



Rubber Expansion Joint Bellow

TECHNICAL DATASHEET

SANDHYAFLEX Rubber Expansion Joint Bellow is a high-performance flexible connector specifically designed to absorb vibration, thermal expansion, contraction, axial movement, lateral displacement, angular deflection and mechanical stresses in piping systems. Manufactured using high-quality elastomeric compounds reinforced with high-strength synthetic fabrics and steel wire reinforcements, these expansion joints provide exceptional flexibility, pressure resistance, vibration isolation and long-term durability under demanding operating conditions.

Designed to protect piping systems from stress-induced failures while maintaining efficient fluid flow, Sandhyaflex Rubber Expansion Joint Bellows effectively compensate for pipeline movements caused by temperature fluctuations, pressure variations, equipment vibration, settlement, and misalignment. These joints are widely used in industrial pipelines, power plants, HVAC systems, water treatment facilities, chemical processing plants, marine applications, and infrastructure projects where reliable flexibility and system protection are essential.

SANDHYAFLEX INDIA PVT LTD has established itself as a trusted manufacturer and supplier of high-quality elastomeric engineering products in India. Utilizing advanced rubber compounding technology, precision moulding processes, and carefully selected raw materials, Sandhyaflex Rubber Expansion Joint Bellows are engineered to provide consistent performance, excellent dimensional stability, superior fatigue resistance, and extended service life under demanding industrial environments.

Overcoming Challenges, Delivering Excellence:

Piping systems are continuously subjected to thermal expansion, contraction, vibration, pressure fluctuations, equipment movement, water hammer effects, misalignment, and structural settlement. Without an effective expansion compensation system, these conditions can result in excessive stress, leakage, flange damage, equipment failure, pipeline cracking, and increased maintenance costs.

To address these challenges, **SANDHYAFLEX Rubber Expansion Joint Bellows** are manufactured using specially formulated elastomeric compounds reinforced with multiple layers of high-strength synthetic fabric and steel reinforcement. The flexible bellow design effectively absorbs movement and vibration while reducing stress transfer to connected equipment and piping systems.

By delivering reliable flexibility, superior vibration isolation, and long service life, **SANDHYAFLEX Rubber Expansion Joint Bellows** have become a preferred choice for

engineers, contractors, consultants, industrial plant operators and infrastructure developers worldwide.

Key Features:

- Manufactured from high-quality elastomeric compounds
- Excellent flexibility and movement accommodation
- Absorbs axial, lateral, angular, and torsional movements
- Superior vibration and noise isolation properties
- High pressure and vacuum resistance
- Excellent fatigue resistance under cyclic loading
- Resistant to weathering, ozone, UV exposure, and moisture
- Excellent resistance to corrosion and chemical attack
- Reduces stress on pumps, valves, and piping systems
- Compensates for thermal expansion and contraction
- Available in single arch and multiple arch configurations
- Suitable for a wide range of fluids and operating conditions
- Easy installation and maintenance
- Cost-effective piping protection solution
- Long service life under demanding industrial environments
- Reliable performance across various industries

Applications:

- **Water Supply Systems:** Accommodates pipeline movement and vibration.
- **HVAC Systems:** Reduces vibration transmission from pumps and chillers.
- **Power Plants:** Suitable for cooling water and process piping systems.
- **Chemical Processing Plants:** Handles aggressive fluids and thermal movements.
- **Petrochemical Industries:** Protects piping systems from stress and vibration.
- **Marine Applications:** Used in shipbuilding and offshore piping systems.
- **Water Treatment Plants:** Provides flexibility in treatment and distribution pipelines.
- **Industrial Process Pipelines:** Compensates for expansion and equipment movement.
- **Fire Protection Systems:** Absorbs vibration and movement in firefighting pipelines.

- **Steel Plants:** Suitable for cooling water and utility systems.
- **Cement Plants:** Provides flexibility in utility and process pipelines.
- **Infrastructure Projects:** Used in municipal water and utility networks.

History of Rubber Expansion Joint Bellows:

- **Early 1900s** – Metal connectors were used to accommodate limited pipeline movement.
- **1930s** – Development of reinforced rubber components improved flexibility.
- **1950s** – Elastomeric expansion joints gained acceptance in industrial piping systems.
- **1960s** – Synthetic rubber compounds improved pressure resistance and durability.
- **1970s** – Multi-arch expansion joints were introduced for greater movement capability.
- **1980s** – Advanced reinforcement fabrics enhanced structural strength.
- **1990s** – Improved moulding technology increased product reliability and consistency.
- **2000s** – Growth of industrial infrastructure expanded demand for expansion joints.
- **2010s** – Enhanced elastomer formulations improved chemical and environmental resistance.
- **2020s** – Modern Rubber Expansion Joint Bellows provide superior flexibility, vibration isolation, and long-term reliability for piping systems worldwide.

Colours and Their Applications:

For **Rubber Expansion Joint Bellows**, colours are primarily used for product identification, fluid service classification, project specifications, maintenance visibility and customer-specific requirements. Performance characteristics are determined by the elastomer compound formulation, reinforcement design, and manufacturing process rather than colour.

Colour	Typical Application
Black	Standard industrial, water, HVAC, and utility applications
Blue	Water supply, cooling water, and municipal infrastructure systems
Red	Fire protection systems and project identification
Green	Environmental, wastewater, and treatment plant applications
Grey	Architectural, utility, and infrastructure projects
Yellow	Safety identification and maintenance visibility
Custom Colours	Available as per customer specifications and project requirements

Materials:

The **Sandhyaflex Rubber Expansion Joint Bellow** shall be manufactured using quality elastomeric compounds, high-strength synthetic reinforcement fabrics, steel wire reinforcement rings, retaining flanges, and protective additives designed to provide superior

flexibility, pressure resistance, vibration isolation, fatigue resistance, and long-term durability under demanding operating conditions.

The system shall consist of moulded rubber bellows, reinforcing fabric layers, steel reinforcement components, retaining rings, and flange connection systems manufactured from carefully selected materials to ensure excellent structural integrity, dimensional stability, wear resistance, and operational reliability throughout its service life.

RAW MATERIALS OF RUBBER EXPANSION JOINT BELLOW BY SANDHYAFLEX				
S. No.	Raw Material	Image	Typical Grade / Example	Function / Purpose
1	Elastomeric Rubber (EPDM / NBR / NR)		<ul style="list-style-type: none"> EPDM Grade (Peroxide Cured) NBR Grade Natural Rubber (NR) 	<ul style="list-style-type: none"> Provides flexibility & elasticity Absorbs vibration & movement Ensures pressure resistance Long service life
2	Reinforcing Fabric (Synthetic Textile)		<ul style="list-style-type: none"> Nylon Fabric Polyester Fabric High Tensile Synthetic Fabric 	<ul style="list-style-type: none"> Provides tensile strength Enhances pressure rating Prevents bulging & bursting Improves durability
3	Steel Wire Reinforcement (High Tensile Steel)		<ul style="list-style-type: none"> High Tensile Steel Wire Spring Steel Wire 	<ul style="list-style-type: none"> Provides structural support Maintains shape under pressure Prevents excessive elongation Enhances safety
4	Steel Flanges (Carbon Steel)		<ul style="list-style-type: none"> IS 2062 / ASTM A105 Carbon Steel Drilled as per ANSI / PN / JIS 	<ul style="list-style-type: none"> Provides connection to pipeline Ensures secure installation Withstands system pressure Ensures leak-proof performance
5	Carcass & Inner Lining (Elastomer Compound)		<ul style="list-style-type: none"> EPDM / NBR Compound Smooth Bore Compound 	<ul style="list-style-type: none"> Ensures smooth flow Resists abrasion & wear Prevents leakage Enhances service life
6	Curing Agents & Accelerators (Chemical System)		<ul style="list-style-type: none"> Sulfur / Peroxide System CBS / TBBS / TMTD Zinc Oxide 	<ul style="list-style-type: none"> Ensures proper vulcanization Improves heat resistance Enhances physical properties Provides dimensional stability
7	Lubricants & Processing Oils (Mineral / Synthetic Oils)		<ul style="list-style-type: none"> Paraffinic Oil Naphthenic Oil Process Oil 	<ul style="list-style-type: none"> Improves processability Enhances flexibility Prevents cracking Provides smooth finish
8	Anti-Oxidants & Additives (Protection System)		<ul style="list-style-type: none"> Anti-Oxidants Anti-Ozonants Processing Additives 	<ul style="list-style-type: none"> Protects from ageing Resists ozone & UV exposure Improves weather resistance Enhances overall performance

MANUFACTURING PROCESS



RAW MATERIALS MIXING → CALENDERING (SHEET FORMING) → CUTTING TO SIZE → FABRIC & WIRE LAY-UP → MOULDING (BELLOW FORMING) → VULCANIZATION (CURING) → QUALITY INSPECTION → FINISHED RUBBER EXPANSION JOINT BELLOW

HIGH QUALITY MATERIALS | FLEXIBILITY & RELIABILITY | VIBRATION ABSORPTION | PRESSURE RESISTANCE | LONG SERVICE LIFE

The components shall possess excellent resistance to water, moisture, pressure fluctuations, vibration, thermal cycling, ozone exposure, UV radiation, weathering, and various industrial environments. Specialized elastomer compounds may also be selected for resistance to chemicals, oils, acids, alkalis, and other process fluids depending on application requirements.

Manufactured from elastomeric and reinforcement materials, **Sandhyaflex Rubber Expansion Joint Bellows** provide reliable movement accommodation, vibration isolation, pressure handling capability, and long-term protection for piping systems across a wide range of industrial applications.

Physical and Mechanical Properties – Sandhyaflex Rubber Expansion

Joint Bellow:

S. No.	Property / Test	Requirement
1	Product Type	Rubber Expansion Joint Bellow
2	Material Composition	Reinforced Elastomer with Synthetic Fabric and Steel Reinforcement
3	Colour	Black / Blue / Red / Custom Colours
4	Joint Type	Flexible Rubber Expansion Joint
5	Shape	Single Arch / Double Arch / Multiple Arch Bellow
6	Surface Finish	Smooth Moulded Finish
7	Movement Accommodation	Axial, Lateral and Angular Movement
8	Pressure Rating	As per Design Requirements
9	Vacuum Resistance	Available as per Application
10	Tensile Strength	High
11	Elongation at Break	High
12	Flexibility	Excellent
13	Elastic Recovery	Excellent
14	Fatigue Resistance	Excellent
15	Vibration Absorption	Excellent
16	Noise Reduction	Excellent
17	Abrasion Resistance	Excellent
18	Wear Resistance	High
19	Water Resistance	Excellent
20	Moisture Resistance	Excellent
21	Weather Resistance	Excellent
22	UV Resistance	Excellent
23	Ozone Resistance	Excellent
24	Chemical Resistance	Available as per Elastomer Type
25	Corrosion Resistance	Excellent
26	Temperature Resistance	Suitable for Industrial Operating Conditions
27	Pressure Shock Resistance	Excellent
28	Vacuum Capability	Available with Reinforcement Rings
29	Dimensional Stability	High
30	Service Life	Long-Term Durable Performance
31	Typical Applications	Water Systems, HVAC, Power Plants, Chemical Plants, Marine and Industrial Pipelines
32	Country of Origin	Made in India
33	Availability	Standard and Custom Sizes Available
34	Maintenance Requirement	Low

PERFORMANCE AND CONSTRUCTION FEATURES

- Test pressure upto 24 bar (upto 300NB)
- Cyclic movement test for 5000 cycles under design pressure conducted on sizes 1600NB, 2100NB and 2200NB bellows.
- Manufactured sizes upto 3600mm (144 inches)*.

Usage Tips:

- Select the appropriate expansion joint size, pressure rating, movement capability, and elastomer type based on fluid characteristics, operating pressure, temperature, and system requirements.
- Ensure compatibility between the rubber expansion joint, piping material, flange standards, operating media, and connected equipment.
- Verify that axial, lateral, and angular movement requirements conform to approved design specifications and operating conditions.
- Inspect rubber bellows, reinforcement layers, retaining rings, flanges, and fastening assemblies before installation for damage, distortion, cuts, cracks, or manufacturing defects.
- Ensure proper alignment of connected piping systems to avoid excessive stress on the expansion joint.
- Use recommended bolts, gaskets, flange arrangements, and installation procedures specified by the design engineer or equipment manufacturer.
- Avoid excessive torsional movement, twisting, stretching, or compression beyond the specified design limits.
- Ensure adequate support and anchoring of the piping system to prevent unintended movement and overloading of the expansion joint.
- Keep the expansion joint protected from welding sparks, sharp objects, chemicals, and mechanical damage during installation.
- Follow applicable industrial piping standards, project specifications, and safety regulations throughout installation and operation.
- Installation should be carried out by qualified technical personnel using suitable tools and approved procedures.

Maintenance and Care:

Maintaining **Sandhyaflex Rubber Expansion Joint Bellows** ensures reliable flexibility, vibration isolation, pressure containment, and long-term operational performance.

- **Regular Inspection:** Periodically inspect rubber bellows, reinforcement areas, flanges, retaining rings, and fastening components for wear, cracking, deformation, ageing, or deterioration.
- **Keep Clean:** Remove accumulated dirt, chemicals, deposits, and foreign materials from the expansion joint surface to maintain performance.
- **Monitor Elastomer Condition:** Check for hardening, softening, blistering, cracking, cuts, abrasion, or loss of elasticity and replace damaged units when necessary.

- **Inspect Fastening Systems:** Examine bolts, nuts, retaining rings, and flange assemblies for loosening, corrosion, or mechanical damage.
- **Monitor Operating Conditions:** Ensure pressure, temperature, vibration, and movement remain within the design limits of the expansion joint.
- **Prevent Mechanical Damage:** Avoid excessive impact, pipeline misalignment, torsional loading, or external mechanical forces that may damage the bellow assembly.
- **Protect Against Chemical Exposure:** Verify compatibility of the elastomer compound with the process fluid and surrounding environment.
- **Maintain System Supports:** Ensure pipe supports, anchors, and guides remain functional to prevent excessive movement and stress.
- **Timely Replacement:** Replace worn or damaged expansion joints promptly to maintain piping system safety and reliability.

Applications by Countries:

India

- Widely used in water treatment plants, HVAC systems, power plants, industrial pipelines, and infrastructure projects.
- Commonly specified for vibration isolation and movement accommodation in industrial facilities.
- Strong demand driven by industrial growth, infrastructure development, and utility modernization programs.

China

- Extensively used in manufacturing facilities, power generation plants, chemical industries, and municipal infrastructure systems.
- Preferred for reliable flexibility, pressure resistance, and vibration control.
- High demand from large-scale industrial and infrastructure developments.

United States

- Commonly installed in HVAC systems, water treatment facilities, power stations, petrochemical plants, and industrial piping networks.
- Strong emphasis on vibration isolation, operational reliability, and service life.
- Increasing adoption in industrial modernization and infrastructure renewal projects.

Europe

- Widely utilized in process industries, district cooling systems, power plants, marine applications, and municipal infrastructure.

- Strong focus on environmental compliance, energy efficiency, and long-term performance.
- Preferred for compliance with stringent engineering and industrial standards.

Middle East

- Applied in desalination plants, district cooling systems, oil and gas facilities, water infrastructure, and industrial developments.
- Suitable for demanding operating environments and elevated temperatures.
- Strong demand driven by industrial expansion and infrastructure investment.

Africa

- Used in water supply systems, mining facilities, industrial plants, power generation projects, and infrastructure developments.
- Increasing adoption due to expanding industrial activities and utility modernization.
- Preferred for durability, flexibility, and low maintenance requirements.

Southeast Asia

- Widely used in industrial facilities, water treatment systems, HVAC installations, marine projects, and infrastructure developments.
- Strong demand driven by rapid industrialization and urban development.
- Suitable for tropical climates, high humidity, and continuous operating conditions.

Australia

- Commonly installed in mining operations, water infrastructure, power plants, industrial facilities, and marine applications.
- Preferred for long-term durability under varying operating conditions and demanding industrial environments.
- Strong demand from mining, utilities, and infrastructure modernization projects.

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