Product brochure

EagleBurgmann®
expansion joint solutions

Fabric expansion joints

EagleBurgmann®

expansion joint solutions

Value engineering raised on global experience

Over 50 years of challenges in the expansion joint industry proves that EagleBurgmann KE is one of the world's most experienced and innovative expansion joint manufacturers.

Experience is sourced from all continents and various market sectors to provide our customers with the latest technologies and solutions.

Metal and fabric expansion joints are flexible connections, installed in piping and ducting systems to accommodate expansion and vibration caused by changes in temperature, pressure and media comprise.

EagleBurgmann KE's major focuses:

- Value engineering to decrease operational downtime
- Lean manufacturing to reduce costs
- 3D smart design to maximize overall service life

EagleBurgmann KE's comprehensive service:

- Evaluations and troubleshooting
- Initial dimensional measurements
- Installation and refurbishment
- Supervision and training
- Plant surveys
- Emergency services
- Final inspection by experienced Service Engineers

EagleBurgmann KE is approved to:

- PED 97/23/EC
- ISO 3834-2
- ISO 9001
- ISO 14001
- OHSAS 18001
- ASME U Stamp
- ASME R Stamp
- Other approvals are available upon customer request

EagleBurgmann KE is a respected member of:

- The European Sealing Association (ESA)
- Fluid Sealing Association (FSA)
- Expansion Joint Manufacturers Association (EJMA)
- Euro-Qualiflex

EagleBurgmann KE is proud of the appreciation given from hundreds of customers around the world.

EagleBurgmann KE's global manufacturing footprint:

- Europe
- Americas
- South East Asia
- India

We have a worldwide sales network supported by EagleBurgmann and Freudenberg offices.

www.eagleburgmann-ej.com

EagleBurgmann
expansion joint solutions

Introduction

Fabric expansion joints

are vital components in most industrial plants. They are installed as flexible connections in duct and piping systems to take up or compensate for thermal expansion, vibration and/or misalignment.

Selecting the right expansion joint for your system is important toward ensuring reliable operation. A properly designed and installed expansion joint can ensure uninterrupted plant performance between scheduled maintenance shutdowns.

Fabric expansion joint advantages:

- Compensates for movements in several directions simultaneously
- Minimal reactive forces
- Advanced insulation design ensures minimal heat loss
- Reduced surface temperature on the outer layer during operation to protect site personnel
- Requires little space for installation
- Easily adapts to existing physical conditions
- Easy to transport

By combining different materials and taking into consideration the thermal, chemical and mechanical resistance as well as the fatigue properties of the material, our designers provide the optimum solutions both technically and economically.

Fabric expansion joints are commonly used in power plants, FGD, cement, incineration, pulp & paper, petrochemical, metal fabrication, food processing, etc.

Fabric expansion joints are easy to transport.

Fabric expansion joints requires little space for installation.

High temperature expansion joints may be designed to reduce surface temperature.

Test & Quality Inspection

Raw materials, semi-finished products and complete expansion joint constructions undergo both general and comprehensive tests and control procedures.

These tests and control procedures include recognized standard tests according to DIN norms etc. and more advanced tests which simulate the actual conditions, under which the expansion joint construction must operate.

Entry control

plays an important role in ensuring that the quality of expansion joints is constantly maintained at the highest possible level.

EagleBurgmann KE has in-house capabilities to test:

- flexibility
- temperature resistance
- tensile, abrasive and tear strength
- mechanical strength
- chemical resistance
- heat convection
- recovery rate after compression
- fibre size and number
- weaving and the strength of same

The chemical resistance of our products are verified using our in-house test rig where the material is exposed to concentrated aggressive media in an accelerated environment. The tested material is then checked carefully to determine what damage (if any) the material has sustained.

Fabrics that are exposed to high temperatures must maintain their mechanical properties to a certain extent. These materials are therefore subjected to high temperature for a specific period of time and then tested to ensure that their mechanical properties are retained within an acceptable level.

In-house lifetime simulation

can be performed on request by EagleBurgmann KE developed test equipment. Lifetime can be simulated on our high cycle fatigue or low cycle fatigue movement simulator. The simulator will test expansion joint units in axial or lateral direction, and test the material to a total of 100.000 movements.

Application technology

i.e. to know the requirements imposed on an expansion joint from different processes and industries, play a major role in order to design the right expansion joint.

Based on our test and research results, we are able to document the operational reliability and lifetime of an expansion joint for a given application. We also carry out customer-specific tests.

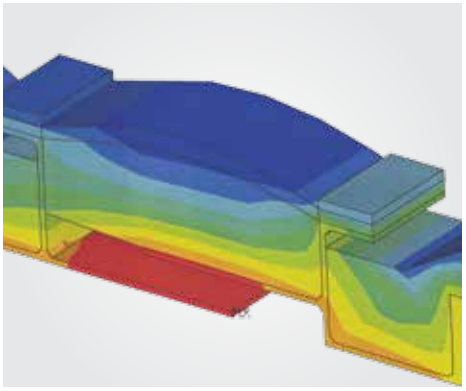
By default, all expansion joint constructions can be tested with regard to:

- flexibility rate of the expansion joint type
- leakage rate of the expansion joint type
- sound insulation properties of the expansion joint
- temperature distribution (heat/energy loss) through the expansion joint
- FEM (Finite Element Method) of expansion joint and steel parts with regard to life and fatigue

Each product undergo final inspection before being shipped from the factory ensuring that the delivered product lives up to customer expectations.

Low cycle fatigue test rig.

High cycle fatigue test rig.



Result of FEM analysis.

Criteria for Applications & Design

Which type of expansion joint
to use and its design is based on some fundamental considerations.

It is necessary to state operating data and other conditions as detailed as possible to ensure maximum operating reliability.

Place and conditions of installation
must be considered before choosing the expansion joint design. Is the place of installation easily accessible, or is scaffolding, a crane or other equipment required to install the expansion joint?

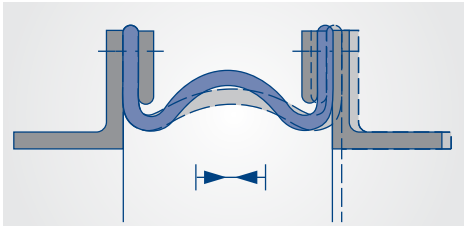
Movements
alone or in combinations, are taken up by fabric expansion joints:
- axial compression
- axial elongation
- Angular offset
- Lateral offset
- torsion

The size and frequency of movements will affect the choice of expansion joint. For large movements, convoluted and expansion joints with scissor control guides are recommended. They ensure controlled movements and prevent damage to the fabric or heat pockets from occurring.

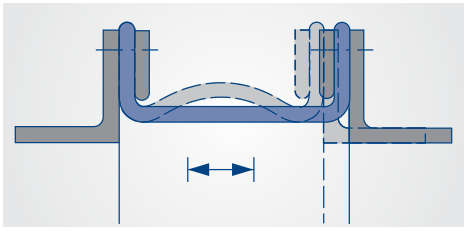
Mechanical loads
Fabric expansion joints are also able to take up:
- vibrations
- structural-borne noise

Essentially, the following should be considered:
- overstretching
- friction along the sleeve
- presetting
- combination of movements

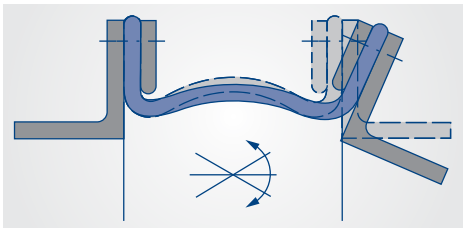
Pressure
will affect the design (type of fabric and number of layers). The following distinctions are made:
- positive pressure (normal, peak)
- negative pressure (normal, peak)
- variations of pressure (pulsations)
- pressure surges
- design/operating pressure



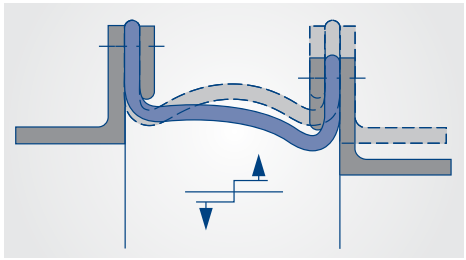
Axial compression



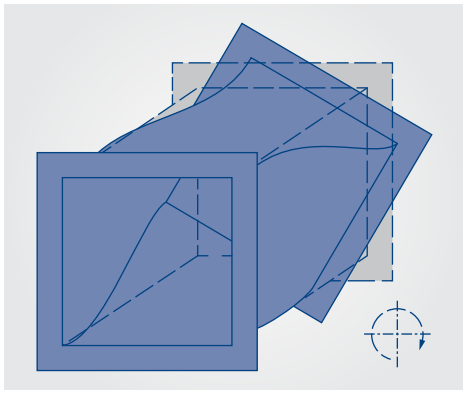
Axial elongation



Angular offset



Lateral offset



Torsion

Flow rates
determine if a sleeve may be recommended. For higher flow rates an insertion of a sleeve is necessary for the functionality of the expansion joint.

Medium
represents an important decision factor in choosing the type of expansion joint and the configuration. Typical media that fabric expansion joints will get subjected to are:

Air
- clean
- dust content
- chemical load by acids, solvents, etc.

Flue gases
- from coal, oil, gas firing etc.
- analysis of the flue gas
- humidity
- contents of soot or fly ashes
- flushing/washing of ducts

Leakage requirements
may be necessary, according to the application area and the medium. In principle, a distinction is made between the tightness of the expansion joint and the tightness of the flange area. Single-layer expansion joint can be made 100% gas tight with appropriate sealing, but multi-layer expansion joint will always have a certain lekage through the flange area. Pressure and temperature will also affect the leakage as both high temperature and high pressure will result in higher leakage in the flange area for mulitilayer expansion joints.

The following requirements can be made:
- nekal tightness
- flue gas tightness

Solid matter
might contaminate the medium which will influence both the design and the construction. In principle, the expansion joint should be protected from abrasive media.

The main considerations concerning solid matters are:
- content (mg/Nm^3)
- grain size (µm)
- arrangement of duct (horizontal, vertical, diagonal)
- direction of flow (upwards, downwards)
- flow rate

Temperature

has important influence on the design, the type and the construction. The outer cover materials are protected from thermal damage by insulating layers, the thickness and numbers of which are depending on the temperature.

The most important values to consider are:

- operating temperature
- excursion temperature
- variations in temperature
- design temperature
- ambient temperature

External influences

Ambient temperature

The design of expansion joints is usually based on a given ambient temperature. Higher ambient temperatures are met by adjusting the insulation thickness accordingly.

Weathering

Cover plates have proved as a suitable measure against the influences of rain, snow, sand storms etc. These plates may also serve as a protection against contact.

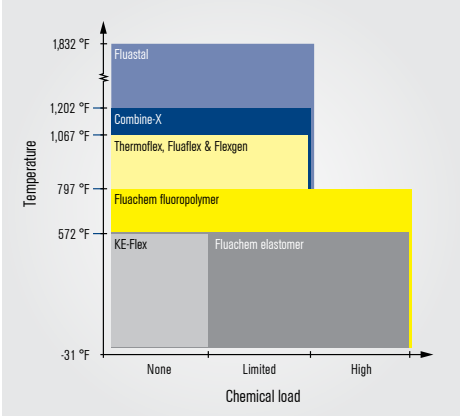
Temperatures below dew point

may occour if the plant is stopped, or if it is operating at a partial load, depending on the process used. The arising humidity results in an increased chemical load on the expansion joint and the duct work as well.

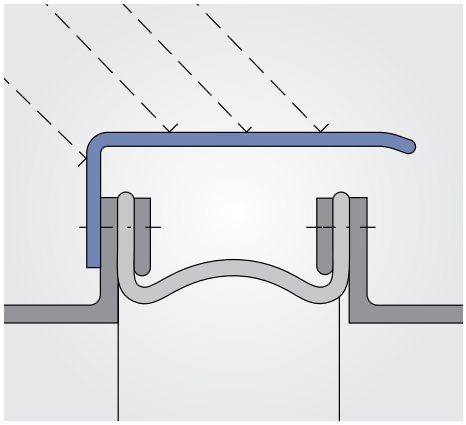
Insulation of the expansion joint can be an efficient measure to prevent the temperature from constantly falling below the dew point.

Temperatures below dew point will influence:

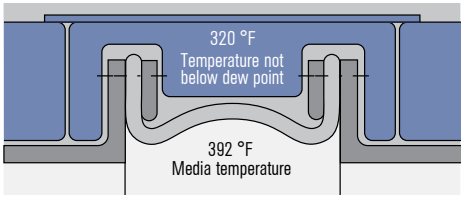
- the choice of material
- the design of the flange area
- the construction



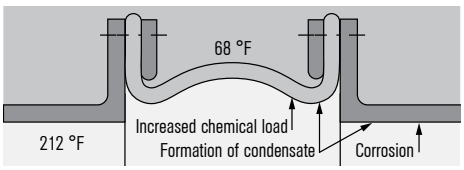
Temperature and chemical load range of standard fabric products.



Expansion joint with cover plate.



Expansion joint with outside insulation.



Expansion joint without outside insulation.

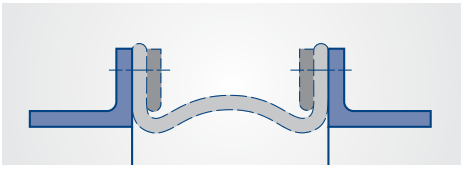
Basic Configuration

Clamping configurations

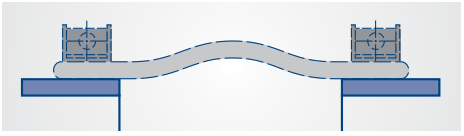
such as a belt or flanged expansion joint is chosen based on the pipe/duct connections. There are three typical types of clamping configurations that may employ one of the above constructions:

- Belt expansion joint configuration (P-flange)
- Vertical flange expansion joint configuration (V-flange)
- Extended belt expansion joint configuration with bolster (PFH-100)
- Combination type expansion joint configuration

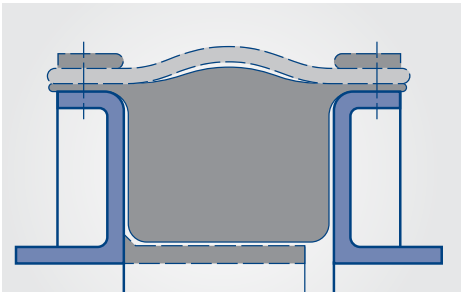
Whether the duct cross-sections are round or rectangular with rounded corners, the fabric expansion joint can be designed accordingly. The fabric expansion joints can also be designed to bridge between round and rectangular ducts.



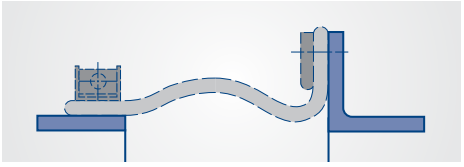
Vertical flange connection on duct level



Belt connection directly on duct



PFH-100 belt configuration



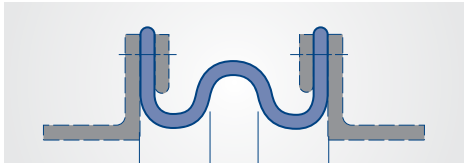
Belt/vertical flange connection

Basic forms of expansion joints

are chosen according to the application.

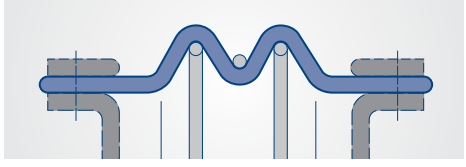
Which configuration is chosen for the finished expansion joint is dependent on the operating conditions, such as temperature, pressure, motion, flow rate, medium, etc.

Each configuration has certain advantages relating to absorbing movements, temperature resistance and ease of installation.

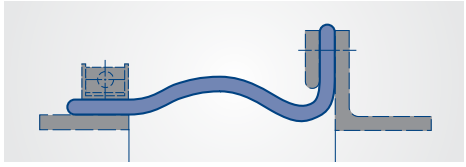


Flanged convoluted expansion joint

Flat belt expansion joint



Convoluted bellows expansion joint (belt connection)



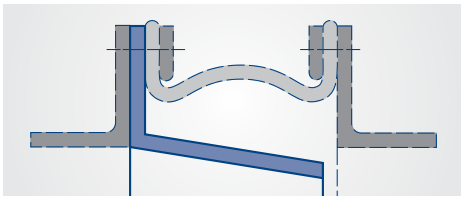
Belt/flanged expansion joint

Sleeve constructions

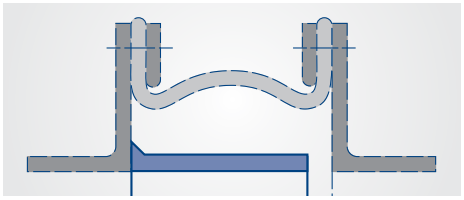
are recommended in most cases and ensures:

- better flow efficiency
- mechanical protection against abrasion
- prevention of duct accumulation
- fixation of expansion joint insulation

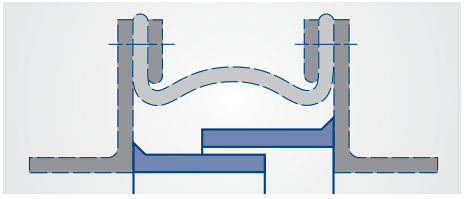
If expansion joints are used without sleeve constructions, their design must be equally more resistant to abrasive particles and mechanical loads.



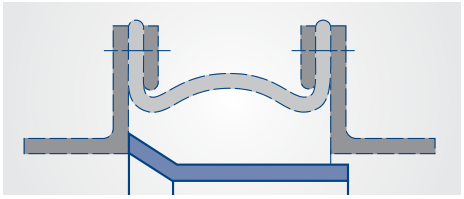
Single sleeve fitted with the expansion joint



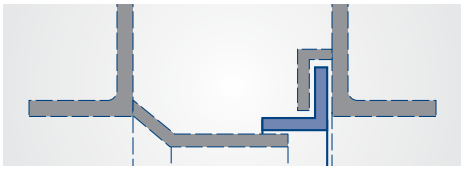
Single sleeve welded to the duct end



Double sleeve with overlap



Inner sleeve



Floating sleeve

Insulation / bolsters

- reduce the temperature of the sealing and thermally sensitive layers
- protect the expansion joint from fly ash etc.
- support the expansion joint in case of pulsations in the duct
- reduce noise

There are three types of insulating techniques:

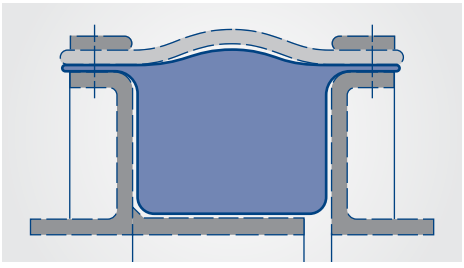
1. insulation integrated in the expansion joint layers
2. an insulation bolster bag, i.e. insulation materials protected by wire mesh or glass fabric, forming a unity with or without flanges
3. loose insulating materials resting between the expansion joint and the sleeve

Refractory lining

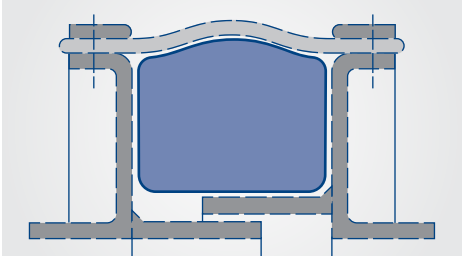
protects the duct at very high temperatures. Refractory lining is a layer of highly temperature resistant material attached to the inside of the duct, which protects the duct against thermal and mechanical wear of the flow medium.

Fastening elements

are used to fit the expansion joint to the duct end. For less complicated expansion joints (e.g. belt types), clamping bands may be sufficient. The higher the requirements are with regards to pressure, temperature, tightness etc., the more sophisticated the fastening method will be.



Bolster with flanges fitted as part of the expansion joint.



Bolster filling out the gap between expansion joint and sleeve.

Stainless steel clamping band.

Backing flange.

Standard Designs

Single-layer expansion joints

consist of one material layer only. Depending on the working conditions, the layer is manufactured from either fabrics, various fluoroelastomers, or fluoropolymers with fabric reinforcement as composite materials.

Single-layer expansion joints offer the utmost tightness and chemical resistance as is required when exposed to heavy condensate and aggressive medias. EagleBurgmann KE supplies both the PTFE-based fluoropolymers and the original virgin (FKM) fluoroelastomers, specifically designed for applications in flue gas cleaning systems.

Multi-layer expansion joints

are designed with carefully selected layers and comprises four groups of materials:

Outer cover material
Acts as supporting layer (especially for the gas-tight foil) and protects the inner layers against weathering and mechanical impact from the outside. In most cases the material is coated or laminated and may also function as gas sealing barrier. Stainless steel wire mesh and steel bands are further used for special designs to give added mechanical protection and dimensional stability.

Gas-tight foil
is the sealing layer that ensures gas tightness of the expansion joint. It is usually imbedded between fabric layers or integrated in the outer cover. It is impermeable and chemically resistant.

Insulating materials
protect both the gas sealing foil and the other expansion joint layers from high media temperatures.

Temperature-resistant fabrics
are used to protect the gas sealing foil and/or the insulation materials.

Which design of expansion joint

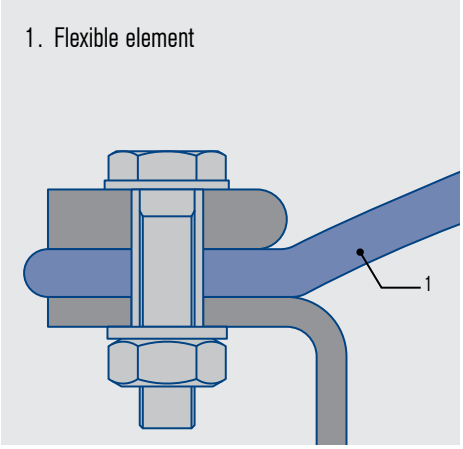
is best suited, depends on a number of factors, such as size of the duct cross-section, site conditions, sleeve construction, type of application etc.

Fabric expansion joints may be supplied as:

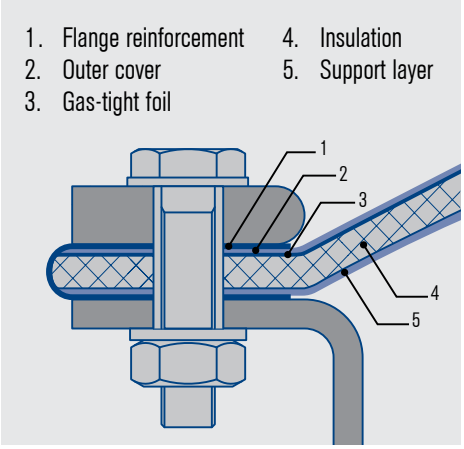
Closed type
- for vertical flanges and flat belt connections
- accurate dimensions required
- usually supplied with pre-punched holes
- steel components may be supplied separately

Open type
- closed on site
- not usually supplied with holes
- ideal for stockkeeping as spare parts
- quick replacement and assembly in case of damage

Expansion joint units
- Installation into the duct is simple and quick
- Transport brackets hold the unit in place during transport and installation
- Large units are transported in sections and welded on-site, for easier transportation and installation.

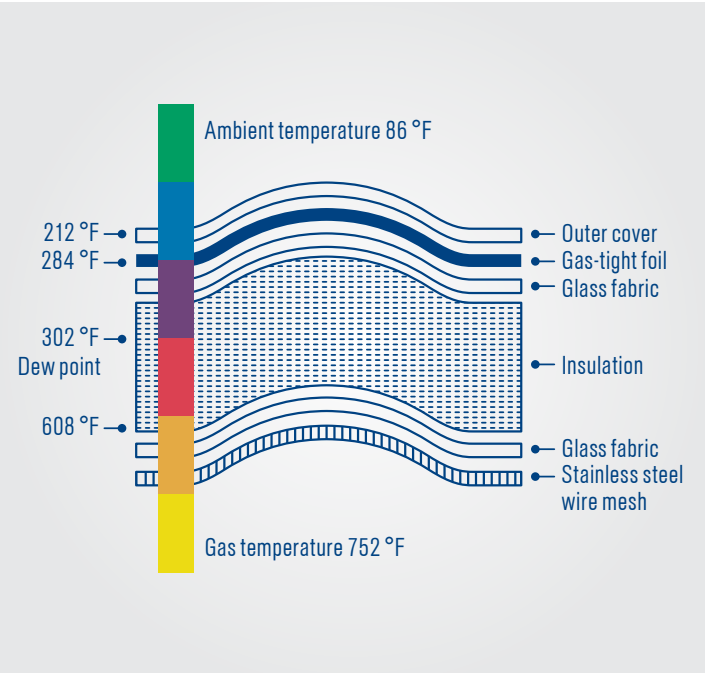


Single-layer expansion joint.

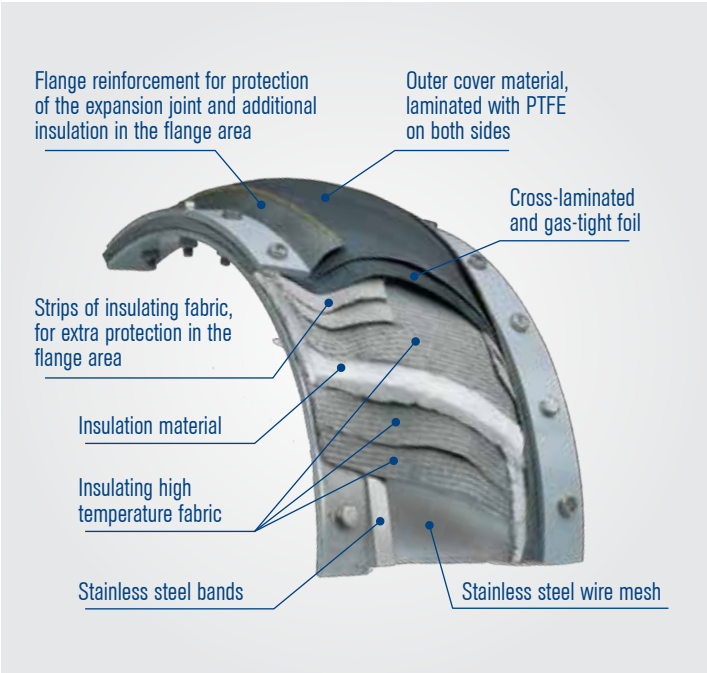


Multi-layer expansion joint.

Open type multi-layer expansion joint.



Temperature gradient and flow in a multi-layer expansion joint.



Layers in a multi-layer expansion joint.

Product Types

KE-Flex

is a single-layer expansion joint designed to be installed in low temperature ducting with no or relatively unaggressive media.

The KE-Flex product line is available in a range of fabrics, plastics and elastomers. They can be provided with rings or reinforced fabrics for stabilization of pressure loads. KE-Flex is supplied with sewn-in or loose clamping bands or a V- or P-flange construction.

This product line is the ideal choice for a wide range of applications including:

- vibrating equipment
- food processing
- heating and ventilation (HVAC) systems
- separators
- powder and granulate conveyor systems

Fluachem

are single-layer expansion joints available in elastomer and fluoropolymer. The choice of material depends on the pressure, temperature and chemical load the expansion joint will be exposed to. Both product types are very flexible, have low reactive forces, can withstand high mechanical loads and are completely gas tight solutions.

They are available for flange and belt connections, for round and rectangular duct cross-sections and in any dimension. The Fluachem products can be delivered with a pre-installed drain nozzle, which allows for drainage through the expansion joint in moist conditions.

Fluachem expansion joints are mostly used without insulation. For better flow and abrasion resistance, it is recommended to install a sleeve in combination with the expansion joint. They are very easy to install.

Fluachem Fluoroelastomer

is an elastomeric product, made from FKM/EPDM, for high pressure and low temperature applications, with the option of fiber reinforcement.

The elastomers are highly durable, resistant to acids and can withstand high mechanical loads and pulsations. The elastomer products will form a self-sealing connection to the duct without a gasket.

Fluachem Fluoropolymer

is a glass fabric reinforced PTFE expansion joint for installation in chemically aggressive, medium temperature applications.

The core of these expansion joints is very strong glass fabric, protected on one side by a PTFE-based coating and on the inside by a PTFE foil. This material structure ensures excellent strength, great flexibility, and excellent chemical resistance.

The Fluachem products are often installed in:

- FGD plants
- petrochemical plants
- oil refineries

KE-Flex operating limits	
Temperature:	−31 ... +572 °F
Pressure range:	−3.63 ... 3.63 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 3”

See page 17 for further technical details

Fluachem Fluoroelastomer operating limits	
Temperature:	−31 ... +572 °F
Pressure range:	−5 ... 5 PSI
Maximal axial movements:	... 6”
Maximal lateral movements:	... 1.5”

See page 18 for further technical details

Fluachem Fluoropolymer operating limits	
Temperature:	−31 ... +797 °F
Pressure range:	−2.9 ... 2.9 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 1.5”

See page 18 for further technical details

KE-Flex installed in an air duct.

Fluachem Elastomer installed in a horizontal duct.

Fluachem Fluoropolymer installed in a vertical duct.

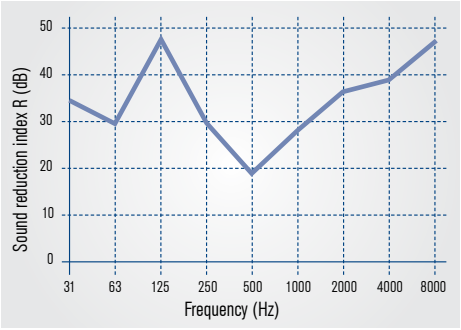
Acouseal

expansion joints are constructed from a single-layer of EPDM rubber material that has proven to have excellent sound reducing properties. EagleBurgmann KE has tested the sound reducing properties of our expansion joint designs and material selection and the results have been verified by the Danish Technological Institute.

The self-sealing property of the EPDM rubber ensures a 100% gas tight solution without the use of gaskets.

Acouseal expansion joints are typically installed in:

- Gas turbine air inlets



Sound insulation index of Acouseal

Combine-X

is a multi-layer expansion joint. It is specifically designed for gas turbine exhaust systems with high operating temperatures, very high gas velocities and pulsating gas flows.

Specially designed steel components and sleeve constructions ensure extremely good functionality and high operating reliability. The expansion joints are often delivered as a preassembled unit, which ensures that both the expansion joint and the steel frame designs are optimized for a long lifecycle of the unit.

Increasing demand to reduce sound emission from gas turbine systems has caused EagleBurgmann KE to develop a model for calculating the optimal design according to site specific intensity of sound pressure.Tests were performed in co-operation with and documented by third party, DELTA Danish Electronics, Light & Acoustics.

Combine-X expansion joints are typically installed in:

- diffuser inlet and outlet
- diverter
- bypass
- boiler inlet

Fluastal

is the optimal expansion joint for extreme environments where high temperatures and high dust loads occur. It is a multi-layer expansion joint, designed with stainless steel wire mesh and bands on the gas side to ensure high form stability and temperature resistance.

The Fluastal product line is available in an easy-to-install option with either a silicone coated outer cover or the more temperature resistant PTFE based outer cover material.

Due to the internal layer of wire mesh, Fluastal products are able to withstand higher dust loads and are suitable for working in applications, where internal refractory lining is required.

Fluastal expansion joints are typically installed in:

- cement plants
- incineration plants
- conventional power plants.
- gasturbine systems
- smelting works
- petrochemical plants

Acouseal operating limits

Temperature:	–31 ... +302°F
Pressure range:	–1.45 ... 1.45 PSI
Maximal axial movements:	... 1”
Maximal lateral movements:	... 0.5”

See page 19 for further technical details

Combine-X operating limits

Temperature:	–31 ... +1202 °F
Pressure range:	–2.03 ... 1.02 PSI
Maximal axial movements:	... 6.5”
Maximal lateral movements:	... 3”

See page 20 for further technical details

Fluastal operating limits

Temperature:	–31 ... +1067 °F
Pressure range:	–2.9 ... 2.9 PSI
Maximal axial movements:	... 6.5”
Maximal lateral movements:	... 3”

See page 21 for further technical details

Acouseal installed in gas turbine air inlet.

Installation of Combine-X on diffuser.

Fluastal exposed to lateral movement in horizontal duct.

Fluaflex, Flexgen and Thermoflex

are simple, yet durable and strong multi-layer expansion joints with unique thermal, chemical and mechanical properties. They are designed to be installed in air and flue gas ducts where the expansion joints typically are exposed to dry and chemically aggressive environments.

The multi-layer construction uses a PTFE based material as the gas sealing layer and various insulating layers depending on the working condition of the expansion joint.

The high flexibility of the materials used for the individual layers ensures a compact design for installation, which is beneficial where limited space is available.

The multi-layer design helps reduce the temperature of the sealing layer to an acceptable level and also reduces the outside temperature of the expansion joint to ensure safety of the personnel working close to the installation.

They are available with two cover options; an option with an easy-to-assemble silicone outer cover or an option with a more chemical and temperature resistant PTFE coated/laminated outer cover.

Fluaflex, Flexgen and Thermoflex offer excellent flexibility and can be designed for a large temperature span and various types of movements for different applications.

Fluaflex, Flexgen and Thermoflex are typically found in:

- conventional power plants
- gas turbine plants
- incinerator plants
- cement works
- petrochemical plants
- pulp and paper plants

Fluaflex operating limits

Temperature:	–31 ... +1,067 °F
Pressure range:	–2.9 ... 2.9 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 3”

See page 22 for further technical details

Flexgen operating limits

Temperature:	–31 ... +1,067 °F
Pressure range:	–2 ... 2 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 3”

See page 23 for further technical details

Thermoflex operating limits

Temperature:	–31 ... +1,067 °F
Pressure range:	–2.9 ... 2.9 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 3”

See page 24 for further technical details

Fluaflex expansion joints being installed in boiler air intakes.

Flexgen expansion joints installed as pipe penetration seals.

Thermoflex expansion joints as a pre-assembled units.

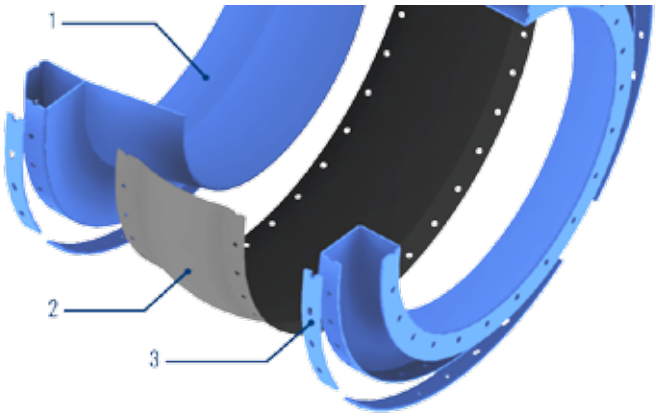
EagleBurgmann
expansion joint solutions

Technical Product Data

KE-Flex

Item description

1. Expansion joint
2. Frames
3. Clamp bar



Features

- Single-layer design
- Compensates for movements in several directions simultaneously
- Can be delivered as fabric only or preassembled unit
- For dry and wet condition*
- Custom made to fit actual working conditions

Advantages

- Highly flexible
- Minimal reaction forces
- Suitable for food processing*
- 100% gas tightness*

Operating range

Temperature:	–31 ... +572 °F
Pressure range:	–3.63 ... 3.63 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 3”

Functional description

KE-Flex safely absorb thermal expansion, vibrations and misalignments in pipe and duct systems in low temperature areas. KE-Flex compensate for movements in multiple directions simultaneously.

Options

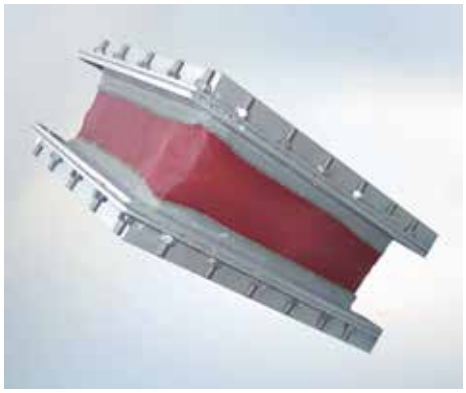
V-flange with single sleeve
Temperature: ... 392 °F
Media with low to medium dust content

P-flange with sewn-in clamps
Temperature: ... 392 °F
Media with low dust content

**Depending on material selection*

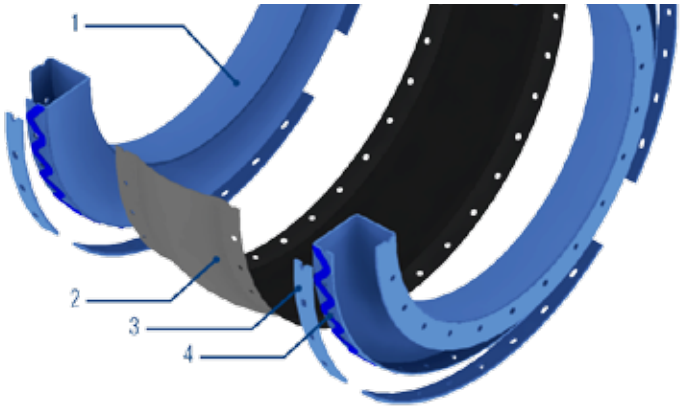
Type	Media		Max. temperature			Min. temp.	Pressure		Flexibility	
	Aggressive	Non-aggressive	P-flange	V-flange	PFH-100		Max.	Min.	Axial	Lateral
PA-600	N/A	Dry	158 °F	158 °F	338 °F	-22 °F	2.03 psi	-2.03 psi	50%	20%
PA-1500	N/A	Dry	158 °F	158 °F	338 °F	-22 °F	3.63 psi	-3.63 psi	50%	20%
NPG	N/A	Dry	230 °F	230 °F	410 °F	-22 °F	2.9 psi	-2.9 psi	50%	20%
Aluglas	N/A	Dry	356 °F	356 °F	536 °F	-31 °F	2.9 psi	-2.9 psi	50%	20%
SIC-S	N/A	Dry	356 °F	356 °F	536 °F	-31 °F	1.45 psi	-1.45 psi	50%	20%
Alusil 1100	N/A	Dry	392 °F	392 °F	572 °F	-31 °F	2.9 psi	-2.9 psi	50%	20%
Silaramid 1500B	N/A	Dry	392 °F	392 °F	572 °F	-31 °F	2.9 psi	-2.9 psi	50%	20%
SKE-700 DB	N/A	Dry	392 °F	392 °F	572 °F	-31 °F	2.9 psi	-2.9 psi	50%	20%
VITON 700	N/A	Dry	392 °F	392 °F	572 °F	14 °F	2.9 psi	-2.9 psi	50%	20%
PUR-foil	N/A	Dry	176 °F	176 °F	356 °F	-22 °F	1.45 psi	-1.45 psi	50%	20%
NITRIL 235	Dry	Wet	248 °F	248 °F	428 °F	-22 °F	0.73 psi	-0.73 psi	50%	20%
NITRIL 600	Dry	Wet	248 °F	248 °F	428 °F	-22 °F	1.45 psi	-1.45 psi	30%	15%
EPDM 235	Dry	Wet	248 °F	248 °F	428 °F	-31 °F	0.73 psi	-0.73 psi	50%	20%
EPDM 600	Dry	Wet	248 °F	248 °F	428 °F	-31 °F	1.45 psi	-1.45 psi	30%	15%
FKM 200	Dry	Wet	392 °F	392 °F	572 °F	5 °F	0.73 psi	-0.73 psi	30%	15%

Fluachem



Item description

1. Metal frames
2. Expansion joint
3. Clamp bar
4. Gasket



Features

- Single-layer design
- Compensates for movements in several directions simultaneously
- Can be delivered as fabric only or as preassembled drop in unit
- For dry and wet condition
- Custom made to fit actual working conditions

Advantages

- Highly flexible
- Excellent chemical resistance
- Minimal reaction forces
- Excellent abrasion resistance (Depending on material selection)
- 100% gas tightness

Operating range

Temperature:	–31 ... +797 °F
Pressure range:	–5 ... 5 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 1.5”

Functional description

Fluachem expansion joints safely absorb thermal expansion, vibrations and misalignments in pipe and duct systems in chemical aggressive areas. Fluachem products compensate for movements in multiple directions simultaneously.

Options

V-flange/P-flange (fluoroelastomer)
Temperature: ... 392 °F
Medium to high flow velocity
Media with medium dust content

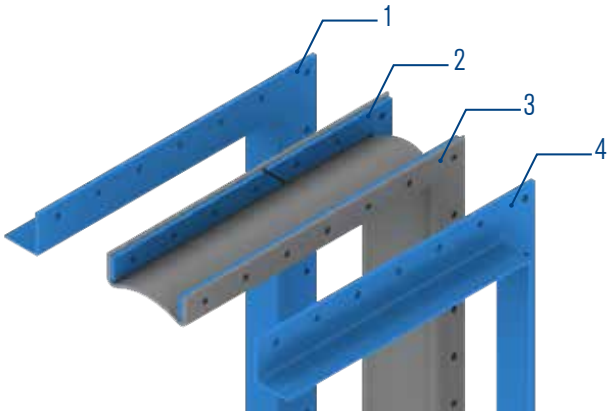
V-flange/P-flange (fluoropolymer)
Temperature: ... 572 °F
Medium to high flow velocity
Media with low to medium dust content

Type	Media		Max. temperature			Min. temp.	Pressure		Flexibility	
	Aggressive	Non-aggressive	P-flange	V-flange	PFH-100		Max.	Min.	Axial	Lateral
Butyl 600GS	Wet	Wet	176 °F	176 °F	356 °F	-31 °F	5 psi	-5 psi	25%	13%
EPDM 400G	Wet	Wet	248 °F	248 °F	428 °F	-31 °F	5 psi	-5 psi	35%	18%
EPDM 600GG	Wet	Wet	248 °F	248 °F	428 °F	-31 °F	5 psi	-5 psi	25%	13%
EPDM 600S	Wet	Wet	248 °F	248 °F	428 °F	-31 °F	5 psi	-5 psi	25%	13%
FKM 320G	Wet	Wet	392 °F	392 °F	572 °F	-13 °F	2.9 psi	-2.9 psi	35%	18%
FKM 350S	Wet	Wet	392 °F	392 °F	572 °F	-13 °F	5 psi	-5 psi	25%	18%
FKM 450GS	Wet	Wet	392 °F	392 °F	572 °F	-13 °F	5 psi	-5 psi	30%	15%
FKM 600GG	Wet	Wet	392 °F	392 °F	572 °F	-13 °F	5 psi	-5 psi	25%	13%
FKM 600GS	Wet	Wet	392 °F	392 °F	572 °F	-13 °F	5 psi	-5 psi	25%	13%
C	Wet	Wet	518 °F	518 °F	752 °F	-31 °F	2.9 psi	-5 psi	50%	20%
O	Wet	Wet	518 °F	518 °F	752 °F	-31 °F	2.9 psi	-5 psi	50%	20%
HD	Wet	Wet	572 °F	572 °F	797 °F	-31 °F	2.9 psi	-5 psi	50%	20%

Acouseal

Item description

1. Duct flange
2. Clamp bar
3. Expansion joint
4. Duct flange



Features

- Single-layer design
- Designed for acoustic demanding environment in GT inlets
- Absorbs movements and vibrations in multiple directions
- 100 % gas tight connection
- Excellent and proven sound reducing properties

Operating range

Temperature:	–31 ... +302 °F
Pressure range:	–1.45 ... 1.45 PSI
Maximal axial movements:	... 1”
Maximal lateral movements:	... 0.5 ”

Options

V-flange with single sleeve
Temperature: ... 302 °F
For high flow velocity

Advantages

- Delivered pre-shaped at required dimensions
- Can upon request be delivered with pre punched holes for easy installation
- Proven sound reduction abilities
- Improved acoustic environment in GT inlet system
- Easy transportation and storage
- Self-sealing expansion joint (no gasket needed during installation)

Functional description

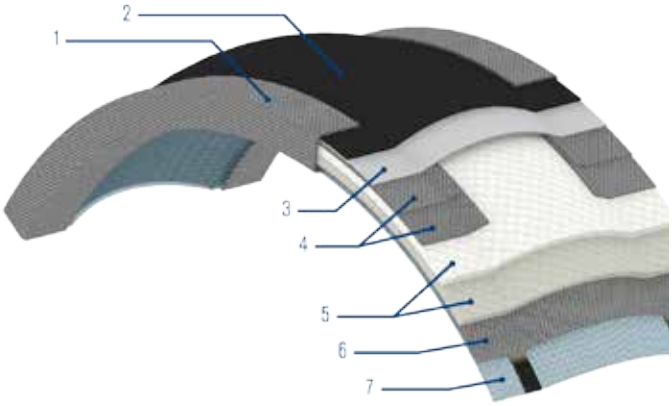
Acouseal expansion joints safely absorb thermal expansion, vibrations and misalignments in sound sensitive pipe and duct systems. Acouseal expansion joints compensate for movements in multiple directions simultaneously.

Type	Media		Max. temp. V-flange	Min. temp.	Pressure		Flexibility	
	Aggressive	Non-aggressive			Max.	Min.	Axial	Lateral
150/8	Dry	Wet	302 °F	-31 °F	1.45 psi	-1.45 psi	20%	10%

Combine-X

Item description

1. Flange reinforcement
2. Pressure carrying layer
3. Gas seal layer
4. Insulation strips
5. Insulation
6. Support layer
7. Mechanical reinforcement



Features

- Multi-layer design
- Compensates for movements in several directions simultaneously
- Excellent form stability
- Can be delivered as fabric only or as preassembled unit
- Custom made to fit actual working conditions
- Specifically designed for gas turbine systems

Advantages

- Highly flexible
- High chemical resistance
- High flutter resistance
- Reduce heat loss
- Low reaction forces
- Good resistance against abrasion
- Suitable for high temperature applications

Operating range

Temperature*:	–31 ... +1,202 °F
Pressure range:	–2.03 ... 1.02 PSI
Maximal axial movements:	... 6.5”
Maximal lateral movements:	... 3”

** Temperatures above 1,382 °F requires internal duct insulation or refractory lining.*

Functional description

Combine-X expansion joints safely absorb thermal expansion and misalignments of pipe and duct systems in dry, high temperature and high velocity area. Combine-X products compensate for movements in multiple directions simultaneously.

Options

Cold-to-hot with floating sleeve and bolster
Temperature: ... 1,112 °F

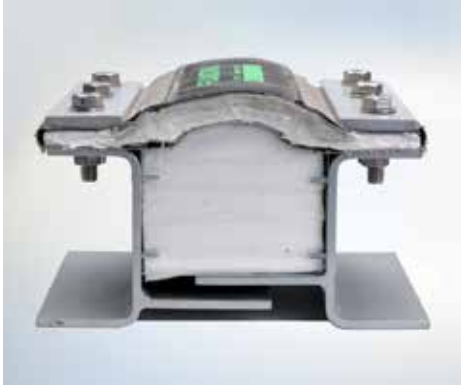
Cold-to-cold with bolster
Temperature: ... 1,202 °F

Hot-to-hot with bolster
Temperature: ... 1,112 °F

Hot-to-hot, high velocity with bolster
Temperature: ... 1,112 °F

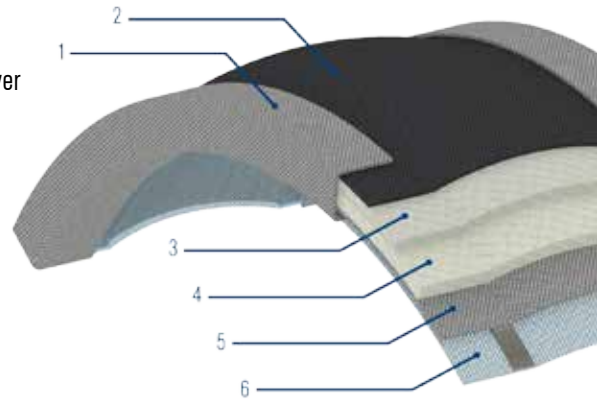
Type	Media		Max. temp. P-flange	Min. temp.	Pressure		Flexibility	
	Aggressive	Non-aggressive			Max.	Min.	Axial	Lateral
A	Dry	Dry	1,022 °F	-31 °F	1.02 psi	-2.03 psi	40%	20%
B	Dry	Dry	932 °F	-31 °F	1.02 psi	-2.03 psi	35%	13%
CC*	Dry	Dry	1,202 °F	-31 °F	1.02 psi	-2.03 psi	50%	20%
E	Dry	Dry	1,112 °F	-31 °F	1.02 psi	-2.03 psi	35%	13%
G	Dry	Dry	1,112 °F	-31 °F	1.02 psi	-2.03 psi	40%	15%
R	Dry	Dry	1,112 °F	-31 °F	1.02 psi	-2.03 psi	35%	13%
V	Dry	Dry	1,112 °F	-31 °F	1.02 psi	-2.03 psi	35%	15%
W	Dry	Dry	1,112 °F	-31 °F	1.02 psi	-2.03 psi	40%	15%
E-L	Dry	Dry	1,112 °F	-31 °F	1.02 psi	-2.03 psi	35%	15%
HF (1+2)	Dry	Dry	1,202 °F	-31 °F	1.02 psi	-2.03 psi	35%	10%
HF3	Dry	Dry	1,202 °F	-31 °F	1.02 psi	-2.03 psi	35%	10%

Fluastal



Item description

1. Flange reinforcement
2. Pressure carrying layer/gas seal layer
3. Insulation
4. Insulation
5. Support layer
6. Mechanical reinforcement



Features

- Multi-layer design
- Compensates for movements in several directions simultaneously
- Excellent form stability
- Can be delivered as fabric only or as preassembled unit
- Custom made to fit actual working conditions

Advantages

- Highly flexible
- High chemical resistance
- High flutter resistance
- Reduced heat loss
- Low reaction forces
- Good resistance against abrasion
- Suitable for high temperature applications

Operating range

Temperature:	–31 ... +1,067 °F
Pressure range:	–2.9 ... 2.9 PSI
Maximal axial movements:	... 6.5”
Maximal lateral movements:	... 3”

** Temperatures above 1,382 °F requires internal duct insulation or refractory lining.*

Functional description

Fluastal expansion joints safely absorb thermal expansion and misalignments in pipe and duct systems in dry and high temperature area. Fluastal products compensate for movements in multiple directions simultaneously.

Options

V-flange with single sleeve
Temperature: ... 842 °F
Media with medium dust content

P-flange with floating sleeve and bolster
Temperature: ... 1,382 °F
Media with high dust content

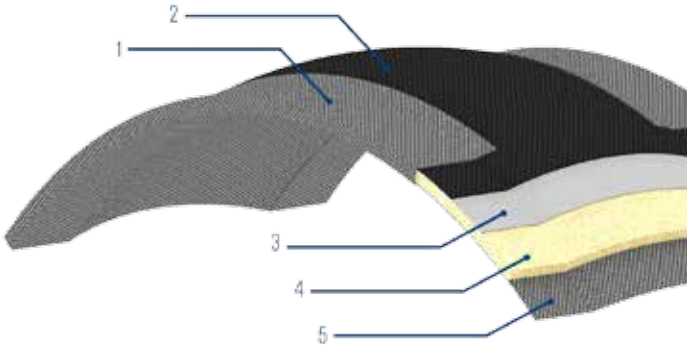
P-flange with refractory and bolster
Temperature: ... 1,832 °F
Media with high dust content

Type	Media		Max. temperature			Min. temp.	Pressure		Flexibility	
	Aggressive	Non-aggressive	P-flange	V-flange	PFH-100		Max.	Min.	Axial	Lateral
SU	N/A	Dry	482 °F	482 °F	752 °F	-31 °F	2.9 psi	-2.9 psi	40%	20%
SX	Dry	Dry	482 °F	482 °F	752 °F	-31 °F	2.9 psi	-2.9 psi	40%	20%
GX	Dry	Dry	752 °F	752 °F	932 °F	-31 °F	2.9 psi	-2.9 psi	40%	15%
Mx	Dry	Dry	1,022 °F	842 °F	1,067 °F	-31 °F	2.03 psi	-2.03 psi	40%	15%
KX	Dry	Dry	1,382 °F	N/A	1,382 °F	-31 °F	1.74 psi	-2.03 psi	40%	15%
HDX	Dry	Dry	1,832 °F	N/A	1,832 °F	-31 °F	0.87 psi	-2.03 psi	35%	13%

Fluaflex

Item description

1. Flange reinforcement
2. Pressure carrying layer
3. Gas seal layer
4. Insulation layer
5. Support layer



Features

- Multi-layer design
- Compensates for movements in several directions simultaneously
- Can be delivered as fabric only or as preassembled unit
- For dry condition
- Custom made to fit actual working conditions

Advantages

- Excellent flexibility
- High chemical resistance
- Reduced heat loss
- Minimal reaction forces

Operating range

Temperature:	–31 ... +1,067 °F
Pressure range:	–2.9 ... 2.9 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 3”

Functional description

Fluaflex expansion joints safely absorb thermal expansion and misalignments in pipe and duct systems in dry and medium temperature areas. Fluaflex products compensate for movements in multiple directions simultaneously.

Options

V-flange with single sleeve
Temperature: ... 842 °F
Media with low dust content

P-flange with single sleeve
and clamping bands
Temperature: ... 842 °F
Media with low dust content

P-flange with inner sleeve and bolster
Temperature: ... 1,067 °F
Media with medium dust content

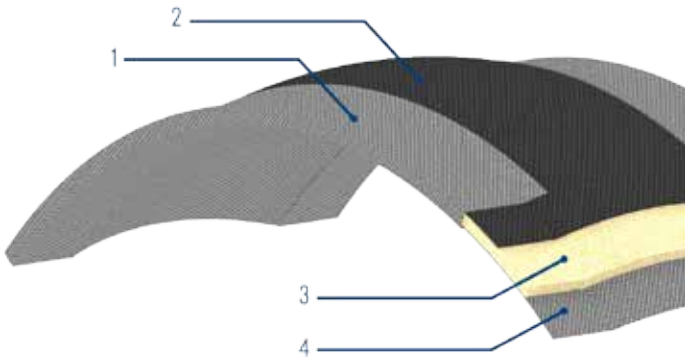
P-flange with floating sleeve and bolster
Temperature: ... 1,067 °F
Media with high dust content

Type	Media		Max. temperature			Min. temp.	Pressure		Flexibility	
	Aggressive	Non-aggressive	P-flange	V-flange	PFH-100		Max.	Min.	Axial	Lateral
25-U	N/A	Dry	482 °F	482 °F	752 °F	-31 °F	2.9 psi	-2.9 psi	50%	20%
25-X	Dry	Dry	482 °F	482 °F	752 °F	-31 °F	2.9 psi	-2.9 psi	50%	20%
25-X-T	Wet	Wet	482 °F	482 °F	662 °F	-31 °F	2.9 psi	-0.72 psi	50%	20%
30-X	Dry	Dry	572 °F	572 °F	797 °F	-31 °F	2.9 psi	-2.9 psi	50%	20%
40-X	Dry	Dry	752 °F	752 °F	932 °F	-31 °F	2.9 psi	-2.9 psi	40%	20%
55-X	Dry	Dry	1,022 °F	842 °F	1,067 °F	-31 °F	2.03 psi	-2.03 psi	40%	20%

Flexgen

Item description

1. Flange reinforcement
2. Pressure carrying layer/ gas seal layer
3. Insulation layer
4. Support layer



Features

- Multi-layer design
- (Flexgen 2002: single-layer construction)
- Compensates for movements in several directions simultaneously
- Can be delivered as fabric only or as preassembled unit
- For dry condition
- Custom made to fit actual working conditions

Advantages

- Excellent flexibility
- High chemical resistance
- Reduced heat loss
- Minimal reaction forces

Operating range

Temperature:	–31 ... +1,067 °F
Pressure range:	–2 ... 2 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 3”

Functional description

Flexgen expansion joints safely absorb thermal expansion and misalignments of pipe and duct systems in dry and medium temperature area. Flexgen products compensate for movements in multiple directions simultaneously.

Options

V-flange with single sleeve
Temperature: ... 842 °F
Media with low dust content

P-flange with single sleeve
and clamping bands
Temperature: ... 842 °F
Media with low dust content

P-flange with inner sleeve and bolster
Temperature: ... 1,022 °F
Media with medium dust content

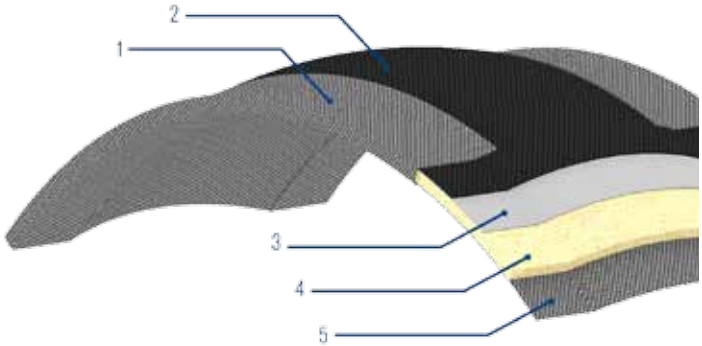
P-flange with floating sleeve and bolster
Temperature: ... 1,022 °F
Media with high dust content

Type	Media		Max. temperature			Min. temp.	Pressure		Flexibility	
	Aggressive	Non-aggressive	P-flange	V-flange	PFH-100		Max.	Min.	Axial	Lateral
2002	Dry	Dry	572 °F	572 °F	752 °F	-31 °F	2.03 psi	-2.03 psi	50%	20%
2003	Dry	Dry	572 °F	572 °F	842 °F	-31 °F	2.03 psi	-2.03 psi	40%	20%
2004	Dry	Dry	932 °F	797 °F	932 °F	-31 °F	2.03 psi	-2.03 psi	40%	20%
2005	Dry	Dry	1,067 °F	842 °F	1,067 °F	-31 °F	2.03 psi	-2.03 psi	40%	20%

Thermoflex

Item description

1. Flange reinforcement
2. Pressure carrying layer
3. Gas seal layer
4. Insulation layer
5. Support layer



Features

- Multi-layer design
- Compensated for movements in several directions simultaneously
- Can be delivered as fabric expansion joint or as preassembled unit
- Custom made to fit actual working conditions

Advantages

- Good flexibility
- High chemical resistance
- Reduced heatloss
- Minimal reaction force

Operating range

Temperature:	–31 ... +1,067 °F
Pressure range:	–2.9 ... 2.9 PSI
Maximal axial movements:	... 8”
Maximal lateral movements:	... 3”

Functional description

Thermoflex expansion joints safely absorb thermal expansion and misalignments in pipe and duct systems in dry and medium temperature areas. Thermoflex products compensate for movements in multiple directions simultaneously.

Options

V-flange with single sleeve
Temperature: ... 842 °F
Media with low dust content

P-flange with single sleeve
and clamping bands
Temperature: ... 842 °F
Media with low dust content

P-flange with inner sleeve and bolster
Temperature: ... 1,067 °F
Media with medium dust content

P-flange with floating sleeve and bolster
Temperature: ... 1,067 °F
Media with high dust content

Type	Media		Max. temperature			Min. temp.
	Aggressive	Non-aggressive	P-flange	V-flange	PFH-100	
N25	N/A	Dry	482 °F	482 °F	752 °F	-31 °F
C25	Dry	Dry	482 °F	482 °F	752 °F	-31 °F
C40	Dry	Dry	752 °F	752 °F	932 °F	-31 °F
C55	Dry	Dry	1,022 °F	842 °F	1,067 °F	-31 °F

Pre-assembled unit

Expansion joints can be supplied as a pre-assembled unit for easy installation.

The unit consists of:

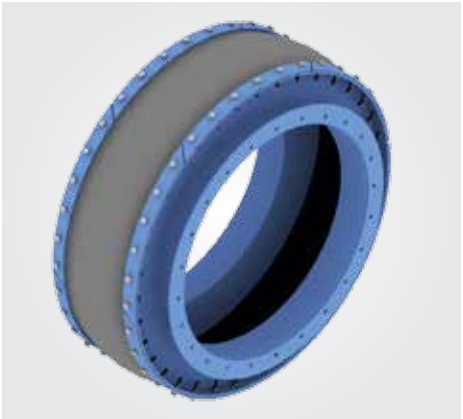
- Fabric expansion joint
- Metal frames/inner sleeves
- Bolster (optional)
- Gasket (optional)
- Fasteners

Frame material:

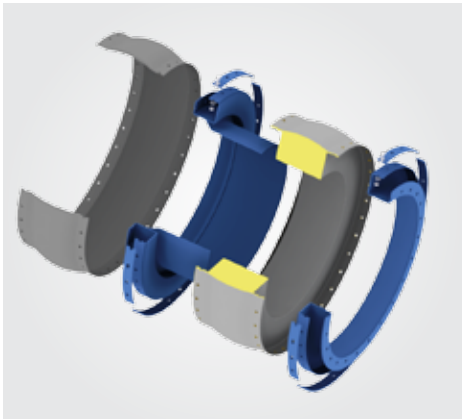
- Carbon steel
- Stainless steel
- Heat resistant steel

Pre-assembled expansion joint units can be supplied with surface treatment that is corrosion resistant (standard) and resistant to high temperatures. Eagle-Burgmann KE offers any RAL color code for the units.

Units can be delivered with seaworthy packing or standard packing for road transportation.



Pre-assembled unit with expansion joint and frame.



Pre-assembled unit with expansion joint, frame/inner sleeve and bolster.

Pre-assembled unit with frame/inner sleeve, bolster, cladding bolster and cladding plates. Hot-to-cold solution.

EagleBurgmann
expansion joint solutions

Installation, Service & Preventive Maintenance

Servicing our customers

is vital to us. Operational reliability and long service life of expansion joints is crucial. Unplanned shut downs are not only troublesome, but expensive. The right installation can save hundreds of man-hours with proper and safe installation.

The key to long-term and reliable expansion joints is dependent on a professional installation team. Eagle-Burgmann KE's service team has extensive installation experience and supervision on projects worldwide and can be available 7 days a week, within 24 to 48 hours.

Safety is the highest priority

not only for our production and field service personnel, but for our customers and users of our products. The safety of all employees and personnel working on your plant or refinery is our greatest concern.

Our service teams complete routine safety training and certification to ensure each member observes current industry safety practices as well as site specific policies and procedures.

Our comprehensive services include:

- Evaluations and troubleshooting
- Initial dimensional measurements
- Installation & refurbishment
- Supervision and training
- Plant surveys
- Emergency services
- Final inspection by experienced service engineers

Fabric expansion joint installed over the manifold.

Installation of fabric expansion joint between the diffuser and diverter in a gas turbine system.

Emergency hotlines	
South East Asia	+65 9630 3420
India	+91 93805 80508
Middle East	+971 55 531 946
Europe	+45 21 24 66 32
USA	+1 (859) 653 8364 (fabric) +1 (619) 562 6083 (metal)

Expansion Joint Product Range

Design and engineering capabilities

With more than 50 years of experience as a solution provider, EagleBurgmann KE has developed capabilities in solving challenges associated with controlling thermal expansion of piping and ducting systems.

EagleBurgmann KE has a proven track record of capabilities both in engineering and product reliability, with installations in all continents and various market sectors.

Through continuous innovation, we provide our customers with the latest technologies and solutions within the expansion joint industry.

As a solution provider, EagleBurgmann KE offers a wide range of services in connection with optimization of conditions for expansion joints. They include:

- Consulting, evaluations and troubleshooting
- Initial dimensional measurements
- Installation and refurbishment
- Supervision and training
- Plant surveys
- Emergency service
- Final inspections

Fabric Expansion Joints

are able to compensate for movements in several directions simultaneously and have almost no reactive force. They require little space for installation and are easy to adapt to physical conditions.

Selection of the right fabric expansion joint depends on a variety of factors which vary from application to application.

By combining different materials and taking thermal, chemical and mechanical resistance into consideration, as well as the fatigue properties of the materials, our engineers develop optimal solutions that provide long-term reliability to customers in various industries.

Fabric expansion joint operating limits*

Dimensions:
According to customer specifications

Temperature range: –30 ... +1,832 °F
For higher temperature, please request

Pressure range: –5 psi ... 5 psi

Metal Expansion Joints

are flexible connections installed in piping and ducting systems to accommodate expansion and vibration caused by changes in temperature, pressure and media.

EagleBurgmann KE offer a full range of metal expansion joints from rectangular and round ducting joints to highly engineered designs for critical applications.

The company has a long history of welding and forming of special materials including a wide range of nickel alloys. EagleBurgmann KE offer complete documentation packages in accordance to current industry standards such as ASME and EJMA.

Metal expansion joint operating limits*

Dimensions:
Circular: DN40 mm and up
Rectangular: According to customer specifications

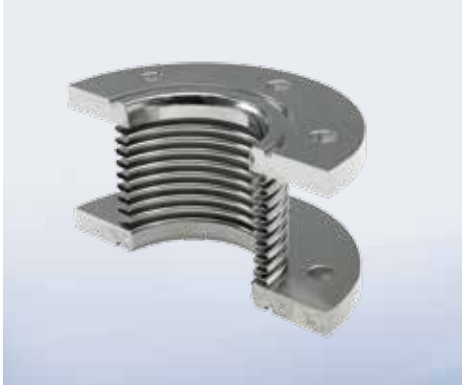
Temperature range: –325 °F ... 2,500 °F

Pressure range: Full vacuum up to 2,500 psi

**Operating limits depends on design, material selection, type of expansion joint and duct insulation.*

EagleBurgmann KE offer a wide range of products.

Cross section of fabric expansion joint.



Cross section of metal expansion joint.

Algeria · Angola · **Argentina** · **Australia** · **Austria** · Bahrain · Bangladesh · Belarus · **Belgium** · Botswana · **Brazil** · Bulgaria · Cameroon · **Canada** · **Chile** · **China** · **Colombia**
Congo · Cyprus · **Czech Republic** · **Denmark** · **Ecuador** · Egypt · Estonia · Finland · **France** · Gabon · **Germany** · Ghana · **Great Britain** · Greece · **Hungary** · **India** · **Indonesia**
Iraq · Ireland · Israel · **Italy** · Ivory Coast · **Japan** · Jordan · Kazakhstan · Kenya · **Korea** · Kuwait · Latvia · Lebanon · Libya · Lithuania · Madagascar · **Malaysia** · Mauritius
Mexico · Morocco · Myanmar · Namibia · **Netherlands** · **New Zealand** · Nigeria · **Norway** · Oman · Pakistan · Paraguay · Peru · **Philippines** · **Poland** · Qatar · Romania
Russia · **Saudi Arabia** · Serbia · **Singapore** · Slovak Republic · Slovenia · **South Africa** · **Spain** · Sudan · **Sweden** · **Switzerland** · **Taiwan** · **Thailand** · Trinidad and Tobago
Tunisia · **Turkey** · Ukraine · **United Arab Emirates** · Uruguay · **USA** · **Venezuela** · **Vietnam** · Yemen · Zambia · Zimbabwe · **www.eagleburgmann.com/world**

EagleBurgmann Expansion Joint Solutions is a leading global organization in the development of expansion joint technology; working to meet the challenges of today's ever-changing environmental, quality and productivity demands. Our flexible products are installed in thousands of plants, refineries and on equipment worldwide where reliability and safety are key factors for operating success. Everyday more than 6000 EagleBurgmann employees contribute their ideas, solutions and commitment to ensure our customers worldwide can rely on our products and services.

For more information – visit eagleburgmann-ej.com

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a member of EKK and FREUDENBERG

EagleBurgmann®
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