SANDHYAFLEX

ISO 9001:2015 certified company

Elastomeric Bridge Bearing as per IRC:83-2018 (Part-II)

TECHNICAL DATASHEET

Sandhyaflex , Offering the finest , Sandhya Flex takes pleasure as a leading manufacturer of the products. We have segregated our infrastructure into several units with one of them as packaging unit. Here we meticulously pack our Elastomeric Bridge Bearing to ensure safe and secure deliverables. For the safe storage of the manufactured products, we have installed our facility equipped with all the modern amenities for absolute quality satisfaction.

The features of the elastomeric bridge bearing involve a strong design, simple installation and high quality. Also, it allows movement in all the directions you desire. Moreover, it finds it application in bridges, auditoriums, buildings and stadiums among others. They have exceptional tensile strength along with good elongation strength.

They are easy to install for various applications. Above all, they require less maintenance as well. They are precisely manufactured by specialists and experts as per the national and international norms and standards. Also, we use premium quality raw material to manufacture these elastomeric bridge bearing which are sourced from reliable vendors. Further, we assure the best quality, superior performing, durable and energy-efficient elastomeric bridge bearing which you can get from Sandhya Flex at competitive prices in the market.

Overcoming Challenges, Delivering Excellence:

Conventional bridge support systems and rigid bearing arrangements often face challenges such as excessive stress concentration, restricted structural movement, vibration transfer, and deterioration caused by heavy traffic loads and changing environmental conditions. These issues can lead to premature structural damage, increased maintenance requirements, and reduced service life of bridges.

Recognizing these challenges, SANDHYAFLEX Elastomeric Bridge Bearings are engineered to provide a reliable and efficient load-transfer solution between the bridge superstructure and substructure. Their advanced elastomeric construction ensures:

- Efficient distribution of vertical and horizontal loads.
- Accommodation of thermal expansion, contraction, rotation, and structural movements.
- Excellent resistance to weathering, moisture, ozone, and environmental degradation.
- Reduction of vibration and impact stresses transmitted to bridge components.
- Long service life with minimal maintenance requirements.
- Compliance with modern bridge engineering standards and infrastructure specifications.
- Enhanced structural stability, durability, and overall bridge performance.

By offering a reliable, durable, and maintenance-free access solution, SANDHYAFLEX PVC Rungs have become a preferred choice for infrastructure, water management, sewage treatment, and civil engineering projects across the country.

Key Features:

High Load Carrying Capacity:
Designed to safely transfer and distribute heavy vertical loads from the bridge superstructure to the substructure, ensuring structural stability and reliability.

Accommodates Structural Movements:
Allows controlled translation and rotation caused by thermal expansion, contraction, shrinkage, creep, and live load effects without inducing excessive stresses.

Superior Elastomeric Performance:
Manufactured from high-quality elastomer compounds that provide excellent elasticity, resilience, and recovery under repeated loading conditions.

Weather and Environmental Resistance:
Highly resistant to moisture, ozone, UV radiation, temperature variations, and atmospheric pollutants, ensuring long-term durability in outdoor environments.

Vibration and Shock Absorption:
Effectively absorbs vibrations and impact loads generated by vehicular traffic, reducing stress on bridge components and enhancing structural lifespan.

Corrosion-Free Construction:
Unlike conventional metallic bearing systems, elastomeric bearings are inherently resistant to corrosion and require minimal protective maintenance.

Low Maintenance Requirements:
Engineered for long service life with minimal inspection and maintenance, helping reduce lifecycle costs for bridge owners and infrastructure agencies.

Easy Installation:
Simple and efficient to install without the need for complex mechanical components, reducing construction time and labor requirements.

Available in Various Sizes and Configurations:
Manufactured in a wide range of dimensions and load capacities to suit highways, railways, flyovers, metro projects, and other infrastructure applications.

Compliance with Industry Standards:
Designed and manufactured in accordance with relevant bridge engineering specifications and quality standards to ensure reliable performance and safety.

Long Service Life:
Combines durability, flexibility, and environmental resistance to provide dependable performance throughout the bridge's operational life.

Suitable for Diverse Infrastructure Projects:
Widely used in highway bridges, railway bridges, flyovers, viaducts, metro corridors, and other civil engineering structures requiring efficient load transfer and movement accommodation.

History of Elastomeric Bridge Bearing:

- **1950s – Need for Flexible Bridge Support Systems:**
With the rapid expansion of highway networks and larger bridge structures, engineers sought bearing systems capable of accommodating movement and reducing stress concentrations.

- **1960s – Introduction of Elastomeric Bearings:**
Natural rubber and synthetic elastomer compounds began to be used as bridge bearings, providing a simple and economical alternative to traditional steel roller and rocker bearings.

- **1970s – Increasing Acceptance in Bridge Engineering:**
Elastomeric bearings gained popularity due to their ability to support heavy loads while allowing controlled rotation and horizontal movement without complex mechanical components.

- **1980s – Development of Laminated Bearings:**
The incorporation of steel reinforcing plates within elastomer layers significantly enhanced load-carrying capacity, stability, and durability for larger bridge applications.

- **1990s – Standardization and Performance Improvements:**
National and international bridge design standards established guidelines for elastomeric bearing design, testing, and quality control, improving reliability and safety.

- **2000s – Advanced Material Technology:**
Improved elastomer formulations enhanced resistance to ozone, UV exposure, temperature variations, aging, and environmental degradation, extending service life.

- **2010s – Expansion in Infrastructure Projects:**
Growing investments in highways, flyovers, metro systems, and railway bridges increased the widespread adoption of elastomeric bearings due to their low maintenance requirements and cost-effectiveness.

- **2020s – Enhanced Engineering and Sustainability:**
Modern manufacturing processes, precision testing, and advanced design techniques have resulted in high-performance bearings capable of supporting increasingly demanding infrastructure projects.

▪ **Modern Era:**
Elastomeric Bridge Bearings are widely used in highway bridges, railway bridges, flyovers, viaducts, metro corridors, and other civil engineering structures worldwide, providing reliable load transfer, movement accommodation, vibration reduction, and long-term structural protection.

Types of Elastomeric Bridge Bearings and Their Applications:

Elastomeric Bridge Bearings are available in different configurations to suit varying structural requirements. Each type is designed to accommodate specific load conditions, movements, and bridge designs.

Type	Typical Application
Plain Elastomeric Bearing	Small bridges, culverts, pedestrian bridges, and light-load structures requiring limited movement accommodation.
Laminated Elastomeric Bearing	Highway bridges, flyovers, railway bridges, and medium-to-heavy load structures requiring enhanced load-carrying capacity.
Reinforced Elastomeric Bearing	Long-span bridges and major infrastructure projects subjected to high vertical loads and structural movements.
Fixed Bearing	Locations where bridge movement needs to be restrained while transferring vertical and horizontal forces safely.
Expansion Bearing	Bridge spans requiring accommodation of thermal expansion, contraction, and longitudinal movement.
Pot-Cum-Elastomeric Bearing	Large bridges, elevated corridors, and heavy-load applications requiring significant rotation and load transfer.
Seismic Elastomeric Bearing	Bridges located in earthquake-prone regions requiring vibration absorption and seismic movement control.
Strip Elastomeric Bearing	Precast structures, small bridge decks, retaining walls, and utility infrastructure applications.

Trusted Performance for Modern Infrastructure

For bridge authorities, contractors, infrastructure developers, and civil engineering consultants seeking reliable load-transfer and movement-accommodation solutions, **SANDHYAFLEX** stands as a trusted partner. With a commitment to quality, innovation, and engineering excellence, SANDHYAFLEX offers premium Elastomeric Bridge Bearings designed to support highway bridges, railway bridges, flyovers, metro corridors, viaducts, and other critical infrastructure projects.

Manufactured using high-quality elastomer compounds and advanced production techniques, these bearings provide efficient load distribution, superior flexibility, vibration reduction, and long-term durability under demanding service conditions. Their excellent resistance to weathering, moisture, ozone, and environmental degradation ensures dependable performance with minimal maintenance throughout the structure's service life.

By combining proven engineering, stringent quality control, and customer-focused solutions, SANDHYAFLEX Elastomeric Bridge Bearings contribute to safer, stronger, and longer-lasting infrastructure projects worldwide.

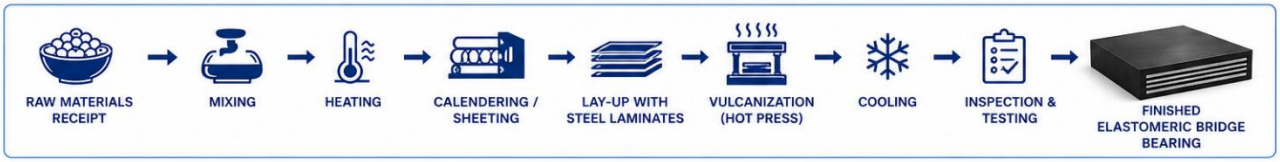
Materials :

The **Elastomeric Bridge Bearing** shall be manufactured using high-quality natural rubber, neoprene (chloroprene rubber), or other approved elastomeric compounds formulated to provide excellent flexibility, resilience, load-bearing capacity, and long-term durability. The elastomer compound may contain carefully selected polymers, reinforcing agents, carbon black, antioxidants, anti-ozonants, curing agents, processing aids, and stabilizers to ensure superior mechanical properties and resistance to environmental degradation.

For laminated bearings, the elastomer layers shall be integrally bonded to **steel reinforcing plates** manufactured from high-strength carbon steel or structural steel. These steel laminates shall be thoroughly cleaned, treated, and bonded during the vulcanization process to ensure permanent adhesion and structural integrity throughout the bearing's service life.

RAW MATERIALS OF ELASTOMERIC BRIDGE BEARING

S. No.	Raw Material	Image	Typical Grade / Example	Function / Purpose
1	**Elastomer (Rubber Compound)** (Natural Rubber / Neoprene / Chloroprene Rubber)		NR (SMR CV 60) Neoprene (CR-244) As per IS 15651 / AASHTO M251	• Main load-bearing material • Provides elasticity, flexibility and resilience • Accommodates movements and rotations • Ensures long service life
2	**Steel Reinforcing Plates (Laminates)** (Mild Steel / Carbon Steel)		IS 2062 Gr. E250 / E350 / Fe 410 / Fe 490 As per IS 15651 / AASHTO M251	• Provides high compressive strength • Enhances load-carrying capacity • Restricts lateral bulging of elastomer • Ensures structural stability
3	**Reinforcing Agents** (Carbon Black)		ASTM N 330 / N 550 / N 660 As per formulation	• Improves tensile strength and durability • Enhances wear and abrasion resistance • Improves tear strength
4	**Anti-oxidants** (Aromatic Amines)		6PPD / DPA / TMQ As per formulation	• Prevents oxidation and ageing • Improves heat resistance • Extends service life
5	**Anti-ozonants** (Waxes)		Paraffin Wax / Microcrystalline Wax As per formulation	• Protects against ozone, UV and weathering • Prevents surface cracking
6	**Oil / Plasticizer** (Processing Oil)		Aromatic Oil / Naphthenic Oil As per formulation	• Improves processability • Enhances flexibility and workability • Ensures uniform mixing
7	**Curing System** (Vulcanizing Agents)		Sulphur / Organic Peroxides As per formulation	• Ensures proper vulcanization • Improves elastic properties • Enhances load-bearing performance
8	**Fillers** (Inorganic Fillers)		Zinc Oxide / Magnesium Oxide / Calcium Carbonate As per formulation	• Improves dimensional stability • Enhances hardness and stiffness • Reduces production cost
9	**Adhesion Promoters** (Bonding Agents)		Resorcinol Formaldehyde Latex / Other Adhesion Systems As per formulation	• Ensures strong bond between elastomer and steel laminates • Prevents delamination



The elastomeric material shall exhibit excellent resistance to weathering, ozone, moisture, oxidation, ultraviolet exposure, temperature variations, and repeated cyclic loading. It shall maintain its elasticity and performance characteristics under continuous compressive loads and structural movements encountered in bridge applications.

The bearing shall be capable of safely accommodating vertical loads, rotational movements, and horizontal displacements resulting from thermal expansion, contraction, creep, shrinkage, traffic loading, and other service conditions without significant loss of performance.

The finished Elastomeric Bridge Bearing shall provide reliable load transfer, vibration isolation, movement accommodation, and long-term structural protection, ensuring safe and efficient operation in highway bridges, railway bridges, flyovers, viaducts, metro structures, and other civil engineering infrastructure projects.

Usage Tips:

Proper Selection: Choose bearings based on design load and movement requirements.

• Correct Installation: Install on clean, level, and properly aligned bearing surfaces.

• Avoid Overloading: Do not exceed the specified load capacity of the bearing.

• Allow Free Movement: Ensure bridge expansion and rotational movements are not restricted.

• Periodic Inspection: Regularly check bearings for alignment, condition, and performance.

• Professional Handling: Installation and maintenance should be carried out by qualified personnel following relevant standards.

Following these recommendations helps ensure the long-term performance, safety, and durability of SANDHYAFLEX Elastomeric Bridge Bearings.

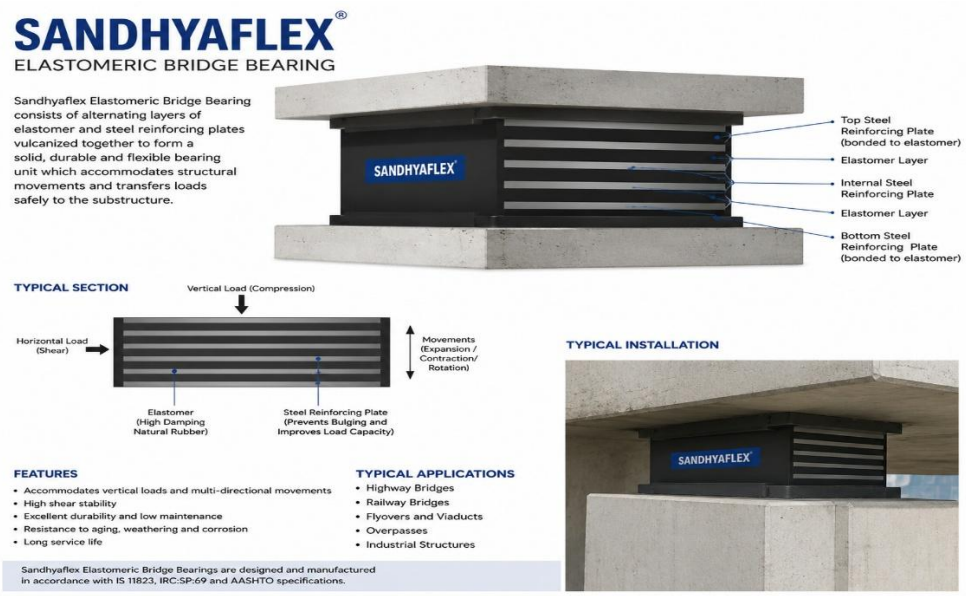
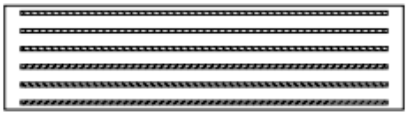
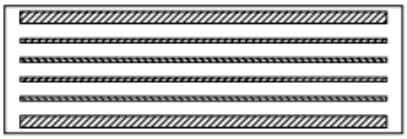
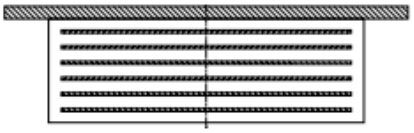
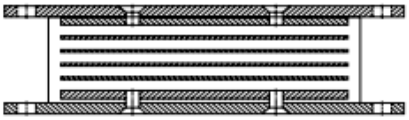
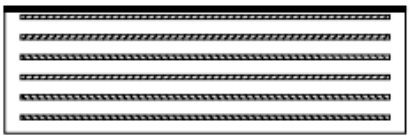
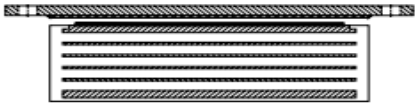
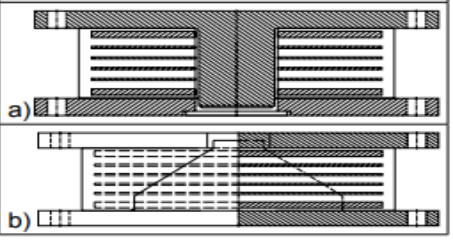


Table 3: Types of Elastomeric Bearings

1)	**Type A:** Plain pad/Strip bearings	
2)	**Type B:** Laminated bearings	
3)	**Type C:** Laminated bearings with thicker end laminates: - laminate may be on either side or on both side - ensures better load distribution - ensures better rotation - back lifting of bearing under shear may be avoided	
4)	**Type D:** Laminated bearings with thicker end laminates exposed: - Corrosion protection is required on exposed steel surface - May be useful for better frictional resistance at bearing structure interface - Friction, if taken into account, should be based on tested and certified value - Useful for contact with steel structure	
5)	**Type E:** Bearings with separate steel plate directly vulcanised with the bearing - lifting/separation of bearing elastomer at edges from exposed steel plate should be avoided under all loading	
6)	**Type F:** Bearings with positive anchorage: - Separate plates provide ease of replacement and fool-proof positive anchorage - Plates may be connected to covered/exposed end laminates - internal fastening and positive means of location to be adequately designed	
7)	**Type G:** Bearings with PTFE bonded to the elastomer: - bond of elastomer to PTFE is critical and vulnerable	
8)	**Type H:** Bearings with sliding interface: - Refer relevant Part covering sliding element for design of sliding interface - Other end may be of any other option as above	
9)	**Type I:** Bearings with restraint against translation to simulate support condition - a) Typical detail of restraint in form of central pin - b) Typical detail of side restraint. - Restraints shall be designed based on relevant Part or other relevant IRC code.	

Maintenance and Care:

✓ **Regular Inspection:** Periodically inspect bearings for alignment, damage, or unusual deformation.

✓ **Keep Clean:** Ensure bearing areas remain free from dirt, debris, and construction materials that may affect performance.

✓ **Monitor Movement:** Verify that the bearing is allowing the intended structural movements without obstruction.

✓ **Check Surrounding Components:** Inspect adjacent expansion joints and structural elements for proper functioning.

✓ **Avoid Mechanical Damage:** Protect bearings from impacts, welding operations, chemicals, and excessive loads during maintenance activities.

✓ **Professional Assessment:** Conduct routine inspections by qualified engineers to ensure long-term performance and structural safety.

Proper maintenance helps ensure the durability, reliability, and service life of **SANDHYAFLEX Elastomeric Bridge Bearings**.

PHYSICAL AND MECHANICAL PROPERTIES

Sr No.	Test	Unit	Specification and Testing Method	Specimens
1	Hardness	IRHD	IS: 3400 (Part II) Cl.5.1.2.2	4.0mm (min) thickness of Test specimen
2	Tensile Strength	MPa	IS:3400 (Part I)	Thick- 2.0 +.0.20mm
3	Elongation at Break	%	Table 1 Type -1	Width 6.0 + 0.40mm Bench Mark-25..0mm (max)
4	Adhesion Strength (Metal to Rubber	KN/M	IS:3400 (Part XIV) Cl.3.3	Length -125mm Width-25mm Width-25mm 1 g (min)
5	Ash Content	%	IS:3400 (Part XXII)	1 g (min)
6	Polymer Identification	Chemically	Cl. A-8.3.1 IS	

7	Percentage of Polymers	%	IS	0.5 g (min)
8	Compression Set	%	IS: 3400 (Part X) Cl. 5.1	Thick -12.5 + 0.50mm
9	Elastic Modulus	MPa	IRC 83 (Part II)	Dia-29 + 0.50mm 2 Nos from Finish
10	Shear Modulus	MPa	1987, UIC 772 -2R	Product
11	Ultimate Compression Strength	MPa	and MORTH	One Specimen size of 100x200mm (Cutting Piece from Finish product.)
12	Stripping Strength (Adhesion Strength)	MPa		Two Specimen size of 100x 100mm (Cutting from Finish Product)
13	5MPa and 15 MPa Deflection Test	MPa	IRC 83 (Part II) 1987, and MORTH	100% on finish Product.

APPLICATIONS BY COUNTRIES :

India:

• Widely used in national highways, railway bridges, flyovers, metro rail viaducts, and expressway projects.
• Commonly installed in bridges constructed under NHAI, state highway, and urban infrastructure development programs.
• Increasing demand in smart city projects, elevated corridors, and high-speed transportation infrastructure.

China:

• Extensively used in large-scale highway networks, high-speed railway bridges, and urban transit systems.
• Widely adopted in long-span bridges, elevated expressways, and major infrastructure developments.
• Commonly utilized in modern transportation corridors requiring high durability and load-bearing performance.

United States:

• Used in interstate highway bridges, overpasses, railway structures, and transportation infrastructure projects.

• Widely installed in bridge rehabilitation and replacement programs to improve structural performance.
• Increasing use in seismic-resistant bridge designs and heavy-traffic transportation networks.

Europe:
• Preferred for highway bridges, railway bridges, pedestrian bridges, and urban transport infrastructure.
• Commonly used in bridge modernization projects requiring efficient movement accommodation and vibration control.
• Strong demand due to stringent engineering, safety, and durability standards.

Middle East:
• Extensively used in highway interchanges, flyovers, metro projects, and large-scale urban developments.
• High demand in infrastructure projects exposed to extreme temperatures and harsh environmental conditions.
• Commonly installed in transportation corridors, industrial zones, and smart city developments.

Africa:
• Used in highway bridges, railway infrastructure, and urban transportation projects.
• Important for supporting expanding road networks, river crossings, and public infrastructure developments.
• Growing adoption due to their durability, low maintenance requirements, and long service life in demanding environments.

Southeast Asia:
• Widely used in expressways, elevated roadways, railway bridges, and port connectivity projects.
• Commonly installed in bridges exposed to high humidity, heavy rainfall, and tropical climatic conditions.
• Increasing demand from rapid urbanization and infrastructure expansion across the region.

Australia:
• Utilized in highway bridges, mining infrastructure, railway networks, and coastal bridge projects.
• Preferred for their ability to withstand varying environmental conditions and heavy traffic loads.
• Commonly specified in long-term infrastructure projects requiring reliable structural performance.

Get in touch:

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