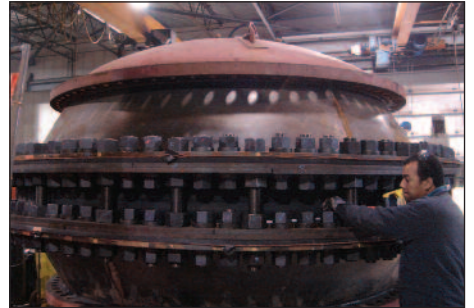




Elastomeric Expansion Joints

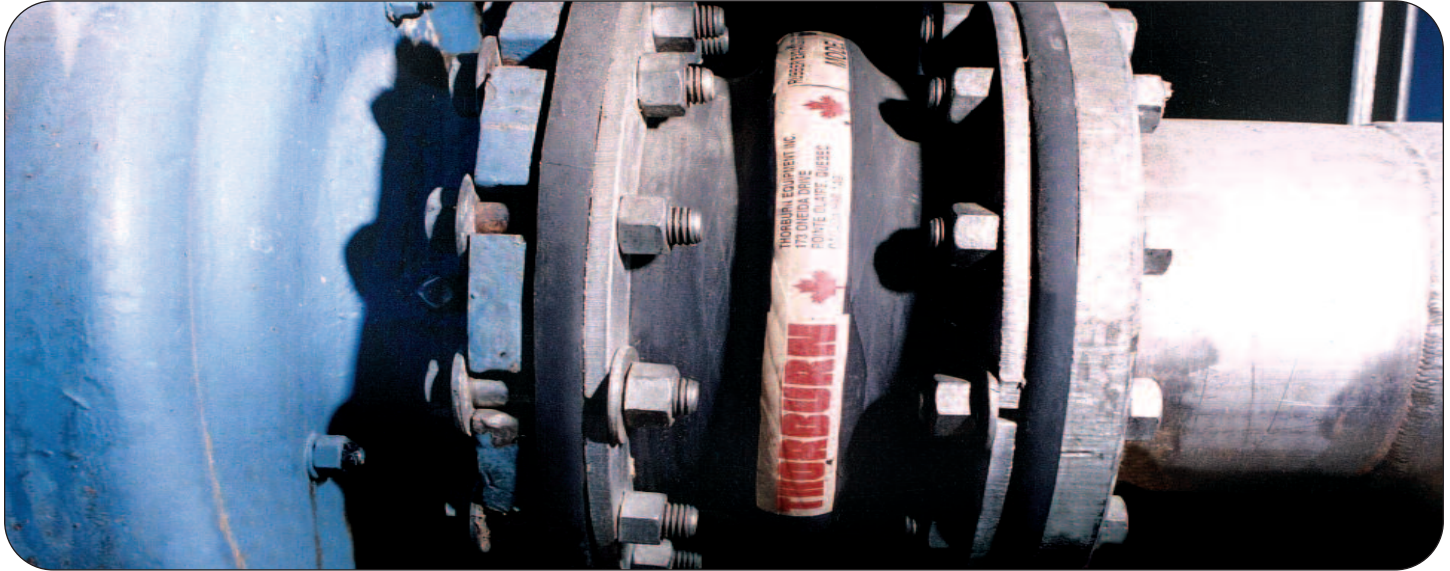


# Serving The Nuclear Industry

Canada   
[www.thorburnflex.com](http://www.thorburnflex.com)

## Thorburn Mighty Spool Rubber Expansion Joints

For Models 42HPW, 62HP, 42HPWX, 42HPWXX, 55HPW & 15RA



Thorburn's 42HPW 200mm (8") Single Arch Rubber Expansion Joint Installed at a Pumping Station at Pointe Lepreau Nuclear Power Plant in New Brunswick Canada

Thorburn's Mighty Spool rubber expansion joints are capable of absorbing movement in all directions (axial lateral & angular), unexpected shock, ground settling thermal and mechanical induced movements caused by pumps, blowers or other rotating equipment.

Sizes from 25mm to 4000mm and pressures up to 35 bar (500 psi) and full vacuum.

### Thorburn's Mighty Spool Advantages

- **Superior abrasion, erosion & corrosion resistance**  
Ideal for sea water, slurry and other abrasive media.
- **Freedom from embrittlement**  
Flexing keeps the rubber "alive", eliminates flex induced cracking & unlimited flex life
- **Vibration and sound absorption**  
Absorbs transmission of vibration without stress. Reduces mechanical noises.
- **Great recovery from movement**  
Returns to its original position .  
Absorbs movement in all directions.  
Compensates for misalignment.  
Relieves strain in the piping system.
- **High chemical resistance compared to metal**  
Eliminates electrolysis between dissimilar metals
- **CRN for all Canadian Provinces**

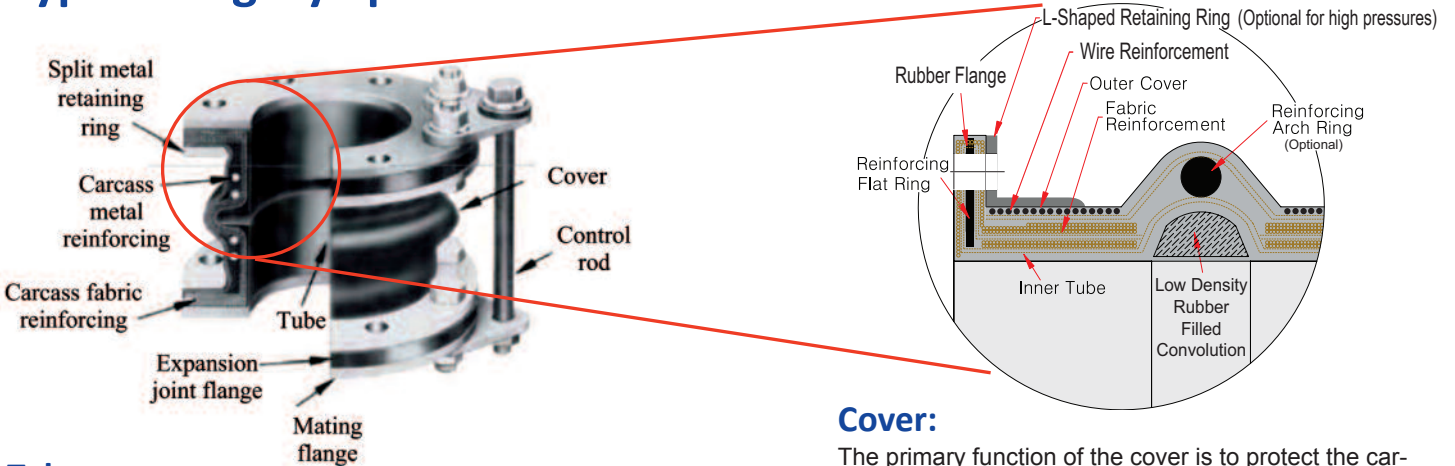
### Comparative Thorburn Elastomers

Rubber Types	Temp Range °C	Temp Range °F	Resistant To
Natural	-29 to 82	-20 to 180	Abrasion
Neoprene	-34 to 107	-30 to 225	Ozone, Moderate Acids
Nitril	-40 to 110	-40 to 230	Hydrocarbons, Solvents
Chlorobutyl	-51 to 149	-60 to 300	Oxidizing Chemicals
Hypolon	-51 to 135	-60 to 275	Strong Acids
EPDM	-51 to 149	-60 to 300	Strong Oxidizing Chemicals
Viton	-23 to 177	-10 to 350	Hydrocarbons, Acids
Silicone	-51 to 204	-60 to 400	Ozone, Heat

### Rubber Acoustical Impedance Compared

Material	Sound Velocity (in/sec)	Density (lbs/in <sup>3</sup> )	Acoustical Impedance (lbs/in <sup>2</sup> -Sec)	Relative Impedance
Steel	206,500	0.283	58,400	500.0
Copper	140,400	0.320	45,000	425.0
Cast Iron	148,800	0.260	38,700	365.0
Lead	49,800	0.411	20,400	190.0
Glass	216,000	0.094	20,300	190.0
Concrete	198,000	0.072	14,200	134.0
Water	56,400	0.036	2,030	19.0
Pine	132,000	0.0145	1,910	18.0
Cork	19,200	0.0086	165	1.6
Rubber	2,400	0.0442	105	1.0

## Typical Mighty Spool Construction



### Tube:

Seamless elastomeric lining that is designed to maintain fluid leak tight integrity of the expansion joint and protect the carcass from penetration or saturation of the media being transferred. Thorburn's expansion joint tubes can be designed to transfer chemical and petroleum products, sewage, gases as well as abrasive media.

### Reinforcement:

**Fabric Reinforcement:** The fabric reinforcement is the flexible and supporting member between the tube and cover. Fabrics of high strength synthetic fibers are used depending on pressure and temperature requirements. All fabric plies are calendered to permit flexibility between the fabric plies and to reduce service strain.

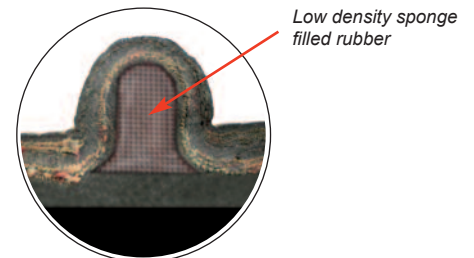
**Metallic Reinforcement:** Consists of coated high tensile spring steel wire and/or solid steel rings embedded in the carcass. The purpose of the metallic reinforcements are to strengthen the joint, permitting the rated working pressures, and to supply the joint with the necessary rigidity for thermal changes and vacuum service. Specially compounded filler rubbers are used between the layers of metallic and textile reinforcement to prevent migration when pressurized. External metallic reinforcement rings are used for high pressure service.

### Cover:

The primary function of the cover is to protect the carcass from outside damage or abuse. Special elastomers can be supplied to resist chemicals, oils, sunlight, acid fumes, ozone, sea water, etc.

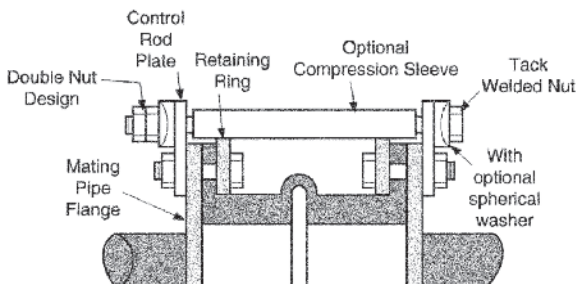
### End Connections:

Integral flanges are constructed of fabric reinforcement, smooth finish, full flat faced flange that form a tight seal against the mating pipe flanges without the need of gaskets. Also available are soft cuff clamp-on ends designed to fit over a pipe and be clamped on.

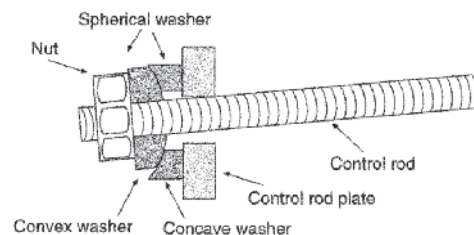


Shown above is a cutaway of Thorburn's low density rubber filled arch specifically designed for smooth unrestricted flow and allow for 50% of open arch movement.

## Thorburn's Superior Spherical Washers Enhances The Control Rod Assembly



Thorburn's control rod assembly systems are set at the maximum allowable expansion of the joint and absorb the static pressure thrust developed at the expansion joint. Over compression of the expansion joint can be controlled by installing pipe sleeves over the control rods or with inner nuts with spherical washers.



### Thorburn's Spherical Washer Advantage

- Allows the torsional, lateral and angular movements to occur with a smooth non binding action.
- Allows forces under axial load to travel through the control rod while maintaining a level altitude on the existing force plane.
- During extreme lateral movement disperses the forces equally on the control rod unit.

## Mighty Spool Rubber Expansion Joints

Wide variety of elastomers Full vacuum for all sizes - Sizes up to 4000mm



### Model 42HPW

- 25% Less force for given movement compared to 42HP
- 40% more movement than 42HP
- Same face-to-face as the standard single arch 42HP
- Self-cleaning wide arch
- Filled, Open, Single & multi-arch design



Quantity of 36 Thorburn 42HPW 1200mm (48") Rubber Expansion Joints installed at a power plant in the middle east

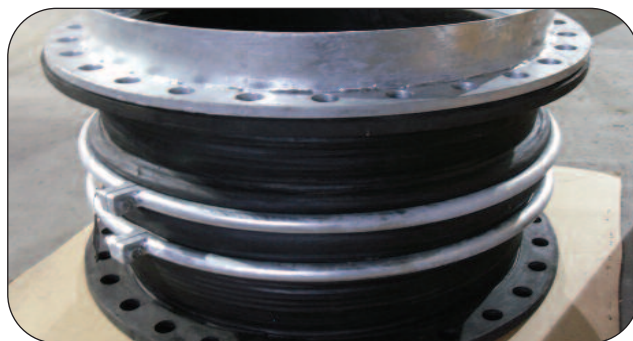


### Model 62HPW

- Specifically designed for plastic FRP piping systems
- Up to 100% less force for given movement of the 42HP
- Double the movement per given arch compared to the 42HP
- Integral control rod assemblies to reduce FRP flange cracking
- Filled, Open, Single & multi-arch design

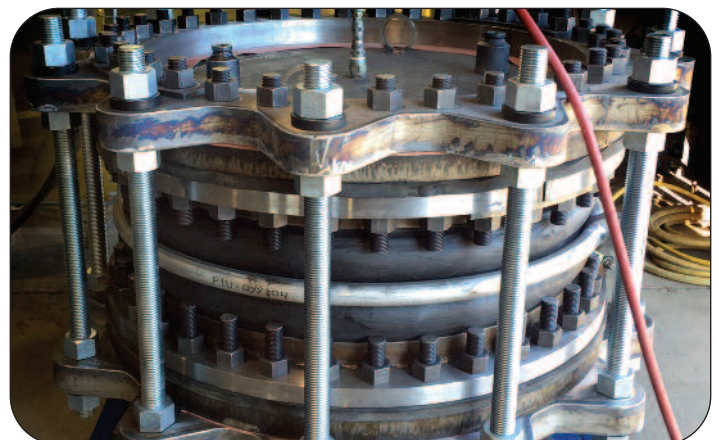


Quantity of 12 Thorburn 62HPW 900mm (36") Rubber Expansion Joints installed on a GRP piping system at a sulphuric acid plant in Baja Mexico



### Model 42HPWXX

- Specifically designed to provide double the working pressure compared to the standard 42HPW
- Internal metallic reinforcement in the flange enhances sealing performance at high pressures
- Filled, Open, Single & multi-arch design
- Available in an economical 42HPWX (slightly reduced pressures)

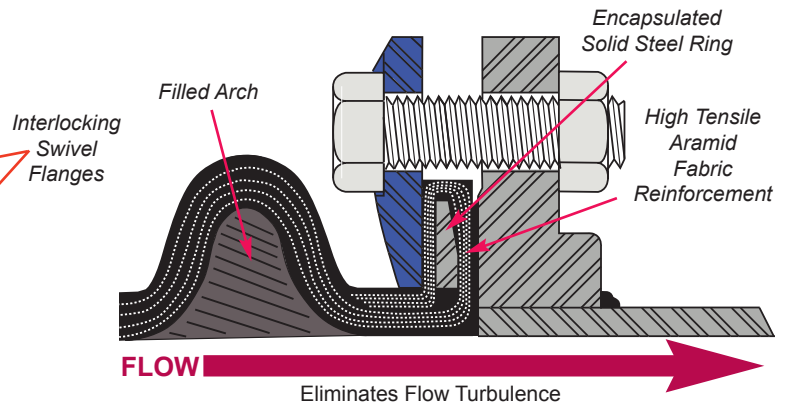


Quantity of 40 extra high pressure Thorburn 42HPWXX 1050mm (42") ID hydrostatically tested to 32 bar (450 psi) for an Alberta Canada oil sands processing plant

## Thorburn's 301EF Ultra High Pressure Rubber Expansion Joints



Style 301EF ultra high pressure 600mm (24") ID expansion joint being hydrostatically tested to 37 bar (540 psi)



**The 301EF Expansion Joint ID = The Pipe ID** - This feature combined with swivel flanges and superior sealing force make it ideally suited for HDPE piping systems

Thorburn's Easy-Flex 301EF series have interlocking swivel flanges which provide leak tight sealing when mated to lap-joint stub ends, raised face or flat full face type flanges. The standard floating flanges are drilled as per ANSI B16.5 Class 150, Class 300, PN10, PN20, PN50 epoxy-coated carbon steel. Galvanized, stainless steel and other alloy type materials and flange drillings are also available. Sizes from DIN40 (1 1/2") to 1200mm (48"), pressures less than 600mm (24") 20 bar (300 psi), 750mm (30") to 1200mm (48") 16 bar (225 psi). Rated for full vacuum for all sizes.

## Thorburn's 42HP Concentric, Eccentric & Offset Reducers

Thorburn's 42HP-CR Concentric, 42HP-ER Eccentric & 42HP-OR Offset Reducers are designed to replace sound transmitting metal pipe reducers. Pipe wall sound that is carried through the piping system is absorbed when passing through the rubber expansion joint. Fluid born noise is absorbed by volumetric expansion which cushions water hammer and smoothes out pumping impulses. Thermal induced pipe growth/contraction movements are neutralized by the deflection of the arches.



Thorburn's 42HP-CR Concentric & 42HP-OR reducing expansion joints installed in pumping station at the OPG Pickering nuclear reactor



Thorburn's 42HP-CR Concentric reducer 300mm (12") by 125mm (5") ID tested at 16 bar



Thorburn's 42HP-OR Offset reducer 300mm (12") by 125mm (5") ID



Thorburn's 42HP-ER Eccentric reducer 250mm (10") by 100mm (4")

## Mighty Spool Rubber Hinged & Gimbal Expansion Joints

For Models 42HPW, 62HP, 42HPWX, 42HPWXX, 55HPW & 15RA



Thorburn's 42HPWX-H 1830mm (72") Universal Hinged Expansion Joint Being Installed at a Nicaraguan Geothermal Power Plant

### Thorburn's 42HPW-H Hinged Expansion Joint

Thorburn's Rubber Hinge Expansion Joints are typically used in sets of two or three, to absorb pipe movement in one or more directions in a single plane piping system. Each individual joint in the system is restricted to pure angular rotation by its hinges. The hinge structure is custom designed to absorb the full pressure thrust forces and dead weight loads.

#### Advantages

- Angular motion in one plane only
- Eliminates pressure thrust forces
- No main anchors required
- Low forces on piping system
- Prevents torsion loads on rubber bellows
- Filled Arch Design Prevents Media Sediment buildup

### Thorburn's 42HPW-G Gimbal Expansion Joint

Thorburn's Rubber Gimbal Expansion Joints are typically used in sets of two or three, to absorb pipe movement in two or more directions in a multiple plane piping system. The gimbal structure is custom designed to absorb the full pressure thrust forces and all dead weight loads, wind loads and shear loads.

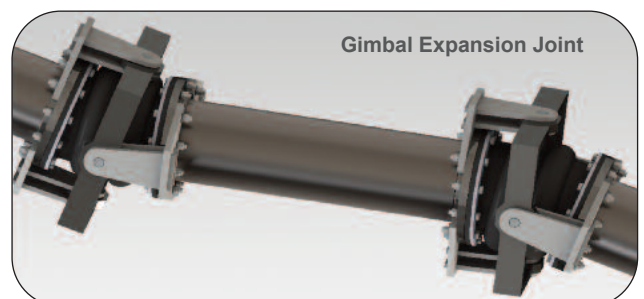
#### Advantages

- Angular movement in more than one plane
- Eliminates pressure thrust forces
- No main anchor required
- Low forces on piping system
- Prevents torsion loads on rubber bellows
- Filled Arch Design Prevents Media Sediment Buildup



Hinge Expansion Joint

Thorburn's 42HPW-H Universal Rubber Hinged Expansion Joint demonstrating absorbing angular deflection in one plane



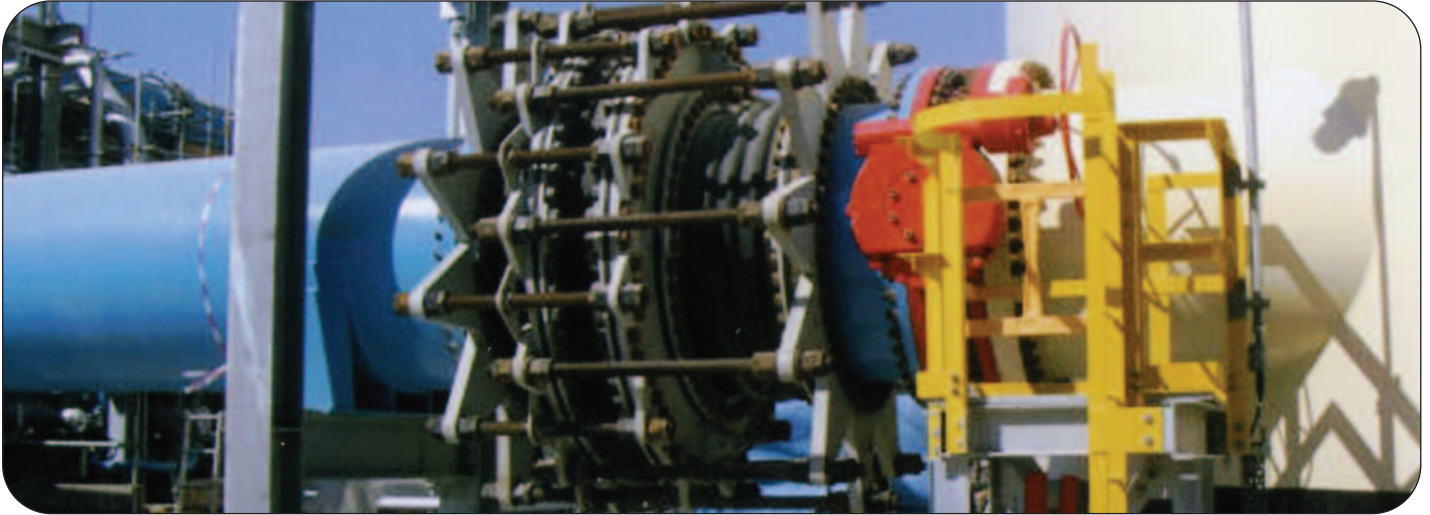
Gimbal Expansion Joint

Thorburn's 42HPW-G Universal Rubber Gimbal Expansion Joint demonstrating absorbing angular deflection in more than one planes

## Thorburn's 42HP-PB In-line Pressure Balanced Expansion Joints

For Models 42HPW, 62HP, 42HPWX & 42HPWXX

Eliminates pressure thrust loads on your piping system while absorbing axial & lateral movement. An alternative to metallic in-line pressure balanced bellows expansion joints, which are susceptible to failures from corrosive media, cyclic loading conditions and solids from settling into the thin walled metallic convolutions.



Thorburn's 42HPX-PB 1830mm (72") In-line Pressure Balanced Expansion Joint installed at a power plant in Saudi Arabia

### Operating Principal of Thorburn's 42HP-PB To Neutralize Pressure Thrust Forces

Thorburn's 42HP-PB has a balancing bellows with an effective area twice as large as the line bellows. The inter-linking arrangement of the tie rods transfers and balances the pressure thrust loads. As the line bellows are compressed, the balancing bellows are extended an equal amount without volume change. Eliminating volume change ensures that the thermal growth loads are absorbed within the expansion joint and not transferred to the adjacent equipment. Therefore, the only loads acting on the piping system are the sum of the forces needed to compress or extend the expansion joint.

### Thorburn's 42HP-PB Advantages

#### Neutralizes Pressure Thrust:

Pressure balanced control rod system is custom designed to absorb the full pressure thrust forces, dead weight loads and eliminates the requirement for main anchors

#### Replaces Pipe Loops:

Reduces piping energy by eliminating pressure losses generated by the loop elbow

#### Extremely Compact:

Greater flexibility in piping layout

#### Filled arches:

Smooth unrestricted flow prevents media sediment buildup.

#### Freedom from Corrosion and Embrittlement:

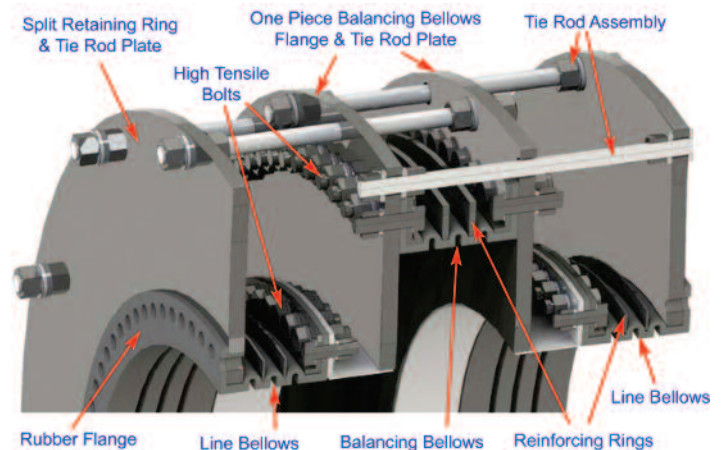
Impervious to corrosive media degradation, flex fatigue and shock

#### Super Abrasive and Erosion Resistance:

Available with smooth filled arches, abrasive resistant lining protects against sea water salt, slurry and other abrasive media

#### Wetted Metal Components Can Be Cladded or Rubber Lined:

Enhances corrosion & abrasive resistance at a fraction of the cost.



### Design

- ASME B31.1, B31.3 Pressure Piping Certification
- FSA Technical Handbook 8th Edition
- Sizes 12.7mm (1/2") to 4000mm (276") ID
- Pressures full vacuum to 20 bar
- Available with CRN

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European  
Conformity



ISO  
9001



B31.1,  
B31.3



ASME "NPT"  
Sec. III Class 1



ASME "U"  
Sec. VIII Div. 1



N285.0, B51  
CGA CR96-001



97/23/EC  
Module H



UL  
536

ISCIR Romania | CNCAN Romania | EN 13480-2002 | HAF 604 China | TSG China

(CRN for all Canadian provinces)



NSF-61 Certified Materials



Thorburn's 42HPXX 3050mm (120") ID crossover  
pressure balanced expansion joint



*Over 50 years of flexible piping experience  
waiting to serve you...*