

NON-METALLIC EXPANSION JOINT

BOSON ENGINEERING PVT LTD.



BRITISH TECHNOLOGY AT ITS BEST

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About Non-Metallic Expansion Joint

Non-Metallic Expansion Joint (NMEJ) mainly used in duct or pipe line. It is a flexible member save the duct/pipe from shock and vibration effect at system layout also act. As a compensating member where the pipe layout are slightly misaligned. Boson manufactured the “nmej” in unlimited design and sizes with the technical requirement of applications. Nmej flexible belts are manufactured with unwanted verity of polymer, fluoroelastomer, fluoroplastics, ceramic fabrics, ceramic wool, fibreglass fabric, fibreglass wool, aramid cloth, incoloy, aisi 304 wire mesh, etc.

USE OF NON-METALLIC EXPANSION JOINTS

INDUSTRIES:

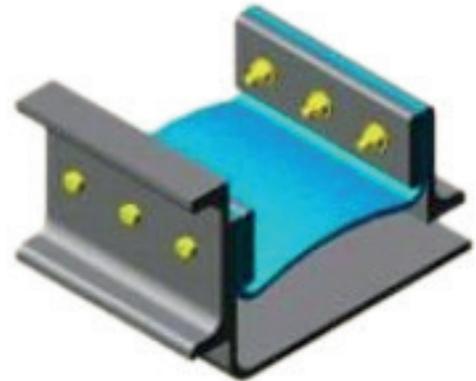
- CEMENT PLANTS
- STEEL PLANTS
- PULP AND PAPER PLANT
- REFINERY
- SMELTER PLANT
- GAS TURBINE PLANT
- REFINERY
- POWER PLANT
- FARTILISER AND CHEMICAL PLANT
- SHIP BUILDING
- PETRO CHEMICALS
- COAL WASHERY

Advantages of Using Non-Metallic Expansion Joint

1. **Resistant to High Temperatures:** With the use of Bosoflex special composite flexi belt, NMEJ easily can operate at 2500 Dig./F.
2. **Absorption of Sound and Vibration:** It has the inherent outstanding properties of sound and vibration absorbing.
3. **Resistant to Corrosion:** Due to the use of best quality of fabrics, Bosoflex NMEJs are excellent resistant to corrosion effect.
4. **Multi-movement Ability:** Bosoflex NMEJs are designed in such a way that it can easily provide the axial/lateral/torsional and swing movements.
5. **Large Movement:** Due to its inbuilt assembly design, Bosoflex NMEJs are very light in weight. Due to that the spring rate is very low, that is, why it can travel long in operative mode.
6. **Lower-system Installation Cost:**
 - Low cost of system anchoring, guiding or hungering due to its low dead load.
 - Due to multi-movement ability less number. of joints can work instead of more joints.
 - As because in shorter face to face length, Bosoflex NMEJs can provide the maximum movement, so the ultimate product procurement cost is very low.
 - Lower trans shipment cost.
 - Easy to design the systems with the help of NMEJs, so the cost of designing is also low.

Typical Part of the Non-Metallic Expansion Joints

- Flexible Belt Element
- Metallic Frame Element
- Mating Flange Element
- Flexible Element Attachment Flange (Outboard Flange)
- Fixing Bolts and Nuts With Washer.
- Gaskets
- Back-Up Bars
- Flow Liners
- Welded Nuts (Attachment)
- Accumulation Pillows



1. Flexible Belt Element: It is the most vital part of flexible elements it is suitable for withstanding the system pressure, non effective character of system medium and with-standing capacity of system temperature. The most essential properties is its inherent flexibility non-porous construction.

2. Bosoflex S.P. Belt: Flexible element comprises of many segments, according to their type and location of applications. Boson provides the most effective and durable flexible belts in the expansion joints. R&D of Boson are quite capable of innovating and matching the belt element with the critical un-parallel system our customer needs. Flexible belts can be of two types:

- Bosoflex Single Belt
- Bosoflex Composite Belt

a) Bosoflex Single Belt:

Single layer belt comprising of elastomeric/fluoro plastics with re-inforcement.

b) Bosoflex Composite Belt:

Bosoflex offers the composite type of flexi element for application up to 2000°F of temperature.

Bosoflex composite belts comprises of the following.

- Visi-belts elements
- Reinforcement plies
- Retaining plies
- Thermal Insulation: Bosoflex offers the Visi-Belt-200clw-1800 lc series for wet corrosive media duct or pipeline NMEJs.

Bosoflex offer the composite belt plies from 200°C–1200°C. Maximum temperature and corrosive (Wet) media handling application.

VISI-BELT ELEMENT

- 1) EPDM, Neoprene, CIIR, FKM, SL or Fluoro Plastics.
- 2) Aramid, Fibre Glass, Polyester or Ceramic Cloth are used as re-inforcement plies.

Retaining/Thermal Insulation Plies.

- 1) Fibreglass needle mat, ceramic blanket, fiber glass blankets, etc.
- 2) High strength Silica cloth or High strength fiber glass cloth are used.
- 3) Corrosion resistant alloy wire net, SS Wire mesh (Inconel).



2. Metallic Frame Element

It is a fabricated steel part for attachment of NMEJ flexi elements and attachment with the applicable system duct or pipe lines. Bosoflex metal frame are generally manufactured from structural steel profile viz. angle, channel or fabricated from plates as per ISO:2062, Grd. A.

3. Mating (Counter) Flange

It is a steel part, required to fix on system duct/Pipe face of the open (Both) end to assembled the Expansion Joints by Bolting.

4. Flexible Element Attachment Flange (Outboard flange)

It is a flexible element attachment flange and undivided part of the expansion joints frame, depending on the system pressure, the flange width, and thickness varies.

5. Bolts and Nuts

Bolts and nuts are used for tightening the flexible elements with backing (Outboards) flange and Back-up bar, length of the fixing bolts should not be maximum in length unless otherwise the flow liner attached with the same bolts.

6. Gaskets

Gasket is a Non-Metallic element used among the mating (Outboard) flange and flexible element and also between the back up bar and flexible element to safe the belt from hot attachment flange and back up bar. It enhances the flexible element life. Boson provides the sufficient thickness of gaskets with heat resistant and chemical inert property.

7. Back-up Bars

Back-up bars are steel section for attachment of the flexible element to the mating (Outboard) flanges tightly, to restrains the fabric under system pressure and thermal movement. Bosoflex provides the sufficient width and thickness of back-up bars with the radius of edges to restrict the cutting of flexible elements.

8. Flow Liner

Liner sleeve indicates the flow direction of system and it protects the expansion joint's flexible membrane as well as the accumulation pillows from fluttering, abrasion, corrosion and heat effect and also the deposition of flow particles in the expansion joints cavity. Flow Liner can be of Single side or double Side type (telescopic) materials of the sleeve liner depend on the system conditions it can be filled installed or shop installed.



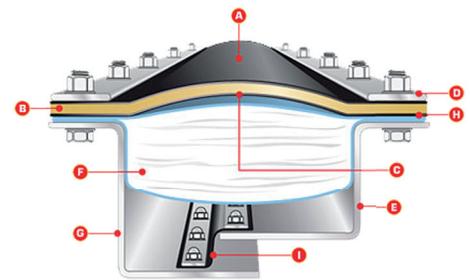
Type of Flow Liner

A) Single sided flow Liner: Single sided flow liner may welded or bolted to the upstream side of the expansion Joint either with duct or with expansion Joint frame and extend to the full width of the working length. Single sided flow liner are generally field welded to the duct or bolted to the upstream flange (counter flange). Single sided flow liner is typically single bended and extend into the duct by an amount required as per system required amount with allowance.

B) Telescopic Flow Liner: Telescopic flow liner are integral part of the expansion joint frame and over the full width working length cross downstream counter flange. Telescopic flow liner designed so that they do not create are a standard feature of 'Z' frame but also can be installed. This is a most advantageous Non-Metallic Expansion Joints frame design and preferred by the engineers in Asia and abroad.

10. Accumulation Pillow

Accumulation pillows are used to protect the flexible membrane from the system's heat and prevent fly ash accumulation in the expansion joint cavity. The insulator/accumulation pillow is comprised of multiple layers of high density mechanically bonded thermal blankets wrapped in a high strength alloy net to meet the system's conditions. The pillow is secured to the frame. By back up bar. In such a fashion to ensure the pillow stays in the proper position after the joint has moved axially or laterally. Without that, the pillow would become compressed and not cover the entire width of the expansion joint cavity, cause hot gas and fly ash will be enter and deposit inside the cavity of expansion joint.



Accumulation Pillow Cover

An accumulation pillow cover contains mechanically bonded insulation blankets wrapped with alloy net. This pillow design for fully fill the expansion joint's cavity to a large protection. Insulation can be easily installed or replace if required easily installed or replaced during an outage.

Accumulation Pillows Materials/Construction

INTERNAL

- Mechanically bonded fiberglass mat for acting 500°C temperature.
- Mechanically bonded ceramic needle mat for acting above 500°C temperature.

EXTERNAL

- Typical tight woven gas fiberglass or FKM coated cloth.
- Aluminum laminated fiberglass cloth for above 500°C temperature.
- Stainless steel wire mesh can be used with these materials (Inconal grid)

Non-Metalic Expansion Joint Frames: Frame is a part which holds the flexible belts Such a way so it can act smoothly, other hand it is a essential part for fixing the NMEJ. With the counter flanges/system duct/pipe directly. This frame can be of two types either stitch on line or bolt on flange type its depend on the system design and the requirement of the applications some of the conventional Bosoflex designs are bellows.

Economy Frame Design: Bosoflex Angle frames are low cost solution than the other type of frames this type of frame can be either line profile or stand of type it made from the standard angles or from plates depending on the applications also flow liner may or may not be attached. The installation cost is very low. Economy angle frame can be supplied In fully assembled condition.

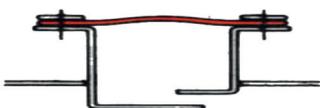
'Z' Frame Design: Bosoflex 'Z' frames are commonly use as Non-Metalic Expansion Joints frame work because It is easy to install, this type of frame has both side flow liner in built (Telescopic) no additional precaution is required to attach the flow liner with the frame. In high and low both the temperature with highly loaded flow media duct or pipeline application purpose, it is the best choice by the plant engineers. This type of expansion joints can be of stitch on type or Bosoflex specially designed bolt on type.

'J' Frame Design: Bosoflex 'J' Frame design Non-Metalic Expansion Joint Frame have a integral part of outer bore (fabric attachment plants) with shock welded or field welded liner sleeve, these type of liner can be in single piece or in double piece (telescopic) also maybe arrangement for Bosoflex special attached accumulation pillows.

'U' Frame Design: Bosoflex 'U' frames are fabricated with structural channels or plates as design requirement, maybe either shock installed or field installed including liner sleeve this type of frame provide the maximum support to the duct/pipe open face.

'Recovery' Frame Design: Bosoflex Recovery frame can be installed on the existing Metallic/NMEJs, without need to remove the old one. On existing equipment permissible system required Fabric/Non-Metallic Expansion Joints with or without accumulation pillows/flow liner sleeves can be used for maximum lives.

BOSOFLEX SPECIAL DESIGN OF NON-METALLIC EXPANSION JOINTS FRAME/FLOW LINER/OUT BOARD FLANGE AND TYPICAL ARRANGEMENT OF NON-METALLIC EXPANSION JOINTS.



TYPICAL ARRANGEMENT OF BOSOFLEX NON-METALLIC EXPANSION JOINTS

