PIPING TECHNOLOGIES

- Variable Spring Supports
- Big Ton Springs
- Constant Spring Supports

The main purpose of an engineered spring support is two-fold:

1. To uphold a specific load, including the weight of the pipe, commodity, flanges, valves, refractory, insulation, etc. AND
2. To allow the suppoted load to travel through a predetermined thermal deflection cycle from is installed condition to its operational condition.

Variable Springs

Used where: 1) Relatively small thermal deflections, usually less than or equal to two incles (2'') are anticipated AND 2) a Difference in the supported load from the installed to the operating condition is acceptable

Big ton Spring

Used for very large load conditions where standard variable springs are too small

Constant Spring Supports

Utilizad when: 1) The supported load cannot vary between the installed and operating position. AND/OR 2) Large thermal growth is anticipated

Basic Steps in Hanger Design

1. Determine Hanger Locations
2. Calculate Hanger Loads due to Piping Weight
3. Calculate Thermal Movement of Piping at Each Hanger location
4. Select Hanger Type
5. Check Clearances

Engineering & Design

- Stress Analysis
- Finite Element Analysis
- Structural Analysis
- Engineered Springs Design
- Engineering

Value-Added Services

- Product Testing
- 24x7 Emergency
- On-site Field Services
- Online Order Status
- Online Quote Request

PIPING TECHNOLOGIES

- Snubbers
  - Hydraulic
  - Mechanical
- Sway Braces
- Sway Struts

ASME Nuclear Qualified

Mechanical Snubbers

Hydraulyc Snubbers	Sway Braces
• Allows movement in tension & compression • Limits rate of movement • Allows for higher loads	• Allows movement in tension & compression • Movemente can occur at any rate
Mechanical Snubbers	**Sway Struts**
• Allows movement in tension & compression	• Does not allow movement in tension & compression • Rigid support.

Engineering & Desiign

- Stress Analysis
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- Structural Analysis
- Expansion Joint Engineering
- Expansion Joint Design

Value-Added Services

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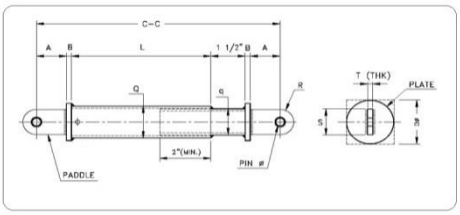
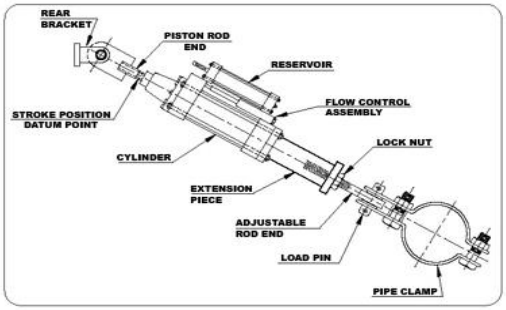
Sway Strut Assembly





Mechanical Snubber in the Field

Standard Sizes of PT&P Hydraulic Snubbers

Bore (inches)	Rod Diameter (incnes)	Max. Recom. Loads (pounds)
1.50	1.00	4.396
2.00	1.00	7.069
2.50	1.75	12.370
3.25	2.00	20.400
4.00	2.50	30.483
5.00	2.00	49.480
6.00	2.50	70.097
8.00	3.50	121.933

Standard Sizes of Mechanical Snubbers

Size	Load Rating	Max. Stroke
MSA – ¼	350	4
MSA – 1/2	650	2 ½
MSA - 1	1500	4
MSA - 3	6000	5
MSA - 10	15000	6
MSA – 35	50000	6
MSA - 100	120000	6

PIPING TECHNOLOGIES

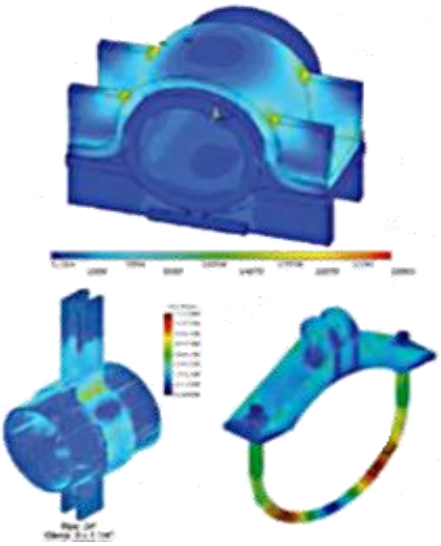
Pipe Shoes, Guides & Anchors:
- Pipe Shoes and Stands
- Cylinder Pipe Guides
- Anchors

Support Assembly Components:
- Pipe Hangers, Clamps, & Risers
- Saddle Supports and Coverings
- Haeware, Rods, and U-Bolts
- Hold-Down Clamps
- Beam Attachments
- Clevis Hangers

Engineering & Desiign
- ❖ Stress Analysis
- ❖ Finite Element Analysis
- ❖ Structural Analysis
- ❖ Engineered Springs Design
- ❖ Engineering

Value-Added Services
- ❖ Product Testing
- ❖ 24x7 Emergency
- ❖ On-Site Field Services
- ❖ Online Order Status
- ❖ Online Quote Request

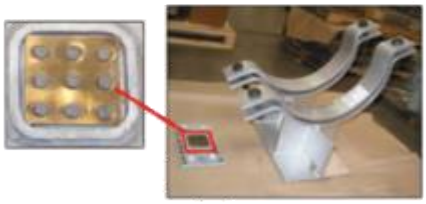
Finite Element Analysis of Clamps



Hold-Down Clamps: Damper large vibrations or stresses to a pipe by transfering yhese forces to the supporting structure and thus protecting the piping system
Clevis Hangers/Roller Hangers: Used to Compensate for pipe movement
Beam Attachments: Attached to the supporting structure to complete the assembly
Cylinder Pipe Guide: Designed to control lateral movement and maintain the alignment of the piping through its axial and contraction cycles

Cylinder Pipe Guides in the Field

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



PIPING TECHNOLOGIES

Experience designing and manufacturing engineered expansion joints of all types including:

- Thin Wall
  - Single
  - Hinged
  - Gimbal
  - Universal
  - Elbow Pressure Balanced
  - In-line Pressure Balanced
  - Externally Pressurized
  - Toroidal
- Thick Wall (Flanged & Flued)
- Slip-type
- Rectangular
- Fabric

Engineering & Desiign

- Stress Analysis
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- Expansion Joint Engineering
- Expansion Joint Design

Value-Added Services

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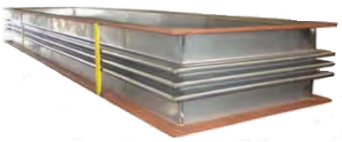


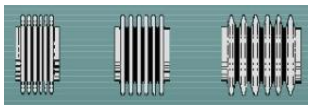
Various Applecations Including:

Power
District Energy
Gas Turbines
Steam Distribution
Geothermal Power Plants
Waste Water Treatment
Fossil Fuel Power Plants

Refinery
Chemical & Petrochemical
Heat Exchangers
FCC Units
Liquefied Natural Gas
Kilns
Stationary Engine Exhaust

Types of Movement

Axial Movement



Lateral Movement

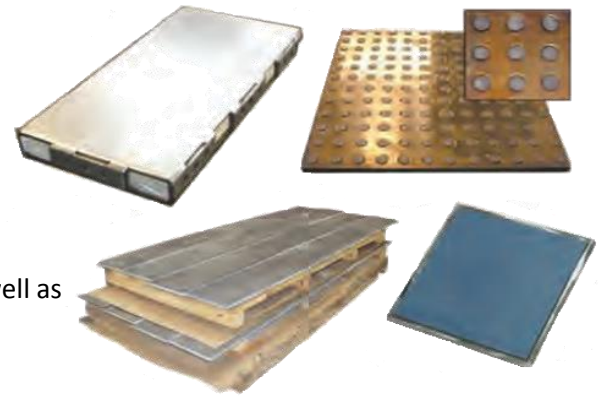
Angular Movement

Torsional Movement

PIPING TECHNOLOGIES

Piping Technology &Products, Inc. Designs and Fabricates a variety of high-quality slide plates:

- Marinite
- Graphite
- Bronzphite®
- PTFE, 25% Glass Filled



The main Purpose of a slide plate is two-fold:

1. To allow for mobement of mechanical systems for high tmperature, low temperature, high loads and low loads, as well as
2. To provide a low coefficient of friction

Marinite

developed to withstand high impact and act as an insulator for high temps – Bottom plate is polished to a mirror finish for sliding along the surface of PTFE, 35% glass filled slide plates.

Graphite

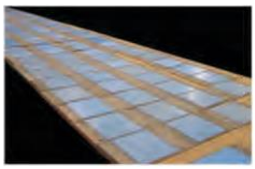
Designed for high operating temperatures (+1000ºF), typically loads up to 2000 PSI, Self-aligning when used in conjunction with elastomeric backing pads

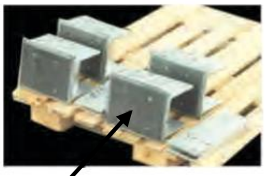
Bronzphite®

Used in high and low high velocitu conditions – Self lubricating and has high wear resistance – prevents accumulation of dust and debris

PTFE, 25% Glass Filled

Used in low heat (less than 400ºF) and hogh velocity conditions - High wear resistence, No susface treatments are necessary, and Unaffected by weather conditions





Graphite

PTFE 25% glass filled

How to Orden Slide Plates

Specify

- Width and Length of bearing element
- Metal for backing plate
  - Galvanized or stainless steel
  - Size and shape of plate
- Temperature and load ranges
- Material desired
  - PTFE, 25% Glass Filled
  - Bronzphite
  - Graphite
  - Marinite
- Desired size and shape for low friction surface

"Sandwhich Concept"

Engineering & Desiign

- Stress Analysis
- Finite Element Analysis
- Structural Analysis
- Engineered Springs Design
- Engineering

Value-Added Services

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PIPING TECHNOLOGIES

Pipe Shields Inc. Is one of world's leading designers and manufacturers of a unique line of pre-insulated pipe supports, slides, guides and anchors that it has developed and patented during its 29 year history. The pre-insulated pipe supports department is devoted to the production of pipe insulation productions for both hot and cold applications. Polyurethane foam (PUF), Permali, Micarta, and FoamGlas® and Calcium insulators used in the manufacture of cold shoes. Marinite, FoamGlas® and Calcium Silicate are the insulation medium used in the manufacture of hot shoes.

Pipe Shields Inc. Has developed a large and growing family of pre-insulated pipe supports that meet an assortment of requirements including the following:

- Gas
- Steam
- Chilled water
- Styrene
- Guide supports
- Sliding suppots
- Restrained supports
- Anchors
- Pipe hangers
- Thermal growth
- Light, medium or heavy load
- High temperatures
- Minimum clearence
- Minimum friction loads

Engineering & Desiign

- Stress Analysis
- Finite Element Analysis
- Structural Analysis
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- Expansion Joint Design

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Temperature Ranges for Standard Insulation

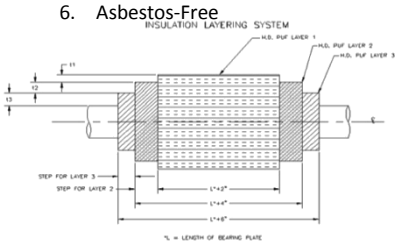
Material	Temperature
Calcium Silicate	+40ºF to +1200ºF
Urethane	-275ºF to +275ºF
Foamglas	-450ºF to +900ºF

Calcium Silicate Advantages

1. Temperature Range to 1200ºF
2. Exceptional Strength
3. Low Thermal Conductivity
4. Fire Resistant
5. Not Damaged by Water
6. Asbestos-Free

Foamglas Advantages

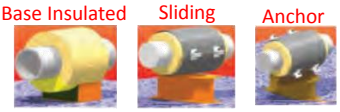
1. Constant Insulating Efficiency
2. Fire Protectio n
3. Corrsion Resistance
4. Long Term Dimensional Stability
5. Physical Strength



Recommended Layering for Cold Shoe Supports with an Insulation Thickness 4'' or Greater

Hot Shoes

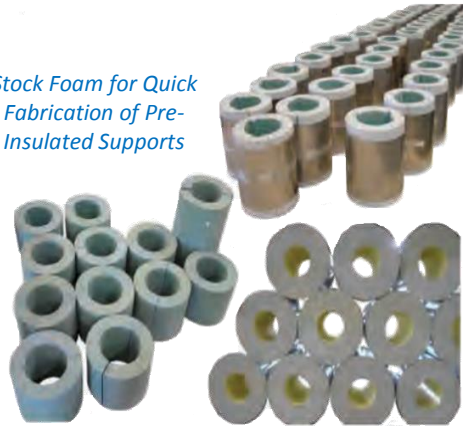
Base Insulated Sliding Anchor



Cryoshoes

Resting Guided Base Insulated

Stock Foam for Quick Fabrication of Pre-Insulated Supports



PIPING TECHNOLOGIES

- Pressure Vessels
- Tanks
- Bellmouth Reducers
- Instrument Supports
- Strainers
- Pig Launchers & Receivers
- Duct and Transition Pieces
- Spectacle and Drip Rings
- Orifice Plates and Flanges
- Miscellaneous Fabrication

Certifications
ASME U-Stamp
ASME R-Stamp

Engineering & Desiign
- Stress Analysis
- Finite Element Analysis
- Structural Analysis
- Engineering per ASME Code
- Design per ASME Code

Value-Added Services
- Product Testing
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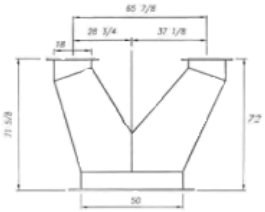
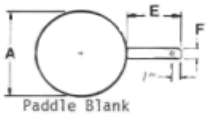
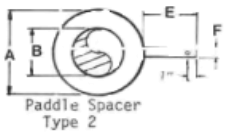
Exhaust Manifold Drawing

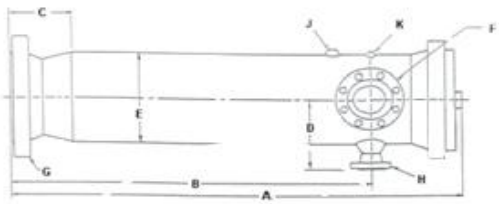
Example Pig Launcher Dimensions
Pig Launcher: 18'' x 24''
Materials: Carbon Steel API 5L x 60
Dimensions: Length= 335''
Weight: 12,716 lbs
Pressure: 3,258 PSIG
Temperature: Minimum = -58ºF
Maximun= 200ºF

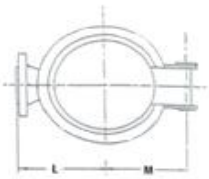


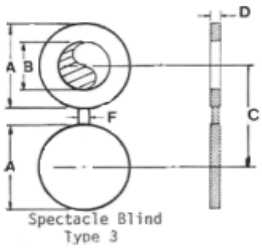


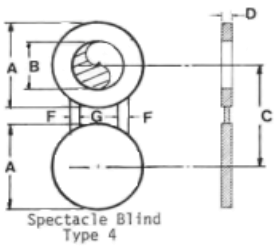


Spectacle Blinds









Questions

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We Greatly Appreciate Your Time!