



ERECOSHIELD®

Metal Expansion Joints

Superior expansion joint technology



Middle East and Africa

Superior expansion joint technology

Metal Expansion Joints

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WHY ERITH?



OUR EXPERIENCE IN EXPANSION JOINTS

Erith has lead the design and installation of the latest Expansion Joint Technology for over many years in the region. All Erecoshield expansion joint styles have been rigorously lab and field-tested, and engineered to ensure long life and reliable service.



GLOBAL EXPERTISE, LOCAL SUPPORT

With an extensive knowledge network built regionally, Erith expansion joint expert team is committed to provide dedicated support locally to meet your requirements.



COMPLETE SOLUTIONS PROVIDER

Erith has a full range of Metal Expansion Joints, Rubber Expansion Joints and high pressure Hoses.



ONSITE MAINTENANCE

We take care of onsite maintenance and inspection.

PRODUCT INTRODUCTION

Metal Expansion Joint is a specially engineered product installed in a rigid piping system to:

- » Absorb movement
- » Compensate for misalignment
- » Relieve system strain due to thermal change, load stress, pumping surges, wear or settling

Introduction

Metal Expansion Joints products need to conform to industry standards such as EJMA. Under the guidance of these standards, Erith offers a complete range of metal expansion joints with the ability to design joints to individual customer requirements.

Rigid engineering and quality control of Erith metal expansion joints are what back up our assurance of long life and reliable service. Erith metal expansion joints carry additional safety factors to increase fatigue life above of EJMA guidance.

Erith Metal expansion joints are ideally suited for hundreds of applications in a wide range of industries, including:

- » Oil & Gas
- » Primary Metals
- » Power Generation
- » Chemical and petrochemical applications
- » WATER Treatment
- » Normal steam piping systems

Features of Erith Metal Expansion Joint



Manufactured using the hydroforming and hot rolling methods according to the guidelines of latest edition of EJMA standards. Team of experts make sure each expansion joint is tailor made to the application.



Multi-Ply bellows



Complete range with the ability to design joints for customized customer requirements.



Conforms to EJMA industry standard and carry additional safety factors to increase fatigue life of bellows to 1000 cycles and above.

Joint Selection

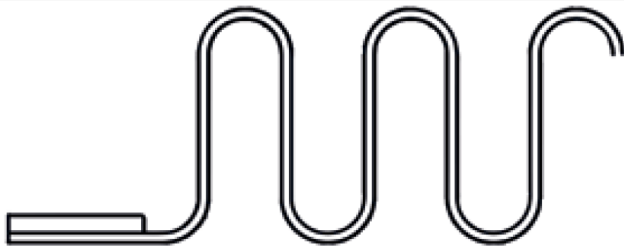
To select the proper metal expansion joint, consider:

- » Piping system stress
- » Pipe size
- » Medium: type of liquid, gas, or vapor in system
- » Temperature range
- » Pressure/vacuum range
- » Movements needed
- » Environment: degree of exposure to:
 - Weathering
 - Sunlight
 - Liquids
 - Gases
 - Vapors
 - Oil
 - Chemicals
 - Other
- » Installed face-to-face dimensions
- » Degree of pipe misalignment
- » Connection type: flange/weld end
- » Need for tie rods
- » Need for control units
- » Need for special construction

Product Description

Style

Single Expansion Joints	ES1000
Double Expansion Joints	ES2000
Tied Double Expansion Joints	ES2100
Gimbal Expansion Joints	ES3000
Hinged Expansion Joints	ES4000
Pressure Balanced Expansion Joints	ES5000
External Pressurized Expansion Joints	ES6000
Rectangular Expansion Joints	ES7000



Single-Ply Bellows



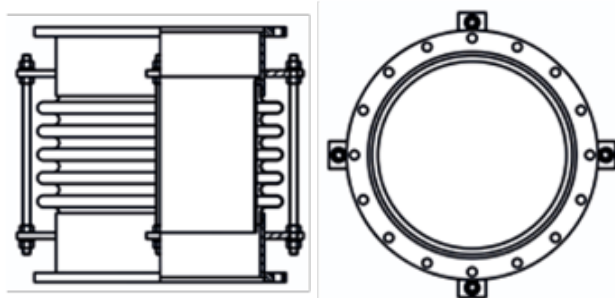
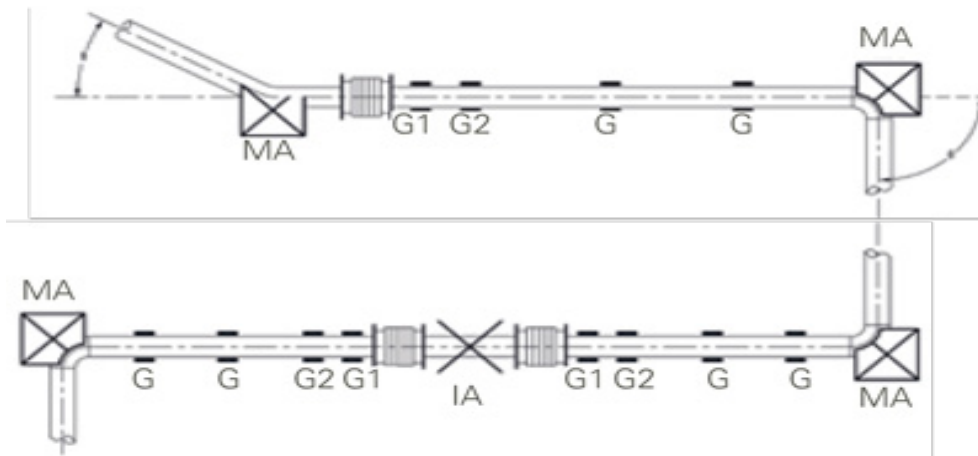
Multi-Ply Bellows (up to 5 plies)

ES1000 SINGLE METAL EXPANSION JOINT

ES1000

A Single Metal Expansion joint is the simplest type of metal expansion joint with single bellow construction welded or flanged to end fittings. The single bellows can absorb any combination of basic movements in pipeline where there are proper anchors and guides.

Size Availability	Standard DN200 - DN4600 (mm)
Design Conditions	
Design Pressure	Full vacuum ~ 6.89 MPa
Design Temperature	-250°C ~ +980°C
Design Fatigue Life	Standard 1000 cycles or above

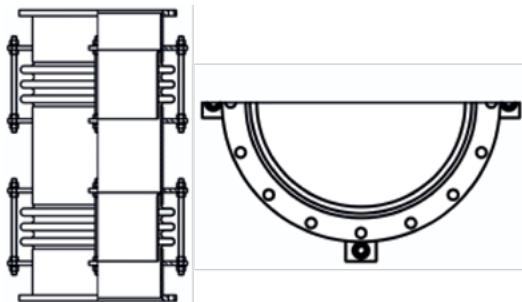
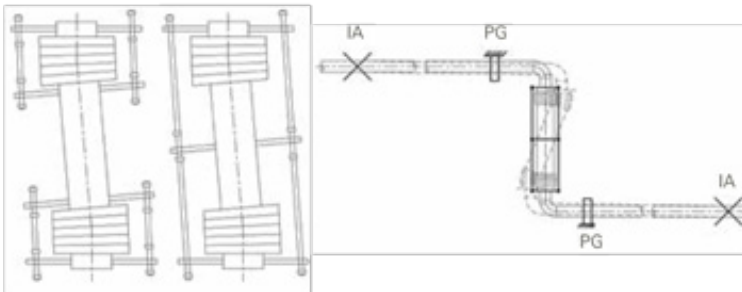


ES2000 DOUBLE METAL EXPANSION JOINT

ES2000

A Universal Double Metal Expansion Joint consists of two bellows connected by a center tube, welded or flanges to pipe ends. The universal arrangement allows greater axial, lateral and angular movements than a single expansion joint. Increasing the center spool length produces increased movement capability. Like the single expansion joint, the double metal expansion joint is used when proper anchors and guides are present.

Size Availability	Standard DN200 - DN4600 (mm)
Design Conditions	
Design Pressure	Full vacuum ~ 6.89 MPa
Design Temperature	-250°C ~ +980°C
Design Fatigue Life	Standard 1000 cycles or above



ES2100 TIED DOUBLE METAL EXPANSION JOINT

ES2100

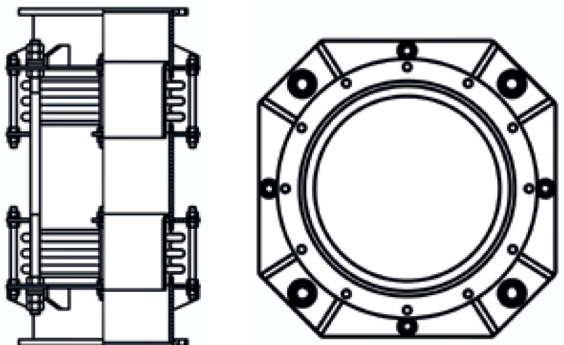
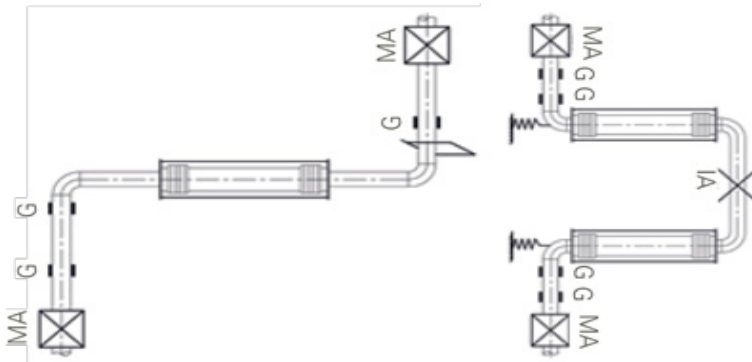
A Tied Double Metal Expansion Joint consists of two bellows connected by a center tube piece with tie rods. The tie rods are connected to the restraining flanges through spherical washers which allow for movement between the tie rods and the flanges during operation. This type of expansion joint can accommodate large movements in the lateral plane and can operate in any direction.



Size Availability Standard DN200 - DN4600 (mm)

Design Conditions

Design Pressure Full vacuum ~ 6.89 MPa
Design Temperature -250°C ~ +980°C
Design Fatigue Life Standard 1000 cycles or above



ES3000 GIMBAL METAL EXPANSION JOINT

ES3000

A Gimbal Metal Expansion Joint is designed to absorb pressure thrust and angular rotation in any plane by two pairs of hinges connected to a common floating Gimbal ring. The Gimbal ring, hinges and pins must be designed to restrain the thrust of the expansion joint due to internal pressure and extraneous forces.

Size Availability

Standard DN200 - D3600 (mm)

Design Conditions

Design Pressure

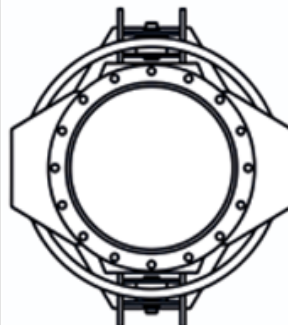
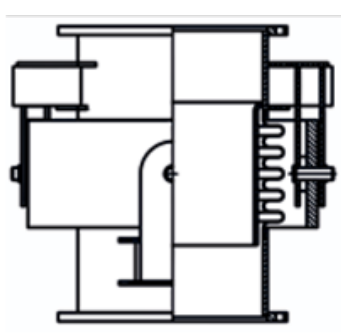
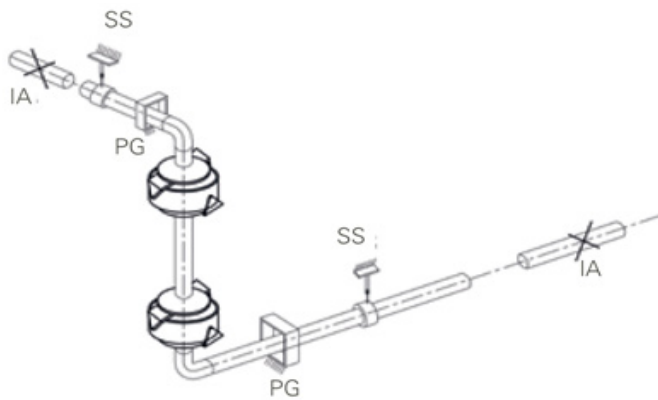
Full vacuum ~ 6.89 MPa

Design Temperature

-250°C ~ +980°C

Design Fatigue Life

Standard 1000 cycles or above



ES4000 HINGED METAL EXPANSION JOINT

ES4000

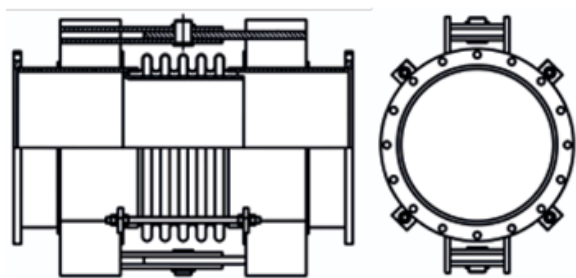
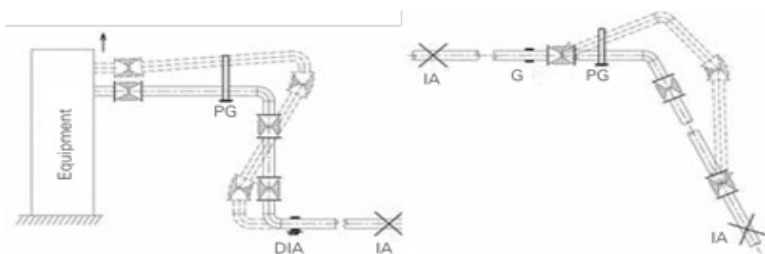
A Hinged Metal Expansion Joint contains one bellow and is designed to absorb angular rotation in one plane only by one pair of hinges. The hinges and hinge pins must be designed to restrain the thrust of the expansion joint due to internal pressure and extraneous forces. Hinged expansion joint should be used in sets of two or three bonded to absorb combinations of movements in piping system.



Size Availability Standard DN200 - DN3600 (mm)

Design Conditions

Design Pressure Full vacuum ~ 6.89 MPa
Design Temperature -250°C ~ +980°C
Design Fatigue Life Standard 1000 cycles or above



ES5000 PRESSURE BALANCED METAL EXPANSION JOINT

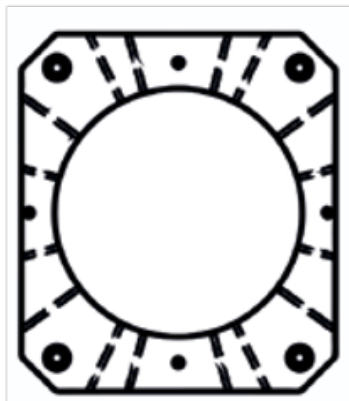
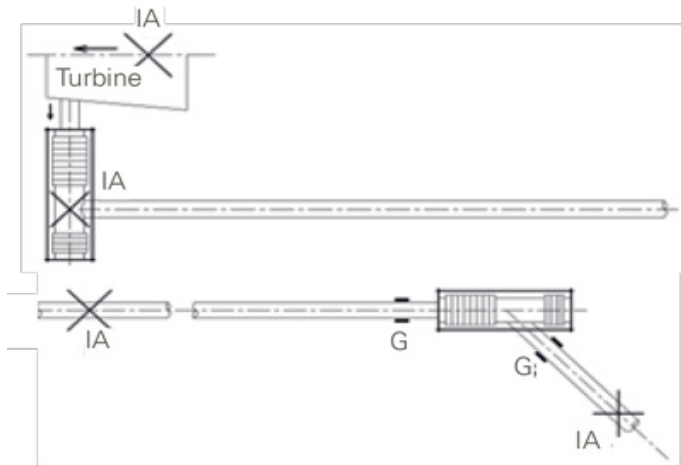
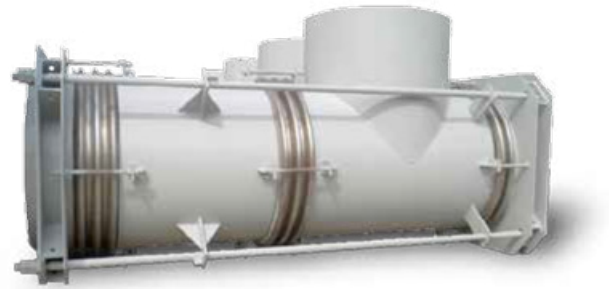
ES5000

A Pressure Balanced Metal Expansion Joint is designed to absorb axial movement and/or lateral deflection while pressure loading upon piping or equipment is considered excessive or objectionable. Pressure balanced metal expansion joint restrains the pressure thrust through tie devices, where two bellows are used in the flow end and a single bellow in the balancing end. The balance bellow will be subjected only to axial movement if the tie rods are properly designed to rotate or pivot at their attachment points.

Size Availability Standard DN200 - DN3000 (mm)

Design Conditions

Design Pressure Full vacuum ~ 6.89 MPa
Design Temperature -250°C ~ +980°C
Design Fatigue Life Standard 1000 cycles or above



ES6000 EXTERNAL PRESSURIZED METAL EXPANSION JOINT

ES6000

The External Pressurized Metal Expansion Joint is designed that the pressure is acting to the bellows externally while the inside of the bellows is at atmospheric pressure. It has many convolutions to allow a large amount of axial movement. But under external pressure the bellows will retain its shape completely stable. Besides, external pressurized bellow is protected from external damage by a heavy wall shroud and is isolated from flow impingement by an internal sleeve.

Size Availability Standard DN200 - DN3600 (mm)

Design Conditions

Design Pressure

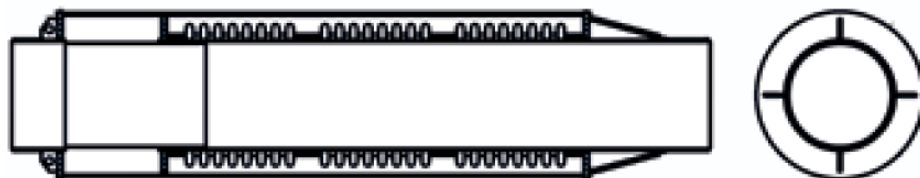
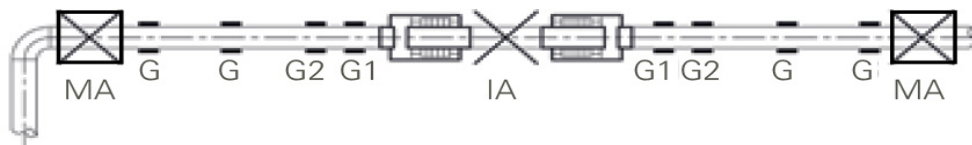
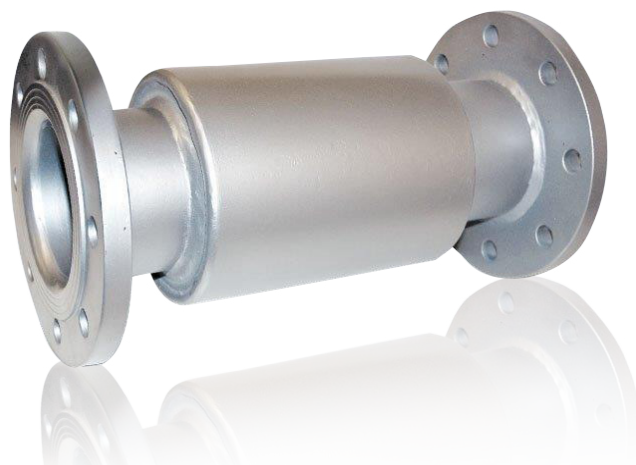
Full vacuum ~ 6.89 MPa

Design Temperature

-250°C ~ +980°C

Design Fatigue Life

Standard 1000 cycles or above



ES7000 RECTANGULAR METAL EXPANSION JOINT

ES7000

Rectangular Expansion Joint may be subjected to axial movement, angular movement, lateral deflection or any combination of these occurring at the interface of bellows and the associated ducting system.

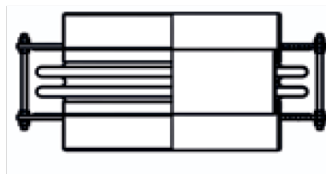
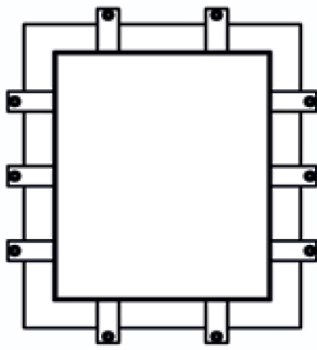
Size Availability Standard Pipe sectional area 0 - 9 m₂

Design Conditions

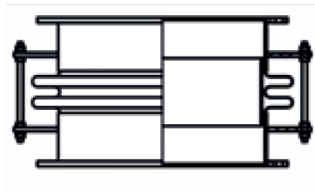
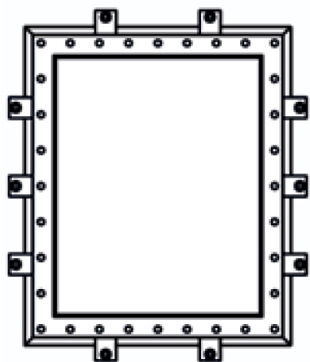
Design Pressure ≤ 0.05 MPa
Design Temperature -250°C ~ +980°C
Design Fatigue Life Standard 1000 cycles or above



Flange connection



Welded end connection



Material List

American Standard	German/British Standard	Manufacturing feasibility & availability
ASTM A240/A240M UNS S31603(316L)	W.Nr.1.4435/316S12	Better welding and machining performance than 316 and comparable corrosion resistance to 316.
ASTM A240/A240M UNS S32100(321)	W.Nr.1.4541/321S31	Standard material for convolution and manufacture; adequate corrosion and mechanical properties at ambient and elevated temperatures for over 90% of all bellows applications.
ASTM A240/A240M UNS S30400(304)	W.Nr.1.4301/304S11	Bellows can be supplied in this grade of material where specialty is required but it is our normal practice to offer 321S31 as a superior alternative material where this grade is requested.
ASTM A240/A240M UNS S31008(310S)	W.Nr.1.4845/310S24	310S is sometimes requested for special purposes. Because of difficulty in obtaining material suitable for bellows manufacturing, we usually offer Incoloy 800 as a superior alternative material where necessary.
ASTMA240/A240M UNS S30403(304L)	W.Nr.1.4306/304S12	Improved mechanical performance compared to S30400, especially good welding performance and formability. It can be used instead of S30400 under same temperature and corrosion requirements.
ASTM A240/A240M UNS S31600(316)	W.Nr.1.4401/316S16	Improved corrosion resistance as compared to 321S31, especially with regard to pitting corrosion. Specified where 321S31 is inadequate but where conditions are not sufficiently severe to require the use of more expensive materials, such as high Nickel alloys. Typical uses include high Sulphur crude oils, brackish waters, flue gases and numerous applications in chemical and petrochemical processing.
ASTM A240/A240M UNS S31254 (254SMo)	W.Nr.1.4547	Super austenitic stainless steel with high corrosion resistance. Widely used in halide and acidic applications, such as high concentrations of chloride ions, sea water and other harsh working environments.
ASTM B424 UNS N 08825 (825)	W.Nr.2.48568	A very useful high Nickel alloy with good corrosion resistance towards a variety of media and excellent resistance to Chloride and Caustic stress corrosion. Applications include steam service when the highest degree of reliability is required, and cases where Type 316S11 stainless steel may be inadequate. For example; dew point conditions in flue gas service, static or contaminated sea water, and sulphuric and phosphoric acids.
ASTM B424 UNS N 08800 (800)	Not Applicable	Alloy with high chromium content and nickel content. It has higher corrosion resistance in higher temperatures, widely used in many applications.
ASTM B443 UNS N 06625 (625)	W.Nr.2.48568	One of the new Nickel-Chrome Molybdenum alloys combining a high variety of corrosive environments.

Installation and Inspection of Expansion Joints

The necessary steps for the installation of all expansion joints should be pre-planned. It is important that the joints are installed at the correct lengths and should not be stretched or compressed to comply with deficiencies in pipe length, or offset to accommodate piping which has not been properly aligned. Any pre-compression or pre-extension on the joint would not be ignored if this has been specified.

The most critical steps of the installation are as follows:

- » Care should be taken to prevent damage to the thin wall bellows section, such as dents, scores, arc strikes and weld spatter.
- » No movement of the joint due to pipe misalignment, for example, shall be imposed which has not been anticipated. If such movements are imposed, this can result in damage to the bellows or other components. Specifically the fatigue life can be substantially reduced, forces imposed on adjacent equipment may exceed their design limits, internal sleeve clearance may be adversely affected, and the pressure capacity and stability of the bellows may be reduced.
- » Anchors, guide and pipe supports shall be installed in strict accordance with the piping system drawings. Any field variations may affect proper functioning of the joint and must be brought to the attention of a competent design authority.
- » The joint, if provided with internal sleeves, shall be installed with the proper orientation with respect to flow direction.
- » Once the anchors or other fixed points are installed and the piping is properly supported and guided, shipping devices should normally be removed in order to allow the joint to compensate for changes in ambient temperature during the remainder of the construction phase.

Post Installation Inspection Prior to system pressure test

Careful inspection of the entire system shall be made with particular emphasis on the following:

- » Are the anchors, guides and supports installed in accordance with the system drawing?
- » Is the proper joint installed in the proper location?
- » Are the joints' flow direction and pre-positioning correct?
- » Have all shipping devices been removed?
- » If the system has been designed for gas, and it is to be tested with water, has provision been made for the support of the additional dead weight load? Some of the water may remain after test. If this is detrimental to the joint or the system, this should be removed before commissioning.
- » Are all guides and supports free to permit pipe movement?
- » Has any joint been damaged during handling or installation?
- » Is any joint misaligned?
- » Are the bellows and other moveable parts of the joint, free from foreign material?

Inspection during and immediately after system pressure test

WARNING: Extreme care must be taken while inspecting any pressurized system or components. A visual inspection of the system shall include checking the following:

- » Evidence of leakage or loss of pressure.
- » Distortion or yielding of anchors, joint hardware, bellows element and other piping components.
- » Any unanticipated movement of the system due to pressure.
- » Any evidence of instability (squirm) in the bellows.
- » The guides, joints and other moveable parts shall be inspected for binding.
- » Any evidence of abnormality or damage shall be reviewed and evaluated by a competent design authority.

Periodic service inspections

- » Immediately after placing the system in operation, a visual inspection shall be carried out to ensure that the thermal expansion is being absorbed by the joints in the manner for which they were designed.
- » The bellows shall be inspected for evidence of unanticipated vibration.
- » A program of periodic inspection shall be planned and conducted throughout the operating life of the system. These inspections shall include examination for evidence of external corrosion, loosening of threaded fastenings and deterioration of anchor guides and supports.

This inspection program, without other information, cannot give evidence of fatigue, stress corrosion or general internal corrosion.

System Operation

A record should be maintained of change of system operating conditions (such as pressure, temperature, cycling, etc.) and piping modifications. Any such change shall be reviewed by a competent design authority to determine its effect on the performance of the joint, anchors, guides and pipework supports.

APPLICATION DATA SHEET

Service

Not sure what would be a suitable Metal Expansion Joint to use for a specific application? Please fill in the Application Data Sheet, and we will get back to you with a proposed solution that meets your application requirements.

ERECOSHIELD®

APPLICATION DATA SHEET: METAL EXPANSION JOINTS

Client: _____ Segment: _____
 Equipment: _____ Contract No: _____
 Qty: _____ Delivery Time: _____

Technical Specification

Style: _____

Tube	ID. mm:		Design Pressure MPa:		Operating Pressure MPa:		Fatigue Life cycles:	
	THK. mm:		Design Temperature °C:		Operating Temperature °C:		Flow Velocity m/s:	
	Length mm:		Media:		Painting Color:			

Type of Connection	Movements	Axial mm:		Stiffness	Axial N/mm:		Material	Bellow:	
		Lateral mm:			Lateral N/mm:			Liner:	
		Angle deg.:			Angle N-m deg.:			Rod:	
Entry:									
Exit:									

Non-Standard Flange		Standard Flange		Other Requirements:
Connection Surface:		Standard:		
O.D. mm:		Material:		
I.D. mm:		Draft drawing		
THK. mm:				
Diameter of Bolt Circle mm:				
No. & Diameter of Bolt Hole:				
Material:				
				Date: _____ By: _____

METAL EXPANSION JOINTS INSPECTION & SERVICE PACKAGE

Contact your Erith representative today to find out more!



**Technical
Support**

**Site Survey
Service**



