



## **Omega Seal Expansion Joint**

### **TECHNICAL DATASHEET**

**SANDHYAFLEX Omega Seal Expansion Joint** is a high-performance elastomeric bridge expansion joint system specifically designed to accommodate expansion, contraction, rotation, vibration and dynamic structural movements in bridges, flyovers, viaducts, elevated corridors, metro structures and other civil engineering applications. Manufactured using quality elastomeric compounds and precision-engineered steel anchorage systems, these joints provide excellent movement accommodation, watertight sealing, load transfer capability and long-term durability under continuous traffic loading and environmental exposure.

Designed to maintain structural continuity while allowing controlled movement between adjacent bridge sections, Sandhyaflex Omega Seal Expansion Joints provide reliable waterproofing performance, smooth vehicular movement and effective protection against water ingress, debris accumulation, corrosion, and premature structural deterioration. The system is widely used in highways, railway bridges, metro rail structures, flyovers, elevated roadways, and infrastructure projects where dependable movement accommodation and long-term performance are critical.

**SANDHYAFLEX INDIA PVT LTD** has established itself as a trusted manufacturer and supplier of high-quality bridge engineering products in India. Utilizing advanced elastomer processing technology, precision manufacturing methods, and high-quality raw materials, Sandhyaflex Omega Seal Expansion Joints are engineered to deliver consistent performance, superior dimensional stability, excellent fatigue resistance, and outstanding durability under demanding service conditions.

#### **Overcoming Challenges, Delivering Excellence:**

Bridge structures are continuously exposed to thermal expansion and contraction, traffic-induced vibrations, creep, shrinkage, settlement, seismic activity, and harsh environmental conditions. Without a properly designed expansion joint system, these movements can cause cracking, leakage, reinforcement corrosion, concrete damage, ride discomfort, and increased maintenance costs.

To overcome these challenges, **SANDHYAFLEX Omega Seal Expansion Joints** are manufactured using specially formulated elastomeric compounds designed to provide exceptional elasticity, recovery characteristics, waterproof sealing, fatigue resistance, and environmental durability. The omega-shaped seal profile effectively accommodates structural movement while maintaining a reliable watertight barrier and smooth riding surface.

By providing dependable movement accommodation, excellent sealing performance, and extended service life, **SANDHYAFLEX Omega Seal Expansion Joints** have become a preferred choice for bridge engineers, infrastructure developers, government authorities, consultants, and construction professionals worldwide.

### Key Features:

- Manufactured from high-quality elastomeric compounds
- Advanced omega-shaped seal design
- Excellent movement accommodation capability
- Superior watertight sealing performance
- High elasticity and recovery characteristics
- Smooth and safe vehicular riding surface
- Excellent fatigue resistance under repeated traffic loading
- Outstanding weather, UV, ozone, and moisture resistance
- Resistant to wear, abrasion, and environmental ageing
- Effective protection against water ingress and debris accumulation
- Suitable for moderate to high bridge movement requirements
- Compatible with various steel anchorage systems
- Easy installation and replacement
- Available in multiple movement capacities and configurations
- Cost-effective and durable bridge expansion joint solution
- Long service life under demanding operating conditions
- Reliable performance in transportation and infrastructure projects

### Applications:

- **Highway Bridges:** Accommodates thermal expansion and contraction movements.
- **Road Bridges:** Provides reliable waterproof sealing and structural protection.
- **Flyovers and Overpasses:** Ensures smooth vehicle movement and long-term durability.
- **Metro Rail Structures:** Suitable for elevated transportation systems.
- **Railway Bridges:** Performs effectively under repeated dynamic loading.
- **Viaducts:** Accommodates structural movement between spans.

- **Elevated Corridors:** Provides dependable movement accommodation and waterproofing.
- **Bridge Rehabilitation Projects:** Replacement and upgrading of existing joint systems.
- **Pedestrian Bridges:** Ensures safe movement and protection of structural elements.
- **Airport Infrastructure:** Suitable for transportation structures requiring movement accommodation.
- **Industrial Structures:** Used where controlled structural movement and sealing are required.
- **Urban Infrastructure Projects:** Widely used in modern transportation developments.

### History of Omega Seal Expansion Joints:

- **Early 1900s** – Bridges relied on simple open gaps for movement accommodation.
- **1930s** – Steel plate expansion systems improved load transfer capabilities.
- **1950s** – Development of elastomeric materials improved flexibility and waterproofing.
- **1960s** – Compression-type elastomeric expansion joints gained acceptance.
- **1970s** – Omega-shaped elastomeric sealing systems were introduced for enhanced waterproofing.
- **1980s** – Improved elastomer formulations increased fatigue resistance and durability.
- **1990s** – Advanced anchorage designs enhanced structural performance and service life.
- **2000s** – Precision manufacturing improved dimensional consistency and installation reliability.
- **2010s** – Enhanced compound technology improved environmental resistance and movement capability.
- **2020s** – Modern Omega Seal Expansion Joints provide superior movement accommodation, waterproofing performance, and reduced maintenance requirements for transportation infrastructure worldwide.

### Colours and Their Applications:

For **Omega Seal Expansion Joints**, colours are primarily used for product identification, project specifications, maintenance visibility, infrastructure coding, and customer-specific requirements. The movement accommodation capability, sealing efficiency, and structural performance are determined by the elastomer compound formulation, seal profile, and anchorage system rather than colour.

Colour	Typical Application
<b>Black</b>	Standard bridge, highway, flyover, and transportation infrastructure applications

<b>Grey</b>	Urban infrastructure, architectural bridges, and elevated corridors
<b>Red Oxide</b>	Protective-coated steel anchorage assemblies and reinforcement components
<b>Silver</b>	Galvanized steel assemblies and corrosion-protected anchorage systems
<b>Blue</b>	Project-specific identification and infrastructure coding requirements
<b>Yellow</b>	Safety marking, maintenance visibility, and inspection identification
<b>Custom Colours</b>	Available as per customer specifications and project requirements

### **Materials:**

The **Sandhyaflex Omega Seal Expansion Joint** shall be manufactured using quality elastomeric compounds, structural steel anchorage assemblies, reinforcement components, fastening systems, and corrosion-resistant protective coatings designed to provide superior movement accommodation, waterproof sealing, fatigue resistance, load transfer capability, and long-term durability under continuous traffic loading and environmental exposure.

The system shall consist of specially engineered omega-shaped elastomeric seals, structural steel anchorages, reinforcement members, fastening assemblies, and protective surface treatments manufactured from carefully selected materials to ensure excellent wear resistance, weather resistance, impact resistance, dimensional stability, and operational reliability throughout its service life.

RAW MATERIALS OF OMEGA SEAL EXPANSION JOINT BY SANDHYAFLEX				
S. No.	Raw Material	Image	Typical Grade / Example	Function / Purpose
1	Elastomeric Seal (Chloroprene Rubber)		<ul style="list-style-type: none"> <li>Chloroprene Elastomer</li> <li>Neoprene / Bayprene / Skyprene</li> <li>Shore A 63 ± 5</li> </ul>	<ul style="list-style-type: none"> <li>Provides movement accommodation</li> <li>Ensures watertight sealing</li> <li>High elasticity &amp; recovery</li> <li>Resistant to weather &amp; ageing</li> </ul>
2	Steel Plates (Galvanized)		<ul style="list-style-type: none"> <li>Mild Steel / IS 2062 / ASTM A36</li> <li>Hot Dip Galvanized</li> <li>Zinc Coating 85-100 Microns</li> </ul>	<ul style="list-style-type: none"> <li>Provides clamping &amp; load distribution</li> <li>Enhances structural strength</li> <li>Corrosion &amp; rust protection</li> <li>Long service life</li> </ul>
3	Anchorage Brackets (Galvanized Steel)		<ul style="list-style-type: none"> <li>Mild Steel / IS 2062</li> <li>Hot Dip Galvanized</li> <li>Thickness as per design</li> </ul>	<ul style="list-style-type: none"> <li>Ensures secure anchorage</li> <li>Transfers loads to structure</li> <li>Enhances joint stability</li> <li>Corrosion resistant</li> </ul>
4	Anchor Bolts (High Tensile Steel)		<ul style="list-style-type: none"> <li>IS 3757 / ASTM A193 B7</li> <li>High Tensile Steel</li> <li>Galvanized / Zinc Coated</li> </ul>	<ul style="list-style-type: none"> <li>Provides strong fixation</li> <li>Withstands dynamic loads</li> <li>Prevents loosening</li> <li>Ensures long service life</li> </ul>
5	Nuts & Washers (High Tensile Steel)		<ul style="list-style-type: none"> <li>IS 1367 / ASTM A194 2H</li> <li>Hardened Washer</li> <li>Galvanized Finish</li> </ul>	<ul style="list-style-type: none"> <li>Ensures secure fastening</li> <li>Distributes clamping load</li> <li>Prevents loosening</li> <li>Corrosion resistant</li> </ul>
6	Backing Rod (Polyethylene Foam)		<ul style="list-style-type: none"> <li>Closed Cell PE Foam</li> <li>Compression Resistant</li> <li>As per Joint Size</li> </ul>	<ul style="list-style-type: none"> <li>Supports seal during compression</li> <li>Controls seal depth</li> <li>Prevents over-compression</li> <li>Ensures proper performance</li> </ul>
7	Sealant / Adhesive (If Applicable)		<ul style="list-style-type: none"> <li>Polyurethane / Polysulfide</li> <li>High Performance Grade</li> <li>Weather Resistant</li> </ul>	<ul style="list-style-type: none"> <li>Enhances sealing efficiency</li> <li>Prevents water ingress</li> <li>Improves durability</li> <li>Suitable for bridge environments</li> </ul>
8	Protective Coating (Steel Components)		<ul style="list-style-type: none"> <li>Zinc Rich Primer / Epoxy Coating</li> <li>Galvanized Coating</li> <li>Corrosion Protection Grade</li> </ul>	<ul style="list-style-type: none"> <li>Protects steel from corrosion</li> <li>Extends service life</li> <li>Withstands harsh environments</li> <li>Maintains structural integrity</li> </ul>

  

MANUFACTURING PROCESS												
	→		→		→		→		→		→	
RAW MATERIALS MIXING		CALENDERING (SHEET FORMING)		CUTTING TO SIZE		SEAL MOULDING / VULCANIZATION		STEEL PLATE & ANCHORAGE ASSEMBLY		QUALITY INSPECTION		FINISHED OMEGA SEAL EXPANSION JOINT
HIGH QUALITY MATERIALS		DURABLE PERFORMANCE		RELIABLE MOVEMENT ACCOMMODATION		EXCELLENT WATERPROOFING		LONG SERVICE LIFE				

The components shall possess excellent resistance to moisture, water ingress, de-icing chemicals, abrasion, temperature fluctuations, repeated traffic loading, UV exposure, ozone attack, and aggressive atmospheric conditions. Corrosion-resistant coatings and protective treatments further enhance service life while minimizing maintenance requirements.

Manufactured from high-quality elastomeric and structural steel materials, **Sandhyaflex Omega Seal Expansion Joints** provide reliable movement accommodation, superior waterproofing performance, and long-term structural protection across a wide range of bridge and infrastructure applications.

### Physical and Mechanical Properties – Sandhyaflex Omega Seal Expansion Joint:

S. No.	Property / Test	Requirement
1	Product Type	Omega Seal Expansion Joint
2	Material Composition	Elastomer Seal with Galvanized Steel Anchorage System
3	Colour	Black / Grey / Custom Colours

4	Joint Type	Elastomeric Omega Seal Joint
5	Shape	Omega Profile
6	Surface Finish	Smooth Moulded Finish
7	Movement Accommodation	As per Design Requirements
8	Expansion Gap Range	Project Specific
9	Hardness	63 ± 5 Shore A
10	Tensile Strength	Minimum 17 MPa
11	Elongation at Break	Minimum 400%
12	Compression Set	Maximum 35%
13	Elastic Recovery	Excellent
14	Fatigue Resistance	Excellent
15	Impact Resistance	High
16	Abrasion Resistance	Excellent
17	Wear Resistance	High
18	Water Resistance	Excellent
19	Moisture Resistance	Excellent
20	Weather Resistance	Excellent
21	UV Resistance	Excellent
22	Ozone Resistance	Excellent
23	Corrosion Resistance	Excellent with Galvanized Steel Components
24	Temperature Resistance	Suitable for Extreme Climatic Conditions
25	Vibration Resistance	Excellent
26	Dimensional Stability	High
27	Watertight Performance	Excellent
28	Load Carrying Capacity	Suitable for Highway, Railway and Bridge Traffic Loads
29	Noise Reduction Performance	Good
30	Service Life	Long-Term Durable Performance
31	Typical Applications	Railway Bridges, Road Bridges, Flyovers, Metro Structures and Viaducts
32	Country of Origin	Made in India
33	Availability	Standard and Custom Sizes Available
34	Maintenance Requirement	Low

### **Usage Tips:**

- Select the appropriate Omega Seal size and movement capacity based on bridge span, anticipated thermal movement, traffic loading, and structural design requirements.
- Ensure compatibility between the Omega Seal system, bridge deck geometry, anchorage arrangement, drainage provisions, and supporting structural elements.

- Verify that the expansion gap and movement range conform to approved design specifications and project requirements.
- Inspect omega seals, galvanized steel plates, anchorage bolts, nuts, and fastening assemblies before installation for damage, distortion, corrosion, or manufacturing defects.
- Ensure proper deck slope and drainage arrangements to prevent water accumulation around the seal assembly.
- Ensure accurate alignment, level adjustment, and anchorage positioning during installation to provide smooth vehicle movement and uniform load transfer.
- Use recommended anchorage systems, grouting materials, fastening methods, and installation procedures specified by the design engineer.
- Keep the expansion gap free from debris, dust, concrete residue, and contaminants during installation to ensure proper sealing performance.
- Avoid improper handling, excessive bending, impact loading, or deformation of elastomeric components during transportation and installation.
- Follow applicable IRC, MoRTH, railway bridge engineering standards, project specifications, and safety regulations throughout installation.
- Installation should be carried out by qualified bridge engineers and trained technical personnel using suitable equipment and approved procedures.

### **Maintenance and Care:**

Maintaining **Sandhyaflex Omega Seal Expansion Joints** ensures reliable waterproofing performance, effective movement accommodation, and long-term structural protection.

- **Regular Inspection:** Periodically inspect omega seals, steel plates, anchorage bolts, fastening assemblies, and adjacent concrete surfaces for wear, cracking, deformation, ageing, or damage.
- **Keep Clean:** Remove accumulated dirt, stones, debris, and foreign materials from the joint area to maintain free movement and watertight performance.
- **Monitor Elastomer Condition:** Check for excessive wear, tearing, hardening, loss of elasticity, or surface deterioration and replace damaged components when required.
- **Inspect Steel Components:** Examine galvanized plates, anchorage bolts, nuts, and steel assemblies for loosening, corrosion, or mechanical damage.
- **Maintain Drainage Systems:** Ensure surrounding drainage arrangements remain functional to prevent water accumulation and structural deterioration.
- **Prevent Mechanical Damage:** Avoid excessive impact, overloading, improper construction activities, or concentrated wheel loads that may damage the joint system.

- **Protect Against Corrosion:** Maintain protective coatings and repair damaged galvanized surfaces where necessary.
- **Timely Replacement:** Replace worn or damaged components promptly to maintain bridge safety, waterproofing efficiency, and serviceability.

## Applications by Countries:

### **India**

- Widely used in railway bridges, highway bridges, flyovers, metro structures, and elevated transportation corridors.
- Commonly specified for bridge movement accommodation and waterproofing applications.
- Strong demand driven by railway modernization and transportation infrastructure development programs.

### **China**

- Extensively used in railway networks, bridge systems, expressways, and urban transportation projects.
- Preferred for reliable sealing performance and long-term durability.
- High demand from large-scale infrastructure developments.

### **United States**

- Commonly installed in highway bridges, transportation structures, and bridge rehabilitation projects.
- Strong emphasis on waterproofing, durability, fatigue resistance, and service life.
- Increasing adoption in infrastructure renewal programs.

### **Europe**

- Widely utilized in bridges, viaducts, railway structures, and urban transportation systems.
- Strong focus on structural reliability, environmental performance, and long-term durability.
- Preferred for compliance with stringent engineering standards.

### **Middle East**

- Applied in highways, flyovers, metro systems, railway infrastructure, and transportation projects.
- Suitable for extreme temperature variations and demanding climatic conditions.
- Strong demand driven by urban expansion and infrastructure investment.

## **Africa**

- Used in bridge construction, railway projects, transportation infrastructure, and public works developments.
- Increasing adoption due to expanding transportation networks and infrastructure modernization.
- Preferred for durability and low maintenance requirements.

## **Southeast Asia**

- Widely used in bridges, flyovers, railway corridors, metro projects, and transportation infrastructure developments.
- Strong demand driven by rapid urbanization and transportation network expansion.
- Suitable for tropical climates, high humidity, and heavy rainfall conditions.

## **Australia**

- Commonly installed in highway bridges, railway infrastructure, mining transportation networks, and urban development projects.
- Preferred for long-term durability under varying climatic conditions and dynamic loading.
- Strong demand from bridge maintenance, rehabilitation, and infrastructure modernization programs.

## **Get in touch:**

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