



CORI ENGINEERS (P) LTD.

ISO 9001



REGISTERED  
FIRM



**FLEXIBILITY  
TO  
FIT  
ALL  
YOUR  
NEEDS!**

**RUBBER EXPANSION JOINTS**





CORI Engineers belongs to IGP Group of companies based at Chennai (Madras), India. CORI is ISO 9001:2008 certified organization. Product range of CORI includes Rubber Expansion Joints, Anti vibration mounts, Rubber lining, Industrial Rubber gaskets etc.

**CORIRUBBER** expansion joints combine the latest materials and construction techniques with engineering expertise. In addition, all CORI's expansion joint styles have been painstakingly engineered and rigorously lab and field-tested to ensure long life and reliable service.

Whatever the requirements -- high temperatures, corrosive media, high pressures, low flexing forces, large duct work, compact dimensions or lightweight -- **CORI** offers an expansion joint suited to each installation.

The industry's widest selection of flexible connectors and expansion joints are available from CORIRUBBER.

**CORIRUBBER** Expansion joint is a specially engineered product inserted in a rigid piping system to achieve one or more of the following:

- Compensate for misalignment
- Absorb pipe movement / stress
- Reduce system / mechanical noise
- Relieve strain on the system due to thermal change, load stress, pumping surges, wear or settling
- Eliminate electrolysis between dissimilar metals
- Prevents stress due to expansion / contraction
- Insulates against the transfer of noise and vibration
- Greater recovery from movements
- High resistant to shocks

#### PERFORMANCE AND CONSTRUCTION FEATURES

- Test pressure upto 24 bar (upto 1,200NB)
- Cyclic movement test for 5000 cycles under design pressure conducted on sizes 1600NB, 1800NB, 2100NB, 2200NB, 2300NB, 2500NB, 2600NB and 2700NB bellows
- Facility available to produce sizes upto 3600mm (144 inches)
- Safety factor built in upto 4 : 1
- Low spring rates
- Greater movement per arch
- Manufactured in single or multiple arches
- Choice of eight liner elastomers
- Choice of cover to match liner materials or different materials for better resistance to external conditions
- Filled or unfilled arches
- Can be built with permanent offset to compensate for existing or designed piping misalignment
- Manufactured 2000NB (80 inch) bellows for test pressure of 30 bar
- Rubber compound meeting flame resistance as per ASTM F1123 in accordance with 30 CFR
- Supplied bellows for 5x800 MW ultra mega power project
- Exporting to 33 countries spread across globe
- Supplied bellows with CE marking

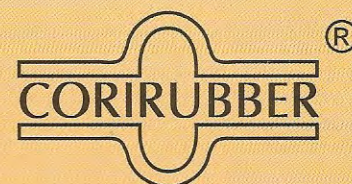
#### POLYMERS

- Natural rubber
- Neoprene\*
- Nitrile
- Chlorobutyl
- Hypalon\*
- EPDM
- Silicone
- Viton\*

\*Trademark of Dupont

#### PRODUCT INSPECTED BY

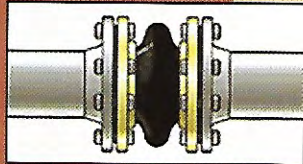
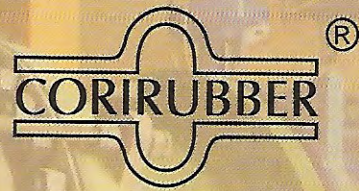
- Lloyds Register Industrial Services
- Bureau Veritas Industrial Services
- SGS India Pvt. Ltd.
- Engineers India Ltd.
- NTPC
- BHEL
- NPC
- UHDE India Ltd.
- Bax Counsel
- TCE
- DNV





## APPLICATIONS

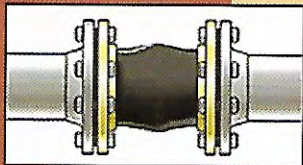
- Air conditioning - Heating and ventilating systems
- Chemical Petrochemical and industrial process piping systems
- Power generating plants
- Steel mills
- Water, Waste water - sewage and pollution control systems
- Marine services
- Pulp / paper systems
- Bellows with 'CE' marking



### Type of Pipe Movements

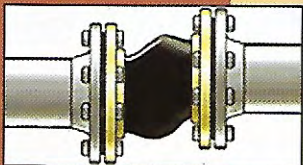
#### Axial Compression

- Longitudinal movement shortens face to face dimension along axis of expansion joint or flexible coupling
- Pipe flanges remain perpendicular to axis



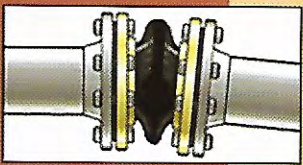
#### Axial Elongation

- Longitudinal movement lengthens face to face dimension along axis of expansion or flexible coupling
- Pipe flanges remain perpendicular to axis



#### Lateral / Transverse Movement

- Offset movement of one or both pipe flanges
- Both flanges remain parallel to each other while forming angle to axis of joint



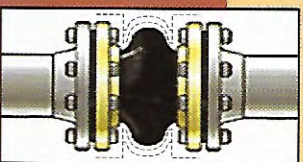
#### Angular Movement

- Deflection of one or both flanges
- Forms angle with axis of expansion joint or flexible coupling



#### Torsional Movement

- Rotation of one flange with stationary counterpart
- Simultaneous rotation of both flanges in opposing motion



#### Vibration

- Oscillating movement around axis of expansion joint or flexible coupling
- Pipe flanges remain parallel with each other
- Flanges remain perpendicular to axis

Compound test facility - Rheometer



Cyclic movements test facility





## Types of Rubber Expansion joints

### CORIRUBBER SERIES 100

#### Single Spool Wide Arch

Installed next to mechanical equipment or between the anchor points of a piping system. Due to improved lower, wide profile arch, more axial compression and axial extension coupled with lateral misalignment, angular and torsional movements can be obtained without increasing the face-to-face requirements. This model will negate the need for long and expensive multi arch products. Flanges can be integrated rubber or metal. Metal can be integrated or rotating type.

#### Movements for single spool wide arch (metal / rubber flange)

| NB(mm)   | Face-to-face (mm) | Axial Compression | Axial Elongation | Lateral Deflection |
|----------|-------------------|-------------------|------------------|--------------------|
| 25-200   | 150               | 20                | 15               | 15                 |
| 250-300  | 200               | 20                | 15               | 15                 |
| 350-500  | 200               | 30                | 15               | 15                 |
| 550-1000 | 254               | 30                | 15               | 15                 |

#### Movements for single spool wide arch (integrated rubber flange)

| NB(mm)    | Face-to-face (mm) | Axial Compression* | Axial Elongation* | Lateral Deflection* |
|-----------|-------------------|--------------------|-------------------|---------------------|
| 1050-1800 | 300               | 40                 | 25                | 25                  |
| 1900-3000 | 350               | 40                 | 25                | 25                  |
| 3500      | 450               | 40                 | 25                | 25                  |

| NB (mm)   | Design Pressure (bar)* | Test Vacuum (Hg) |
|-----------|------------------------|------------------|
| 25-600    | 20                     | 730 mm           |
| 700-1200  | 16                     | 730 mm           |
| 1300-1800 | 10                     | 730 mm           |
| 1900-2200 | 5                      | 730 mm           |
| 2300-3000 | 4                      | 700 mm           |
| 3500      | 4                      | 700 mm           |

\* For higher pressure and movements please contact us.



## APPLICATIONS

### HVAC

- Chilled water
  - Pump inlet & outlet
  - Chillers inlet & outlet

- Brine solution line
  - Pump inlet & outlet
  - Chillers inlet & outlet

### Sewage Treatment

- Blowers
- Centrifugal pumps
- Sludge pumps
- Grit removal
- Aeration
- Activated sludge
- Odour controls

### CORIRUBBER SERIES 200

#### Multi arch type / Double arch type

- Accommodates greater movement than single arch type
- Minimum joint length depending on the number of arches
- Maximum 4 arches recommended to maintain lateral stability

#### Movements for double arch (moulded)

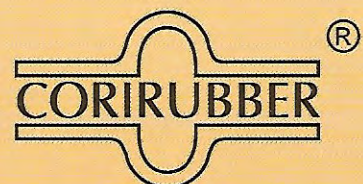
| NB(mm)  | Face-to-face (mm) | Axial Compression | Axial Elongation | Lateral Deflection |
|---------|-------------------|-------------------|------------------|--------------------|
| 50-200  | 250               | 25                | 20               | 20                 |
| 250-400 | 300               | 25                | 20               | 20                 |
| 450-600 | 350               | 25                | 20               | 20                 |

| Size NB | Design Pressure (bar) | Vacuum (Hg) |
|---------|-----------------------|-------------|
| 50-400  | 16                    | 700 mm      |
| 450-600 | 10                    | 700 mm      |



Sizes upto 1000mm with a Face to Face distance of 500mm for a maximum working pressure withstanding capacity of 15bar can be fabricated.





## CORIRUBBER SERIES 300

### Wide arch type

- This model gives greater amount of movements in the shortest possible space
- Arch design reduces turbulence and allow smooth quiet flow
- Arch design prevents sediment build up
- Floating flanges can be rotated to accommodate torsional misalignment
- Lower spring rate for FRP Pipelines



### Movements for wide arch

| NB<br>(mm) | Face to Face<br>(mm) | Axial Compression<br>(mm) | Axial Elongation<br>(mm) | Lateral Deflection<br>(mm) | Angular  |
|------------|----------------------|---------------------------|--------------------------|----------------------------|----------|
| 50-300     | 130, 150, 200        | 25                        | 25                       | 25                         | 20 to 5° |

| NB (mm) | Design Pressure (bar) |
|---------|-----------------------|
| 50-300  | 16                    |

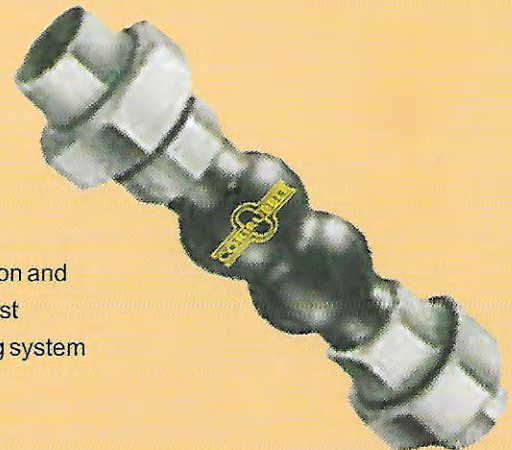
## FACILITIES

- In house Hydro, vacuum test and movement test facility
- Laboratory with Advanced testing facilities like "Rheometer"
- Autoclaves / Presses for curing
- Manufacturing facilities for both fabricated & moulded bellows

## CORIRUBBER SERIES 400

### CORI 'Twin-Sphere' model with Union coupled end fittings (upto 65NB)

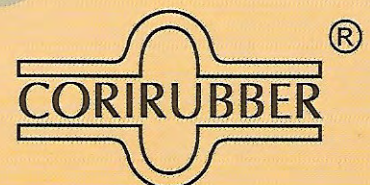
The twin-sphere provides excellent vibration absorption and stress relief in light, compact construction. This low cost expansion joint is available for smaller diameter piping system found in power plants, chemical plants, water works, sewage plants etc.



## CORIRUBBER SERIES 450

### PTFE Bellows

- Chemical resistant with the exception of fluorine compounds, halogens and liquid alkali metals
- Useable from -70 to +240 °C
- Insensitive to many movements, material does not so quickly fatigue
- Designed as standard with tie rods

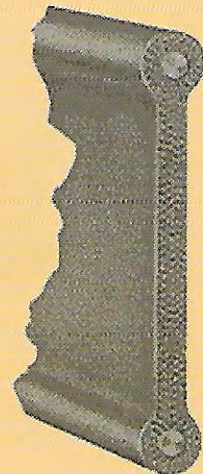




### CORIRUBBER SERIES 500

#### Dog bone expansion joints

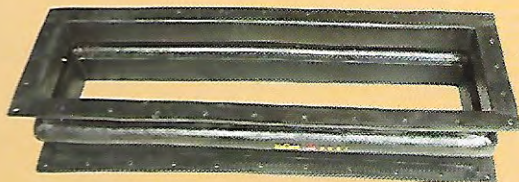
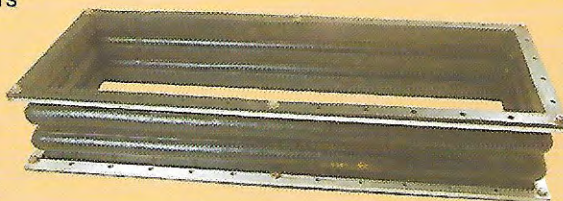
The Belt Type (Dog Bone) Condenser Expansion Joint is used as flexible connection between low pressure turbines and condensers. It is the most widely used turbine to condenser expansion joint in use. It is designed for full vacuum service and can accommodate movement up to 1" of compression and 1/2" lateral deflection. The solid bulb construction is highly flexible when smashed down by the clamps.



### CORIRUBBER SERIES 600

#### Bus duct bellows / rectangular / square / circular bellows

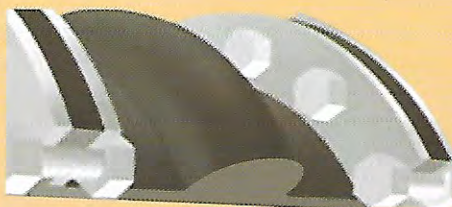
- Used in electrical ducting system in power stations
- Available in circular / rectangular and square shapes
- Available with flanged ends
- Available without flanged ends with SS clamping arrangement
- Available with multiple arch construction
- Available with or without arches
- Recommended for low pressure service only
- For connection between turbine and condensers
- Available in any size and length



### CORIRUBBER SERIES 700

#### Filled arch type

- Filled arches are built as an integral part of the carcass
- To reduce turbulence and prevent collection of sediment in the arch way
- Movement of the joint is reduced by approx. 50% of the normal movements with unfilled arch



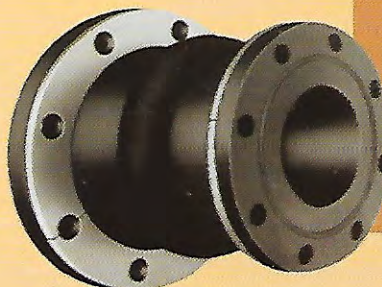
↓  
**Filled Arch**

### CORIRUBBER SERIES 800

#### Concentric Reducer type

Serves as a reducing element for transition from one pipe to another. Concentric in design, each flange-end shares the same common centre line. This model is engineered to replace metallic or rubber lined reducers used to provide unequal diameter connections.

Movements as per customer requirement.



### CORIRUBBER SERIES 825

#### Clamp type

- Same design as single arch type except that the sleeve ends have an ID equal to the pipe OD
- Will slip over straight ends of open pipe
- Ends secured by suitable clamps
- Recommended for low pressure service only



### APPLICATIONS:

#### Industrial

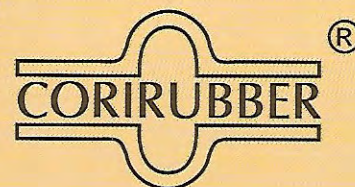
Pulp & Paper mills

Oil Refineries

Cement production

Chemical processing

Food & Pharmaceutical

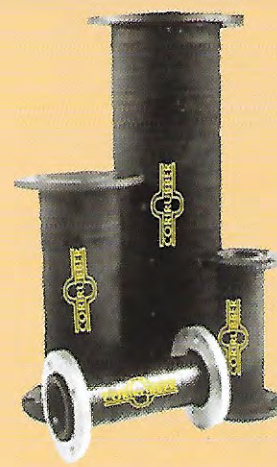




## CORIRUBBER SERIES 850

### "U" type / straight flanged connectors / flexible rubber pipe / no arch type

- Used primarily to suppress noise and vibration from pumps, chillers and other rotating equipments
- It also inhibits electrolysis, water hammer and corrosion



## APPLICATIONS:

### Marine

Reduce electrolysis

Reduce maintenance

Unaffected by salt water environment

### Power Generation

Scrubber system

Cooling water

Pumps

Ash slurry

Condenser-turbine connections

Preheaters

Precipitators

## CORIRUBBER RUBBER EXPANSION JOINTS WITH COMPLETE UNIT

### Pressure balanced type application

- Used where the pressure thrust is considered excessive
- It absorbs lateral and axial movement while restraining pressure thrust
- Also used where a change in direction of the piping occurs

Its function is to balance, or cancel out, internal working pressure in order to minimize the net end loads acting on adjacent piping or equipment. Pressure balanced type is used when the piping system cannot facilitate an anchor or when the loads on adjacent equipment, ex. turbines, condenser etc. must be kept to a minimum, while offering a means for accepting excellent movements.

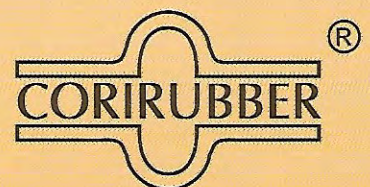
## EXPANSION JOINT SELECTION

To select the proper type of expansion joint, consider:

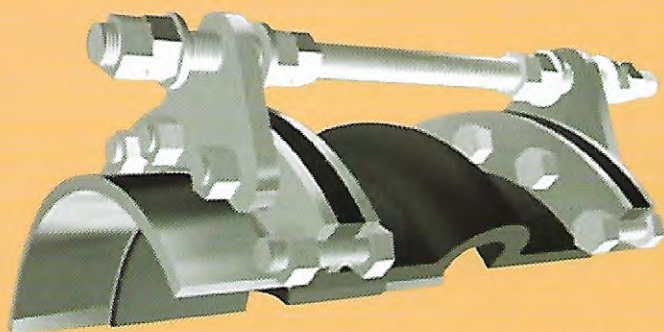
- Pipe size
- Flowing medium: type of liquid, gas or vapor in system
- Temperature range
- Pressure/vacuum range
- Movements needed
- Environment: degree of exposure to:
  - Weathering
  - Sunlight
  - Liquids
  - Gases
  - Vapors
  - Oil
  - Chemicals
  - Others

- Installed face-to-face dimensions
- Degree of pipe misalignment
- Drilling (specify standard)
  - Flange O.D.
  - Bolt circle
  - Number of bolt holes
  - Diameter of hole
- Need for retaining rings
- Need for control units
- Recommended for use with most expansion joints
- Must be used in cases of insufficient pipe support
- Need for special construction

## CUSTOM MADE







### RETAINER RINGS

- Provides metal surface to distribute bolting pressure equally and must be used for rubber flanged bellows
- Install behind and against inner face of each flange
- Standard material: Carbon steel (galvanized or corrosion resistant coated) and stainless steel
- Retainer ring will be supplied in segments
- SS and other alloy steel material supplied against special type for GRP/FRP service requirements

### CONTROL UNITS

The control units usually consist of two or more tie rods, triangular stretcher plates, nuts and locknuts. The failure of an anchor or some other piece of equipment in a pipeline can cause excessive motion. The control unit assemblies can be set at the maximum allowable expansion and/or contraction of the rubber expansion joint. Control units are an additional safety factor and can minimize possible damage to the adjacent equipment. The control unit assembly is a system of two or more control rod units placed across an expansion joint from flange to flange to minimize possible damage caused by excessive motion of a pipeline.

**CORIRUBBER** Engineers its control unit assemblies to system requirements. The number of rods, control rod diameters and stretcher plate thicknesses are important consideration when specifying control units for an application. Our designs incorporate an allowable stress of 65% of material yield for each rod and plate.

- Recommended on most applications to prevent damage due to excessive pipe movement
- Consists of two or more tie rods connected between flanges
- Stretcher / triangular end plate has two holes for bolting plate securely to flange, and one hole to accommodate plate connecting tie rod

### COMPANION FLANGES (Mating Flange)

Cori can also supply companion flanges / mating flange along with fasteners.

### Drilling Standards

Flanges (Rubber or metal) are drilled to the following drilling standards to match the pipeline flange.

- ANSI B16.5 CL150
- ANSI B16.5 CL300
- AWWA C207 CLB & AWWA C207 CLD
- DIN 2642-PN10
- DIN 2633-PN16
- DIN 2576-PN10 & DIN 2501-PN10
- BS10 TABLE "F" & BS 10 TABLE "H"
- BS 10 TABLE "D" & BS 10 TABLE "E"
- BS 4504-PN10
- BS 4504-PN16
- BS 3293 CL150
- TAYLOR 125
- SIS 1538
- IS 6392 TABLE 11
- IS 6392 TABLE 17
- API 605
- MSS SP 44
- Any other standards



### CORIRUBBER EXPANSION JOINTS MODELS

#### Series 100

Single spool wide arch

#### Series 200

Multi arch type / Double arch type

#### Series 300

Wide arch type

#### Series 400

Twin sphere model

#### Series 450

PTFE bellows

#### Series 500

Dog bone expansion joints

#### Series 600

Bus duct bellows - rectangular / circular / square

#### Series 700

Filled arch type

#### Series 800

Concentric reducer type

#### Series 825

Clamped type

#### Series 850

"U" type / straight flanged connectors / flexible rubber pipe / no arch type

Bellow connectors for cyclonic air filtration system for diesel locomotive engine



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