piece. Load tests were performed and the assemblies were shipped in just under four weeks.

SUPPORT ASSEMBLY COMPONENTS

68,000 lb. Load Custom Clamp

This custom clamp will be used in conjunction with a hydraulic snubber to restrain pipe movement during extremely high disturbances. It is designed to support the pipe where two heavy duty flanges join. The yoke, lugs, and strap sections of the clamp are carbon steel, and the clamp bolts and load bolt/pin are stainless steel.

The outer diameter of the clamp section is 16", and the inner diameter is 10". The upper lugs are fabricated from $\frac{3}{4}$ " thick plate with a 2 $\frac{1}{4}$ " diameter load bolt. The maximum load for this custom clamp is 68,000 lb.

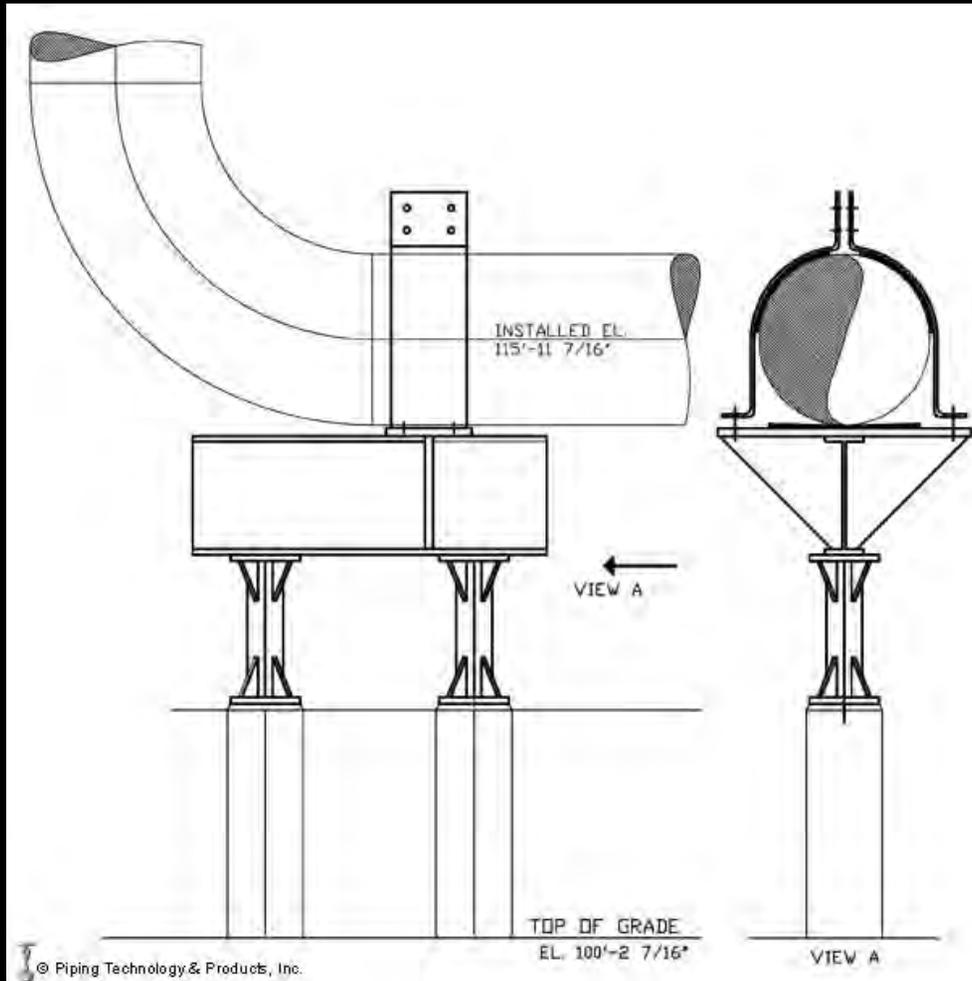


78 Heavy Duty Pipe Saddles for Ductile Iron Pipelines

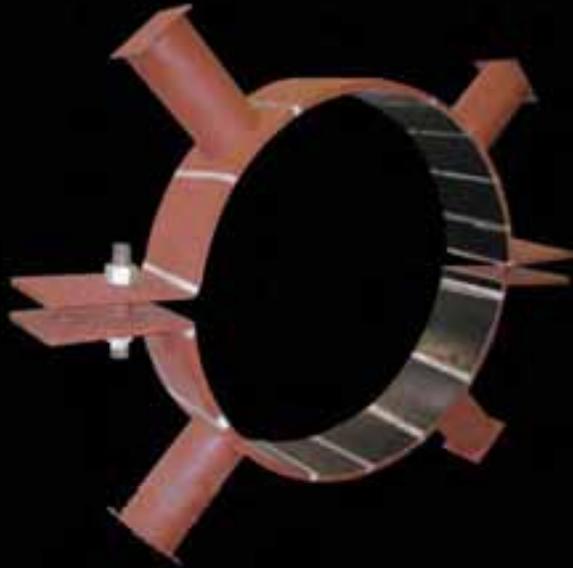
PT&P custom designed 78 Fig. 2000 heavy duty pipe saddles for two 24" insulated ductile iron pipelines. The two pipelines are routed beneath a 650' bridge crossing over a river in upper New York State. The insulation is 3" thick with high density polyethylene jacketing. Axial movements due to expansion can approach 3". In order for the jacketing to avoid being damaged when displacements occur, the saddles have been lined with polished stainless steel.

Elevated Hold-Down Clamp Assembly Custom Designed for a 54" Suction Line in a Gas Plant

The 54" suction line carrying gas to a gas compressor at a rate of 1.7 million lb./hr. developed a severe vibration. The deflections in the line were up to ¾" and it was fully observable during operation. PT&P designed and manufactured a special elevated hold-down clamp, including a unique laminated vibration dampening lining. The entire pipe hanger assembly stands 22" high and is coated with a carboline zinc finish. After installation and resumption of operations, the vibrations are now almost imperceptible.



Riser Clamps with Neoprene Lining for 54" Diameter FRP Pipe



The riser clamps are 54" in diameter and custom designed to be installed in the Emission Control Unit of a 1600 MW coal fired power plant in Texas. The clamps include neoprene lining adhesively bonded to the carbon steel to protect the FRP pipe. Prior to assembly, the riser clamps received a coat of Red Alkyd Primer to prevent rust and resist moisture and corrosion. The power plant is fired with lignite coal, and will be 75% cleaner than conventional power plants. PT&P also designed an additional 1100 custom supports for this Emission Control Unit. All of the supports required extensive engineering and Finite Element Analysis.

Riser Clamp Assemblies with Neoprene Lining for an Oil Rig

These eight sets of custom designed riser clamp assemblies for an oil rig in the Gulf of Mexico are fabricated from API 2H GR. 50 carbon steel. They were designed to support vertical pipelines on an offshore platform. Each set equipped with a neoprene lining consists of two clamps and a clamp stand. Several coats of marine paint finish were applied to the assemblies to prevent corrosion due to high salt water content and open air exposure.



Adjustable Pipe Saddle Supports for a Hydrocracker Project

PT&P supplied 69 adjustable pipe saddle supports for a hydrocracker project in an oil refinery. The supports will be installed under a trunnion and range in heights from 12" to 48". They have 8" diameter top plates, and are designed to support pipes from 2" to 8" in diameter. The supports are fabricated from carbon steel and consist of schedule 40 and 80 pipes and concentric reducers. The operating temperature for these custom designed saddle supports is 750°F. Each assembly was inspected by quality control prior to shipment.



42" Hold Down with Wedge Support

This hold down support is designed for a 42" pipe. The assembly is PTFE, 25% glass filled, bonded and will be used to control and reduce pipe vibration at a LNG plant. Both the hold down and wedge support are made from A36 carbon steel and a fabric pad which is specially suited for vibration impact and declination.

230 HD-2 Hold Down Clamps

PT&P designed and manufactured 230 HD-2 hold down clamps to fit 6" to 8" pipes at a chemical refinery. These hold down clamps are used on pipe lines where there is a high temperature and great thermal movement requirements, they allow axial movement and restrain lateral movement at the same time. The clamps are fabricated from carbon steel with PTFE, 25% glass filled bonded to the radius. The plates are manufactured from three layers of materials: PTFE, 25% glass filled, 1/2" thick fabric belting material and carbon steel.



Structural Supports with MegaLug® Pipe Attachments



These carbon steel structural supports are designed for 6", 10" and 12" ductile iron pipe. They are hot-dip galvanized to protect against corrosion and will be used in conjunction with hydraulic snubbers. The hydraulic snubbers are used to protect against axial shock loading, as well as providing vertical weight support.

Each support utilizes a MegaLug® pipe attachment to eliminate the need for field welding. The MegaLug® attachments are designed to "bite" into the sides of the pipe providing an attachment point for the flanges on the fabricated clamp. The 6" supports are designed for a maximum vertical load of 3770 lb., while the 10" and 12" supports are designed for a maximum vertical load of 11,630 lb. All of the supports are built for an overall height of 55 1/8" from the upper support steel to pipe centerline.

Structural Supports for the San Francisco-Oakland Bay Bridge



Piping Technology & Products, Inc. and its wholly owned subsidiary, Pipe Shields, Inc. designed and fabricated many structural pipe hangers for an ongoing project to rebuild the San Francisco-Oakland Bay Bridge. The pipe hangers are made out of A-36 carbon steel and galvanized to withstand corrosion from the ocean waters and rough winds.

These supports will be welded to Pipe Shields' C Model Anchor Plates, which are set in a cast concrete to the bottom cavity of the bridge. Supports pictured utilize friction holding devices known as MegaLug®, which permit attachment to the pipes without welding. These supports were designed and fabricated to include improvements in regard to strength and durability to withstand high loads during earthquakes and other seismic events.

FABRICATED PIPE SHOES, GUIDES & ANCHORS

Adjustable Pipe Stands Designed to Support Ductile Iron Pipe

Piping Technology & Products, Inc. designed and fabricated adjustable pipe stands to support ductile iron pipe. Due to ductile iron pipes having non-standard diameters, each of the supports were custom fabricated per the customers' requirements regarding pipe diameter and elevation. All the supports were fabricated from carbon steel with an HDG finish and designed to provide 9" (+/- 4.5") of adjustment and each support has an 11" x 11" base plate.

They will be used on horizontal piping and will be attached at their base to pre-cast concrete pedestals. Each base plate has been pre-drilled to accept anchor bolts provided at the site. The pipe stand's threaded adjustment column will allow field personnel to adjust the height of each support. They can also accurately place the pipe at the required elevation without using shims or modifying the concrete pedestal.



» Flange type supports are designed for an installed height of 81 1/4" from the base to the BOP.



» Tee type supports are designed for an installed height of 77" from the base to the BOP.



» Cradle type supports are designed for an installed height of 84" from the base to the BOP.

60" Adjustable Pipe Stands Designed for an LNG Plant



These adjustable pipe stands were designed for pipes ranging in size between 2" and 16". The height requirement ranges from 36" to 60". The pipe stands were fabricated from carbon steel. The stands were completed with a hot-dipped galvanize finish. They were also designed with a neoprene lining in the saddle to prevent metal to metal contact in the field. The function of the pipe stand is to allow for adjustment of the support after expansion or contraction of the pipeline. The simplicity of the design allows for easy installation and maintenance of the support.

Immediate Replacement of over 160 Pipe Shoes



PT&P was called on by an energy center in Oklahoma to inspect failing pipe shoes supplied by another company. The insulated supports were designed for temperatures ranging from 650°F to 1065°F. After thorough inspection, PT&P's field service representatives concluded that the problem was due to the existing pipe clamps' inability to firmly grip the pipe during expansion. This exposed the pipes to atmospheric moisture, resulting in both heat loss and deterioration. To alleviate the situation, PT&P designed secured pipe clamps that were bolted and torqued so the entire pipe shoe would move with the pipe's expansion. PT&P's field service team also provided on-site installation of the replacement pipe shoes. The entire process involved stripping of the existing damaged insulation, removal of the failing supports, and installation of new pipe shoes and insulation.



Over 160 pipe shoes were engineered, manufactured, and installed for this energy center. The fabricated pipe shoes, designed for pipe sizes ranging from 12" to 28" in diameter, are equipped with special base plate and slide bearing plate combinations which allowed axial movement from ½" to 7" and lateral movement up to 10 ½". In addition, they were designed to support a maximum vertical and lateral load of 38,000 lb. and 7600 lb. respectively.



24" Bolted Clamp Pipe Shoe for a Radiant Syngas Cooler Piping System

These customized bolted clamp pipe shoes with PTFE, 25% glass filled slide plates were fabricated for a radiant syngas cooler piping system in Indiana. The supports were designed for 24" diameter piping with a pressure of 2,256 psig at 350°F. The axial displacement is +/- 1.326" facilitated by slide plates on three quadrants. These pipe shoes were custom designed and fabricated entirely from carbon steel with a hot-dipped galvanized finish.

81 Pipe Shoes for a Solar Power Plant in California

PT&P designed and manufactured 81 custom pipe shoes for a solar power plant in California. The shoes will support heat transfer in fluid pipes at the facility. They consist of $\frac{3}{8}$ " stainless steel slide plates and microtherm insulation. The shoes measure 10" wide, 10" height, and 18" in length with a 750°F operating temperature. The assemblies have a vertical operating load of 10,000 lb. with 2"- 3" of axial movement.



75,000 lb. Load Pipe Shoes

PT&P designed and fabricated several pipe shoes with loads up to 75,000 lb. for a 750MW power plant in Alabama. The shoes are to support the cooling towers' circulatory water system at the power plant. The majority of the shoes were designed for a 60" line and 50,000 lb. load, and the remaining few were designed for a 78" line and 75,000 lb. load. After extensive engineering hours and structure analysis, PT&P's engineering department was able to produce a detailed design and 3-D model for the supports that would allow them to run electronic interface checks.

PRE-INSULATED PIPE SUPPORTS

58" High Temperature Rotational and Axial Stop Insulated Supports

These high temperature rotational and axial stop insulated supports were designed for styrene lines in a petrochemical complex. The supports have an overall outside diameter of 58" and are capable of handling temperatures up to 1500°F. They are fabricated from a combination of carbon steel for the top and stainless steel for the bottom. The hot shoes include Belleville washers, an Inconel 800HT rotational insert assembly, and high density fire temperature insulation.



48" Heavy Duty Guided Insulated Supports for High Temperatures

Pipe Shields, Inc., a subsidiary of PT&P, designed these insulated supports for a pipe size of 48". The clamp and base are fabricated from carbon steel that includes a hot-dip galvanized finish. The 4" thick insulation is a high density calcium silicate. These guided supports allow for a maximum axial travel of plus or minus 4 ½" and have a vertical load rating of 7100 lb. The operating temperature of the pipe may exceed 1200°F; therefore, the hot shoes are designed for 1700°F. These heavy duty base mounted pipe supports are specially designed to be installed on four emergency diesel exhaust mufflers in a hospital.



25 7/8" Diameter High Temperature Insulated Supports for a Rush Job

PT&P fabricated hot shoes with an insulation thickness of 2 1/2" and a pipe size of 20". The supports are fabricated from carbon steel with red oxide finish and calcium silicate insulation. They are capable of loads up to 3400 lb. and temperatures ranging from 40°F to 1200°F. PT&P completed delivery for this rush job within two weeks.

42" Dia. Heavy Duty Insulated Pipe Support Anchors for a High Temperature Application

PT&P designed and fabricated heavy duty insulated pipe support anchors for a high temperature application. The base, clamps, nuts, jackets and bolts are all fabricated from hot-dipped galvanized carbon steel. The hot shoes have 3" thick high density calcium silicate insulation, and are designed for 12"-42" diameter pipes. The dimensions are 47" L X 51" W X 16" H. Standard Q.C. and dimensional tests were performed prior to an expedited shipment.





Cold Shoe Anchors with Micarta Insulation for a LNG Plant

The cold shoes are fabricated from a combination of carbon steel, micarta insulation, and stainless steel. They measure 18" x 12" x 10" and are designed for 7" of lateral movement with temperatures as low as -162°C. A total of 16 supports were manufactured and PMI tested. This was a rush order completed in just under 12 weeks for a LNG plant.

Foam Glass - PUF Hybrid Cold Supports for 16" Dia. Pipe

These foam glass-PUF hybrid insulated supports are designed for a temperature range of 77°F to -300°F. They are designed for a 16" diameter pipe and have a load capacity of 11,050 lb. The 2 ½" thick insulation consists of foam glass on the upper half and polyurethane (PUF) on the bottom half. The clamps, ribs and base are fabricated from A-36 carbon steel.



Permali Insulated Anchors for Cryogenic Temperatures

These cold shoes are anchor supports and fabricated from A-36 carbon steel with a permali block insulation. The carbon steel is hot-dip galvanized for protection and longevity of the cold shoe. The permali block insulation, between the base plate and the saddle, functions to insulate the supporting structure from extreme cold temperatures of the pipe. These cold shoes are designed for pipes ranging in size from 6" to 14". The assemblies are capable of loads ranging from 194,000 lb. to 291,000 lb.

Injection-Molded Anchors Designed for an LNG Facility



Piping Technology & Products, Inc. designed and fabricated injection-molded anchors for a LNG plant in New Brunswick, Canada. These supports are used in a regassification terminal and are designed for -29°C ambient and -196°C fluid temperatures. The polyurethane foam insulation is injected into a mold with a pipe spool in place to ensure maximum fit. The pipe anchors are made from 516 Grade 70-N carbon steel. These supports were put through Finite Element Analysis and inspected by our Quality Control Department.

42" NPS	20" NPS	6" NPS
Axial Load: 136,000 lb.	Axial Load: 62,500 lb.	Axial Load: 9,773 lb.
Vertical Load: 40,000 lb.	Vertical Load: 14,773 lb.	Vertical Load: 5,682 lb.
Lateral Load: 15,909 lb.	Lateral Load: 11,364 lb.	Lateral Load: 2,273 lb.
Foam Density: 32 lb. PCF	Foam Density: 32 lb. PCF	Foam Density: 20 lb. PCF

72" Dia. Cryogenic Pipe Supports Designed for an LNG Facility

Custom designed cryogenic pipe supports were fabricated for an LNG facility in Africa. The shoes range in diameter from 30" to 72", 45" to 88" in height, 42 ½" to 85 ½" in width, and 28" to 33" in length. The insulation is a high density polyurethane foam (PUF) ranging from 5" to 6" thick. The shoe and bearing plates were fabricated from carbon steel with a HDG finish. The jacket was fabricated from aluminized steel and includes a vapor barrier.



Cold Insulated Pipe Anchors with Axial Stops

Cryogenic pipe supports, ranging in diameter from 6" to 38", were designed to support and insulate piping in an LNG receiving and regassification plant. The "cold shoe anchors" were designed for temperatures down to -260°F and a load range of 26,000 lb. to 210,000 lb. A combination of high density polyurethane foam (PUF) and Permali® was used for the insulation. The center stops that are welded to the process pipe were built from 304 stainless steel, and carbon steel was used for the remainder of the shoe.

Cryogenic Trunnion Supports

Fabricated from 304 stainless steel and A-36 carbon steel, these trunnion supports are designed for temperatures of -300°F. The material between the stainless steel trunnion and carbon steel base is cryogenic insulation. This material is a halogen-free epoxy laminate that has a high compressive strength to accompany its thermal properties. This product will be used to support a cryogenic line carrying liquified natural gas in an LNG receiving, storage and regassification terminal.

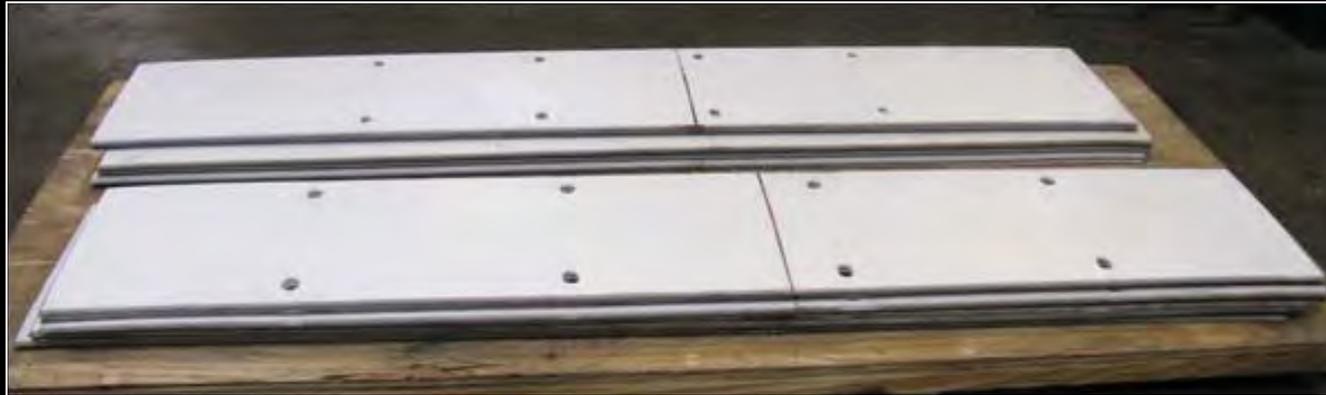


Micarta Base Insulated Supports

These low-temperature base supports are fabricated from carbon steel with a hot-dip galvanized finish and range from 23" to 37" in height. The supports are 18" in diameter with a base plate of 20"W x 20"L x 1"H and are designed to support pipes ranging in size from 24" to 30". The base supports are fabricated with Micarta insulation and will be utilized in a LNG plant as a base beneath a cold temperature pipe.

SLIDE PLATES

PTFE, 25% Glass Filled Slide Plates Bonded to Stainless Steel Backing Plates

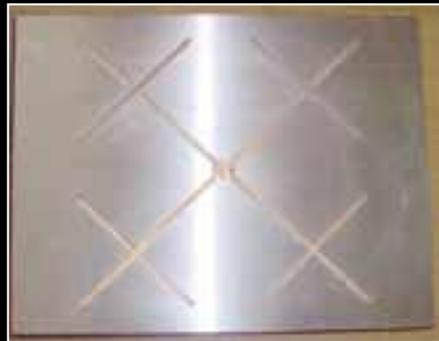


The slide plates are comprised of $\frac{1}{4}$ " thick PTFE, 25% glass filled slide plates bonded to $\frac{1}{8}$ " A240 grade 316L stainless steel backing plates. Stainless steel was used for better resistance to corrosion and longevity. The assemblies measure 83" long by 20" wide and will be installed underneath a bridge. A total of 16 slide plates were fabricated and designed for a pressure of 500 psi at ambient temperature. PTFE, 25% glass filled material provides a low coefficient of friction, is easy to install, does not require surface treatments, or grouting, and is unaffected by weather conditions.

Stainless Steel and Phosphorus Bronze Slide Plate Assembly



The assembly is designed to support vessels, and is a combination of slide plate materials, including stainless steel and phosphorus bronze. The carbon steel base will be securely anchored to a foundation and instead of welding, the lower slide plate will be affixed to the carbon steel base by countersunk attachment bolts. The upper phosphorus bronze slide plate is fabricated with machined grooves on the underside to allow lubrication between the contact surfaces of the upper and lower slide plates.



The stainless steel is polished to achieve a low coefficient of friction and the countersunk bolts are used to avoid interference. The hole seen to the right of the slide plate is the access point for pouring the grout after installation and above that is a fitting to replenish the grease.

PTFE, 25% Glass Filled Slide Plates

PT&P designed and manufactured PTFE, 25% glass filled, slide plates for cable trays located on a floating structure. The slide plates are used to reduce the friction between the cable trays and the structural steel it is resting on. These particular slide plates are bonded to stainless steel backing plates that are bolted to the structure.



61" x 61" Graphite Slide Plates

PT&P designed and fabricated 18 graphite slide plates for a refinery project in India. These plates are made of graphite sheets with thicknesses of 6 mm and 12 mm. The overall dimensions of the plates are $\frac{3}{8}$ " x $19\frac{1}{16}$ " x $19\frac{1}{16}$ " and $\frac{3}{8}$ " x 61" x 61". The plates will be tack welded on top of big ton spring supports in the refinery to minimize frictional effects.



Bronzphite® Slide Plates

These Bronzphite® slide plates are constructed from graphite and phosphorus bronze with dimensions ranging from 3" x 3" to 6" x 36". They are designed for up to 500°F and a total travel of up to 30". In general, Bronzphite® is a self-lubricating bearing plate made of a high quality bronze with graphite filled grooves. The solid graphite inserts are arranged in various patterns and sizes to meet customer specifications. This type of slide plate is best suited for high loads, low velocity applications and in places where the use of oil or grease is undesirable or unfeasible.



13,900 lb. Load Pipe Shoes and Bronzphite® Slide Plates



Piping Technology and Products, Inc. recently designed and fabricated more than 75 pipe shoe and Bronzphite® slide plate assemblies for an oil refinery in Texas. Each assembly consists of two pipe clamps, a base plate and a maintenance free Bronzphite® slide plate. The pipe shoes with sizes ranging from 18" to 24" are fabricated from A387 alloy steel. They are designed for 965°F and 2" of horizontal movement.

The 3" x 3" Bronzphite® (graphite impregnated bronze) slide plates are self-lubricating bearing plates made of a high quality bronze with graphite filled grooves. They are designed for heavy loads, low velocity applications, and for situations where the use of oil or grease is undesirable or unfeasible.

ASME/Misc. Fabricated Products



4" to 14" Diameter Spectacle Blinds

Sweco Fab, Inc., a division of PT&P fabricated a variety of six spectacle blinds that will be used for selective line isolation. The spectacle blinds are fabricated from A516-70 carbon steel with sizes ranging from 4" to 14" diameter and per ASME B16.48 code. The function of a spectacle blind is to allow a line to be in either full shut-off mode or full flow mode, depending on which side is being utilized. Spectacle blinds are a lower cost alternative to double block and bleed valves where OSHA requires positive isolation of piping segments for safety reasons.



Engine Exhaust Duct Spool

This engine exhaust duct spool is fabricated from carbon steel and coated with specialized paint that is capable of resisting temperatures up to 1000°F. It measures 6' long and connects two exhaust manifolds of 18" in diameter to a bottom flange of 50" in diameter. This engine exhaust duct spool will be covered with insulation and will be used to direct engine exhaust in a gas storage facility.



Lateral Joints

Lateral joints are machined from a forged piece of stainless steel, and are used as flow diversion on pipelines for the chemical process industry. Sizes fabricated were 1-½" x ¾", 3' x 2', and 4' x 3'.

Design Temperature:	302°F
Design Pressure:	960 PSIG
Test Pressure:	1440 PSIG

84" Diameter Seawall Outfall Flow Regulating Device

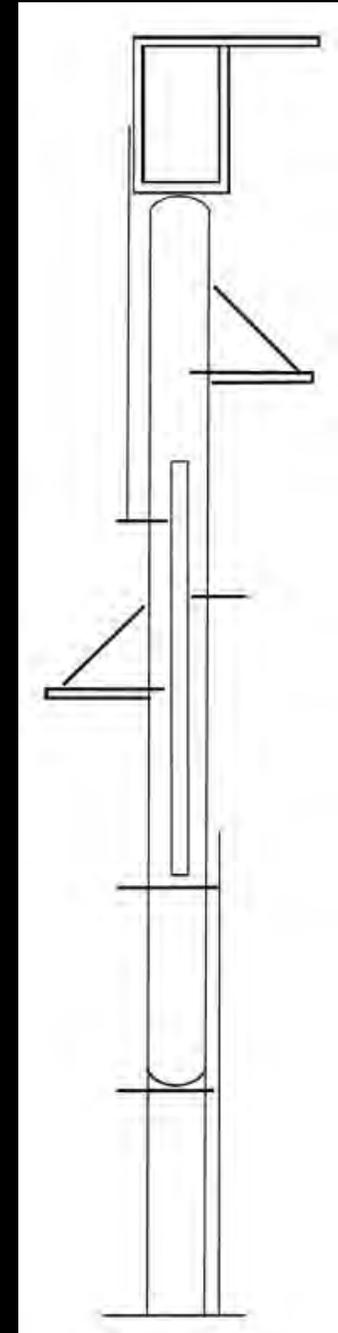


Sweco Fab, Inc., a division of PT&P, designed and manufactured a 30,000 lb. seawall outfall flow regulating device for a sea water outlet in Qatar. This 320" long flow conditioner is designed to allow water to flow through evenly. There are nineteen 16" FRP pipes inside an 84" diameter carbon steel pipe. The pipe bundle is secured within the 84" diameter shell pipe using spring washers, which keep the bundle tight and allows for differential expansion between the steel and FRP.

Ladders and Pressure Vessel Platforms for a Delayed Coker Unit Stripper Tower in California



The ladders and platforms were designed to be installed on a 90" tall pressure vessel. The ladders were fabricated from carbon steel and ranged in size from 5" to 38" in length. The vessel platforms were also fabricated from carbon steel and measure up to 16' 6" in diameter.



Structural Supports Designed for Instrument Panels in an LNG Facility

These structural supports were designed to mount instrument panels in a liquid natural gas facility in Australia. All 72 assemblies were fabricated from carbon steel with a hot-dipped galvanized finish. The dimensions are 68" x 82" x 10" and all assemblies underwent quality control inspection prior to shipment.



Custom Designed Instrument Supports

These custom instrument supports are fabricated from carbon steel with a hot dipped galvanize finish. The supports vary in heights up to 5" and widths from 18" to 24". A total of 126 stands will be used to support instruments at an oil refinery. PT&P offers a complete line of adjustable and welded instrument supports in various mounting styles.

42" Dia. Transition Piece Designed for a Water Tower

Sweco Fab, Inc. (a division of PT&P) custom designed a transition piece weighing 6,000 lb. for a facility in Texas. The piece measures 48" x 72" x 72" and is fabricated from carbon steel. It will be used to connect a round water tower to a square duct. Prior to shipping, the product was 100% dye penetrant tested.



24" and 42" Diameter Spectacle Blinds



Piping Technology and Products, Inc. and Sweco Fab, Inc. designed and fabricated 24" 300 # (ANSI rating), 2 1/2" thick and 42" 600 # (ANSI rating), 3 7/8" thick carbon steel spectacle blinds. Spectacle blinds serve the same purpose as flow control valves at less the cost. Spectacle blinds either stop or continue the flow depending on which end is being utilized. PT&P/Sweco Fab. can supply these spectacle blinds in any material needed, such as stainless steel, Monel, Inconel and carbon steel. Smooth, mill, machined or serrated finish is also available upon request.



Hot-dipped Galvanized Instrument Stands

A total of 55 instrument stands were manufactured from carbon steel with a hot-dip galvanized finish. They are 75" tall and 90" wide, and will support various instruments and junction boxes in a heavy oil refinery.



643 Instrument Stands for an Oil Refinery

PT&P manufactured 643 instrument stands from hot-dip galvanized carbon steel. The instrument stands are 52" in height and have varying widths from 1' to 4'. They will be used to support instruments in a new coker unit that is part of an oil refinery in Illinois.

Anchor Bolts & Embed Plates

Anchor Bolts for Boiler Feed Water Pump Turbine Drives in Colorado



These are special high-strength anchor bolts used in a coal-fired power plant to secure the water pumps' foundation. They range from 1" to 3 1/2" in diameter and 137" in length. The actual bolts are made from ASTM low Alloy Steel F1554-04, grade 55. This steel has a tensile strength of 517-655 Mpa, (75-95 Ksi), and a yield strength of 380 Mpa, (55 Ksi). The nuts are made from ASTM A563, grade A, the washers from ASTM F436, Type 1, and the bolts are threaded per UNC threading, class 2A fit.

Embed Plates for Gold Mine in Peru

Piping Technology & Products, Inc., designed and manufactured 150 special embed plate pieces for four gold mines in Cajamarca, a province of Northwestern Peru.

At an altitude of 4700 meters, this complex of four gold mines and processing facility is Latin America's largest gold producer. The gold district is a 10 x 4 km zone of altered rocks within a belt of tertiary volcanics that extends through Peru.



Cajamarca, Peru



Embed Plates Ready to Ship



Flat Embed Plates for Grizzly Feeder Opening



Close Up View of Embeds

This project involved the production of 150, 93" x 27" x 1" embed plates which required the use of 80,000 lb. of steel and anchors. The custom designed, carbon steel, embed plates are to provide stability for the feed openings of four mine-shaft reclaim tunnels and are scheduled to be put to use immediately. The initial birth of this project began at the end of December 2000 and production was expected to last through the beginning of March 2001, but PT&P advanced its completion date to February 2001. In addition, PT&P also performed bend test on each plate to ensure product quality. The test requires bending the studs 5 degrees to determine whether the weld is in accordance to B31.3.

PRESSURE VESSELS

108" Dia. Storage Tank and Containment Tank Designed for a Chemical Plant in Texas



Sweco Fab., a division of PT&P, designed and fabricated this 108" diameter storage tank that will be submerged inside a containment tank for a chemical plant in Texas. The storage tank is fabricated from $\frac{1}{2}$ " thick SA516-70 carbon steel and is 240" in length. The containment water tank measures 295" L x 124" W x 128" H. The storage tank is designed for 100 PSIG at 130°F internally and 15 PSIG at 130°F externally. The storage tank was hydro tested for 1 hour at 150 PSI and a full radiography test was done prior to shipment.

48" Diameter ASME Code Pressure Vessel for Replacement



This process vessel has an inside diameter of 48" and measures 60" tangent to tangent. The overall height of this vessel is 81" and measures 120", including the legs. It is fabricated from ½" 516-70 carbon steel material. This vessel is designed and fabricated according to ASME Section VIII Div 1 codes. It has a capacity of 500 gallons with an internal design pressure of 50 PSIG. The maximum acceptable working pressure is 178 PSIG. This process vessel was heat treated for stress corrosion resistance in the field. It was also 100% x-ray tested and hydro-tested at 231 PSIG prior to being shipped to the customer. This vessel was designed as a replacement vessel for one in the field that had been in service for 20 years in a mildly corrosive environment.

Sweco Fab, Inc. worked with the customer to provide a vessel that was even more efficient than the previous one by including ¼" thicker walls, an additional 12" between tangents, heat treatment, an internal drip plate, and an OSHA compliant ladder and platform.

SWELCO FAB
INC.
®

170 PSIG Air Receiver Tank



This 5,400 lb. tank measures 60" x 143" tangent to tangent and is designed for 170 PSIG and 200°F. It is fabricated from SA516-70 carbon steel. The interior and exterior are painted with standard epoxy paint to provide an interior lining and exterior protection. A hydro test at 221 PSIG was performed to ensure product quality.



2,800 lb. Pressure Vessel for an Oil Refinery

SWECO Fab, Inc. recently designed and fabricated a 2,800 lb. pressure vessel for an oil refining company in the United Arab Emirates. This pressure vessel will be used as a dust collector to filter a process fluid for an unleaded gasoline project. The vessel, 30" in diameter and 14'-11" OAL, is designed for 150 PSIG and 248°F. Spot radiography, dye penetrant, and hydrostatic tests were implemented to ensure product quality.



Explosion Proof Electrical Junction Box



PIG LAUNCHERS AND RECEIVERS

Pig Launcher and Receiver with a GD Closure for a Plant in Russia



Both pig launcher and receiver are fabricated from various low temperature carbon steels. They also include a GD Closure built to ASME Section VIII specifications. The GD Closure is a locking device that will not open if there is pressure in the barrel. The operating temperature range is from -35°C to 65°C . The receiver is 33' long and the launcher is 20' long. Both have a 24" diameter major barrel feeding into a 16" diameter minor barrel. A rugged three coat paint system was applied per customer specifications. Various tests were performed, from hydrostatic and dye-penetrant to full radiography and ultrasound.

740 PSIG Pig Launchers and Receivers

The launchers and receivers, with dimensions of 24" x 30" x 138" long and 10" x 14" x 132" long, are designed for 740 PSIG at 170°F . One of the pig launchers and receivers composed of a 24" dia. minor barrel and a 30" dia. major barrel, while the other one consisted of a 10" dia. minor barrel and a 14" dia. major barrel. The major and minor barrels are fabricated from API 5L X 52. To ensure quality, the launchers and receivers were 100 % x-rayed and hydro-tested prior to shipment.

Pig launchers and receivers are installed in pipelines to launch and receive pipeline pigs. In addition to cleaning the pipeline, pigs can be used for the separation of two products within the same pipeline. Sweco Fab/Piping Technology & Products, Inc. has over 40 years of experience in designing and manufacturing a wide variety of ASME/Misc. Fabricated Products - including pig launchers and receivers.



ASME Code Pig Launchers/Receivers with Safety Locking System



Sweco Fab., a division of PT&P, designed and fabricated pig launchers and receivers for a coal-bed methane gas production facility in Colorado. The launchers/receivers are equipped with an integral safety locking system which works on the principle of mechanical key interlocking (transfer of keys). This system avoids serious injuries from human error and insures safety of personnel. One starter key per launcher/receiver is kept in a box located in the control room. Each lock is executed with two keys. When the first valve is opened with this starter key, it releases the second key. This key is transferred to the next valve which releases the second key from that valve and so on and so forth. This process guides the operator through the specified sequence for opening and closing valves with a unique key for each step.

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