



PT. SK METALINDO
MANUFACTURERS AND FABRICATORS



TECHNICAL HANDBOOK EXPANSION JOINTS TECHNOLOGY & PIPING RELIABILITY MANAGEMENT

Jl. Raya Lemahabang No.Km 59,
Karangsari, Kec. Cikarang Tim., Kabupaten
Bekasi, Jawa Barat 17530

**ENGINEERING,
PROCUREMENT,
AND
CONSTRUCTION**

**WE ARE YOUR
TECHNOLOGY
PARTNER!**



PT. SK METALINDO
MANUFACTURERS AND FABRICATORS

OUR HISTORY

Founded in **2009**, **PT SK Metalindo (SKM)** has established itself as a **leading fabrication company** serving the **Oil & Gas, Petrochemical, Water Treatment, Thermal Power, and Pulp & Paper industries** across the **Southeast Asian region**.

As the **sole Indonesian subsidiary of Technical Group (Singapore)**, SKM is renowned for its **quality, reliability, and innovation** in the manufacturing of **pressure vessels, heat exchangers, boilers, tanks, piping, and steel structures**.

With over a decade of proven excellence, SKM continues to expand its capabilities into **metallic and non-metallic expansion joints, strainers, dampers, and silencers**, backed by **ISO certifications, patents, and TKDN recognition**, which reflects our commitment to **quality and local industry growth**.

VISION

To be the **Preferred Global Partner** for **Engineering, Procurement, Construction, Installation, and Commissioning (EPCIC)** in **Oil & Gas, Petrochemical, Water Treatment, Thermal Power, Pulp & Paper Plants**, and other related industries.

MISSION

We are committed to being a **sustainable business entity** specializing in **Engineering, Procurement, Construction, Installation, and Commissioning (EPCIC)** across various industrial sectors.

We uphold **quality, health, safety, environment, reliability, on-time delivery, and cost efficiency** as our highest operational values.

We continuously **develop local skills, competencies, and performance** to deliver excellence wherever we operate.



PROCESS EQUIPMENT



Since 2010, we have successfully completed the manufacture all types of static equipment with **excellent track record for quality, competitive pricing, and timely delivery.**

We Specialize in the fabrication of:

- Pressure vessels,
- Heat exchangers,
- Steam boilers and components,
- Economizers,
- Furnaces,
- Evaporators,
- Tanks,
- Piping,
- Stacks,
- Steel structures,
- Mining products.
- LP/MP Separators,
- Scrubbers,
- Pig Launchers & Receivers,
- Knockout Drums,
- Hydrocyclones,
- Dehydrators,
- Fuel Filters,
- Free Water Knockouts,
- Heater Treaters,
- Coalescer Filters,
- Dump Trucks and Buckets.

custom-engineered solutions



PT. SK METALINDO
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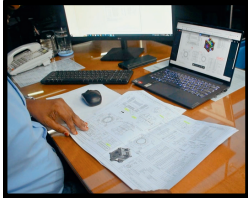
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OUR EXPANSION JOINTS : THE SUSTAINABLE SOLUTION YOU NEED



DESIGN

For new projects and replacement of existing joints: Concept Development, System Layout, and Specifications.



ENGINEERING

Detailed Calculations, Drawings, and Compliance Checks.



FABRICATION

Our fabrication is carried out by highly skilled personnel using advanced methodologies, ensuring every component is precision-engineered to meet stringent quality and dimensional requirements.



QUALITY CONTROL

We implement the highest quality control standards, ensuring our expansion joints deliver optimal reliability and extended service life.



PT. SK METALINDO
MANUFACTURERS AND FABRICATORS

04

FULL LIFE-CYCLE SUPPORTS IS ENSURED FOR EVERY PRODUCT WE DELIVER



SUPPLY

Logistics, Material Handling,
and Site Delivery



TRAINING

End-User Training, Documentation, and
Handover Support



INSTALLATION

On-Site Assembly, Testing,
and Commissioning



TRANSFORMING CHALLENGES INTO RELIABLE SOLUTIONS

Many clients face challenges with unreliable suppliers, design risks, and delays. We offer comprehensive solutions, ranging from EJMA-certified designs and rigorously tested materials to a robust supply chain and full support throughout the product lifecycle. **We are your trusted partner**, from design to installation and beyond.



Design Stage

- ✗ No EJMA-based design → reliability risk
- ✗ Wrong convolution count → short lifespan
- ✗ Incomplete data for temp/pressure/media

Manufacturing Stage

- ✗ No CoC for materials
- ✗ Delays due to no raw stock
- ✗ Limited technology → weak bellows

Supply and Delivery

- ✗ Long import lead times
- ✗ Wrong material delivered vs. quoted
- ✗ No flexibility for urgent orders

Installation & Service

- ✗ No installation team provided
- ✗ Wrong installation practice → failures
- ✗ No training/after-sales support

Procurement Challenges

- ✗ Hard to compare offers (no EJMA data)
- ✗ Hidden costs from “cheap” suppliers
- ✗ Risk of unreliable partners



Design Stage

- ✓ All designs done with EJMA software (we use latest version 11)
- ✓ Optimized convolution count → longer life, lower cost

Manufacturing Stage

- ✓ Certified materials (CoC)
- ✓ Fast manufacturing with stocked raw materials
- ✓ We are the only one in Southeast Asia to offer exclusive hydroforming in the size range of 40NB-1000NB.

Supply and Delivery

- ✓ Strong supply chain → avoids import delays with our presence in Indonesia, Australia, Canada, India, Korea, Malaysia, Singapore, Switzerland, Thailand, UK & US
- ✓ Flexible delivery → urgent orders possible
- ✓ We deliver exactly what we quote

Installation & Service

- ✓ In-house installation team ensures correct fitting
- ✓ On-site repair & assessment → less downtime
- ✓ Training for clients & non-clients
- ✓ Full lifecycle partner (design → install → service)



CERTIFICATIONS & STANDARDS

PT SK Metalindo operates with a strong commitment to quality, safety, and reliability, and maintains the following certifications.

**ISO
9001:2015**



**ISO
45001:2018**



**SMK3
Certified**



**ASME-U
Certificate**



**ASME-S
Certificate**



**NBIC-R
Certificate**



**SKUP
MIGAS**



**EBTKE
Certificate**



**TKDN
Certificate**



**EU
Certificate of Conformity**



**Brand
Certificate**



**Our Commitment:
To Be Your Best Technology Partner**



MANUFACTURING FACILITIES & CAPABILITIES



Our manufacturing facility features a **7,500 m² workshop**, **2,000 m² open space**, and a **500 m² office area**. Supported by a overhead cranes with a **12-meter** hook height, we are capable of handling large-scale fabrication projects. With a complete range of advanced machinery such as **CNC Plasma Cutting**, **Pipe Bending**, **Hydroforming**, and **various welding systems**, we ensure high-precision fabrication, expansion bellows production, and piping solutions that meet international standards.

OUR FACILITIES & EQUIPMENTS

NO.	EQUIPMENT LIST
1	Overhead Crane 25 Ton
2	Overhead Crane 10 Ton
3	Overhead Crane 5 Ton
4	Overhead Crane 2 Ton
5	Forklift 3.5 Ton
6	CNC Plasma Cutting
7	CNC Milling Machine
8	CNC Turning Machine
9	Rolling Machine Max Thk 16 mm
10	Rolling Machine Max Thk 50 mm
11	Press/Bending Machine 400 Ton
12	Press/Bending Machine 1000 Ton
13	Rolling Pipe Machine
14	Compressor Blasting Machine 7 & 8 Barg
15	Vertical Lathe Machine
16	Radial Drill Machine
17	Welding Electrode Oven
18	Welding Machine FCAW
19	Welding Machine SMAW
20	Welding Machine GTAW
21	Welding Machine GMAW
22	Welding Machine SAW
23	Hydroforming Machine
24	Mechanical Forming Machine
25	Rerolling Machine
26	Automatic Longseam Welding Machine
27	Flaring Machine
28	Genset 250 KVA
29	Plasma Cutting Machine

Our workshop is equipped with a full range of machinery to support precision fabrication and assembly. Key capabilities include Plate Rolling, CNC Plasma Cutting, Shearing, Pressing, Tube Bending, and advanced welding systems (FCAW, SMAW, GTAW, GMAW, SAW), enabling us to handle projects of various complexities.



Additional facilities, such as Blasting Halls, Overhead Cranes (up to 25 MT), Forklifts, Hydroforming Machines, and Automatic Long Seam Welding, further enhance our production capability, ensuring efficient and high-quality project delivery.





PRODUCT INNOVATION

ASIA'S FIRST MULTI-LAYER LEAK-DETECTION SYSTEM WITH A TESTABLE PLY AND PRESSURE GAUGE

CHALLENGE ADDRESSED

Emergency plant shutdowns due to undetected leaks can cause catastrophic downtime, safety hazards, and multi-million-dollar losses. Traditional single-layer systems provide limited early warning.

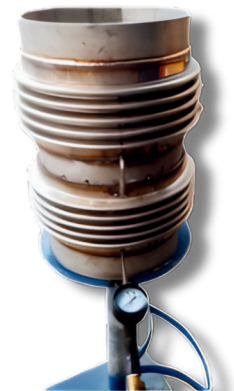
SOLUTION DELIVERED

We engineered a Multi-Layer Leak-Detection design featuring:

- Testable Ply connected to a dedicated Pressure Gauge for real-time monitoring.
- Multiple Containment Layers, offering redundancy and reliability.
- Early Alert Mechanism to enable controlled non-emergency shutdowns.

IMPACT

The system provides critical lead time to take action before a minor leak becomes a major incident. This advancement significantly boosts safety, reduces emergency downtime, and protects operational integrity.





PRODUCT INNOVATION

INNOVATION: IN-LINE PRESSURE-BALANCED EXPANSION JOINT

CHALLENGE ADDRESSED

Traditional anchoring systems are often impractical in high-stress scenarios like elevated pipeline runs or compact industrial layouts. A new solution was needed to maintain structural integrity while accommodating thermal and mechanical movements.

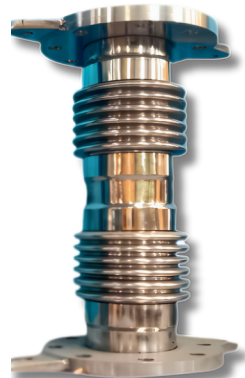
SOLUTION DELIVERED

We have developed an in-Line Pressure-Balanced Expansion Joint that features:

- Precisely balances Axial Pressure Thrust.
- Supports installations without requiring Massive Anchor Blocks.
- Reimagines proven Pressure-Balanced Elbow Technology for in-Line applications.

IMPACT

The innovative joint offers unparalleled performance and flexibility in demanding environments, reducing downtime, enhancing safety, and supporting efficient system designs, even in the most constrained conditions.





PRODUCT INNOVATION

INNOVATION: UNIQUE MULTI-LAYER COMPOSITE DESIGN FOR HARSH ENVIRONMENTS

CHALLENGE ADDRESSED

High-corrosion, high-pressure industrial conditions often cause premature failure of conventional single-layer systems. The challenge was to create a solution that could withstand extreme chemical exposure, high temperatures, and mechanical stress, while maintaining long-term reliability.

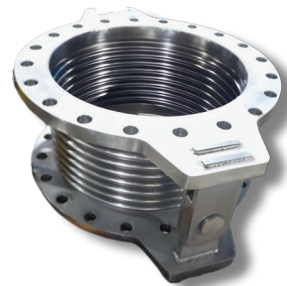
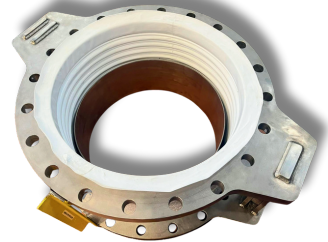
SOLUTION DELIVERED

We have developed a custom-engineered, three-layer Composite System with:

- Inner layer: Inconel 625 ($t = 0.5$ mm), with two layers of 0.7 mm thickness PTFE lining, along with an 8 mm diameter. PTFE reinforced round bar for top-tier chemical resistance.
- Middle and outer layers: Stainless Steel 321, providing strength and thermal stability.
- Outer sleeve: Super Duplex 2507, delivering superior mechanical performance and stress corrosion resistance.

IMPACT

This solution sets a new benchmark for integrity and durability in aggressive service environments. It offers protection, minimizes unscheduled shutdowns, and extends system lifespan, especially in industries such as oil & gas, petrochemicals, and marine operations.





PT. SK METALINDO
MANUFACTURERS AND FABRICATORS

METAL EXPANSION JOINTS



APPLICATION OF EXPANSION JOINTS

LOADS AND PRESSURE THRUST

Pressure thrust is one of the most critical forces to consider when selecting the appropriate expansion joint for any pressurized system. In a closed system, unrestrained expansion joints naturally tend to expand outward in an attempt to reach a state of maximum volume. This expansion is resisted only by the stiffness of the expansion joint itself and the rigidity of the piping system.

An unrestrained expansion joint subjected to internal pressure behaves similarly to a hydraulic jack, generating an end thrust force. This force is equal to the product of the effective cross-sectional area of the expansion joint and the internal pressure acting upon it.

This pressure thrust force is transferred directly to the main anchors in systems utilizing unrestrained SKM expansion joints. In contrast, when restrained expansion joints are used, the force is absorbed by the built-in restraining components of the joint assembly, thereby reducing the load imposed on the piping system.

$$\text{PRESSURE THRUST (N)} = \text{PRESSURE (N/mm}^2\text{)} \times \text{EFFECTIVE AREA (mm}^2\text{)}$$

SPRING FORCE

Expansion joint assemblies are designed with a constant spring rate, which means they produce a reaction force whenever the bellows are compressed or extended during operation.

$$\text{SPRING FORCE (N)} = \text{SPRING RATE (N/mm)} \times \text{DEFLECTION (mm)}$$





APPLICATION OF EXPANSION JOINTS

Friction Loading

This loading is influenced not only by the type of guides or supports used but also by their physical condition. Wear and tear over time can lead to increased frictional resistance, potentially resulting in higher loads than originally anticipated, and posing a risk of damage to equipment or system components.

Anchors

Expansion joints generate forces that must be absorbed and controlled by properly designed anchors. Anchors serve two primary purposes:

- To absorb the forces Generated by the Expansion Joint.
- To divide complex Piping Systems into manageable segments, making Movement and Force Calculations more precise and system behavior easier to predict.

Main Anchors

These anchors are designed to absorb the full range of force in the system, including pressure thrust, spring force, and any directional loads. They prevent movement in any direction and are typically located at plant terminal points, which should always be treated as main anchors.

Note: Terminal points may themselves introduce movement into the system; these must be considered when calculating total thermal expansion and compensation requirements.

Intermediate Anchors

In long straight piping runs, where multiple SKM expansion joints are installed, intermediate anchors must be used.

These anchors ensure each expansion joint absorbs its correct share of movement, avoiding over-extension or excessive compression that could lead to premature failure.

While intermediate anchors do not need to withstand pressure thrust, they must be strong enough to resist all other system-generated forces.



APPLICATION OF EXPANSION JOINTS

DIRECTIONAL OR PLANAR ANCHORS

These Anchors are designed to limit movement in either one or two planes, but not in others.

They can be main or intermediate anchors, depending on the pipe layout and the type of expansion joints being used. The use of directional anchors can result in a significant reduction in the number of SKM expansion joints in a line.

LOADS AND PRESSURE THRUST

In some cases, expansion in pipelines must be compensated by using an expansion joint, while smaller diameter branch lines can accommodate expansion through their natural flexibility. However, the flexing of these branch lines imposes additional forces on the anchors and guides in the main piping system. These imposed forces should not be overlooked during system design, as they may affect the integrity and performance of the piping layout.

$$F = \frac{3 E l y}{L^3}$$

Legend :

- E = Young Modulus (N/mm²)
- L = Cantilever Length (mm)
- I = Moment of Inertia (mm⁴)
- y = Deflection of Pipe (mm)
- F = Force in Newtons

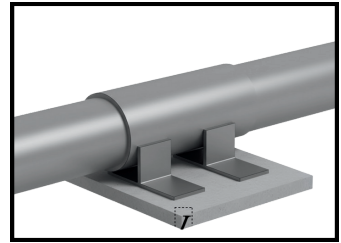


APPLICATION OF EXPANSION JOINTS

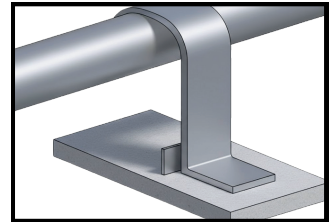
GUIDES AND SUPPORTS

Proper guiding and support of piping systems containing Expansion Joints is critical. If not correctly guided, un-intended movements may be transferred to the expansion joint, which it is not designed to accommodate, potentially leading to premature failure. A pipeline that includes an Expansion Joint behaves similarly to a column construct with one fixed end. This makes it inherently unstable unless guides are correctly installed to control movement and maintain alignment.

The free end of the pipe (nearest to the expansion joint) is particularly support to misalignment and thus requires more support and tighter guiding than the fixed end (nearest to the anchor).



Pipe Guides



Roller Guides 1, 2, 3, & 4 roller

GUIDE POSITIONING AND LOAD CONSIDERATIONS

Proper positioning of pipe guides is essential to ensure the correct performance of Expansion Joints and to maintain the integrity of the piping system.

- The first guide must be placed no more than 4x pipe diameters from the expansion joint.
- The second guide should be installed within 14x pipe diameters from the first guide.
- Subsequent guides should be spaced according to system pressure and pipe diameter, as referenced in the SKM Guide Spacing Graph.

The lateral forces acting on pipe guides depend on multiple variables, making simple load calculations difficult. According to EJMA standards, lateral guide loads can reach up to 15% of the axial force imposed by the expansion joint.

Therefore, all pipe guides must be designed with sufficient strength and rigidity to resist any potential side thrust and prevent misalignment.

SKM offers a comprehensive range of pipe guides and supports, specifically engineered to complement and enhance the performance of our SKM Expansion Joints.



EXPANSION JOINTS HANDLING & INSTALLATION

HANDLING GUIDELINES FOR SKM EXPANSION JOINTS

- Do not roll SKM Expansion Joints on their convolutions.
- Always protect them from weld splatter.
- Shield stainless steel components from cement, plaster, and concrete mixtures.
- Ensure flange faces remain undamaged during handling and storage.
- Prevent mechanical damage to the convolutions during transport or handling.
- Store in a clean environment, free from debris that could lodge on or inside the convolutions or sleeves.
- Do not use slings or lifting gear on or near convolutions.
- Avoid using slings on shipping bars.
- Store joints in a dry area, off the ground on pallets or blocks, with covers for protection.

INSTALLATION GUIDELINES FOR SKM EXPANSION JOINTS

To ensure optimal performance and longevity of Expansion Joints, the following installation practices must be followed:

- Confirm the correct Expansion Joint is selected for your application, considering the system's thermal expansion and contraction during start-up and shutdown.
- Ensure that the joint is not subjected to torsional movement, as it is not designed to withstand twisting.
- Maintain a guide clearance of 2–3 mm.
- Do not install the joint adjacent to valves or equipment that restrict axial movement, such as dampers or butterfly valves.
- Avoid using the joint to compensate for pipe misalignment or to correct inaccuracies in system layout.
- Install the Expansion Joint with the flow arrow aligned with the pipeline flow direction.
- Protect convolutions from weld splatter, concrete, or external impacts.
- Ensure the maximum design pressure is not exceeded, as joints are tested to this limit.
- Remove shipping restraints after installation.
- Use only non-chloride insulation to avoid stress corrosion.
- Do not install more than one joint between anchors without an intermediate anchor.

EXPANSION JOINTS HANDLING & INSTALLATION



INSTALLATION GUIDELINES FOR SKM EXPANSION JOINTS

Recommended minimum length of pipe guides:

Up to Ø 40 NB - 80 mm long

Ø 40 NB to Ø 125 NB - 130 mm long

Ø 150 NB to Ø 300 NB - 200 mm long

Ø 350 NB to Ø 600 NB - 600 mm long

Internal sleeves are recommended where internal flow velocities exceed the following limits:

Air, Steam and other Gases

Up to Ø 150 NB - 1200 mm/s - 35 mm of Ø

Over Ø 150 NB - 8000 mm/s

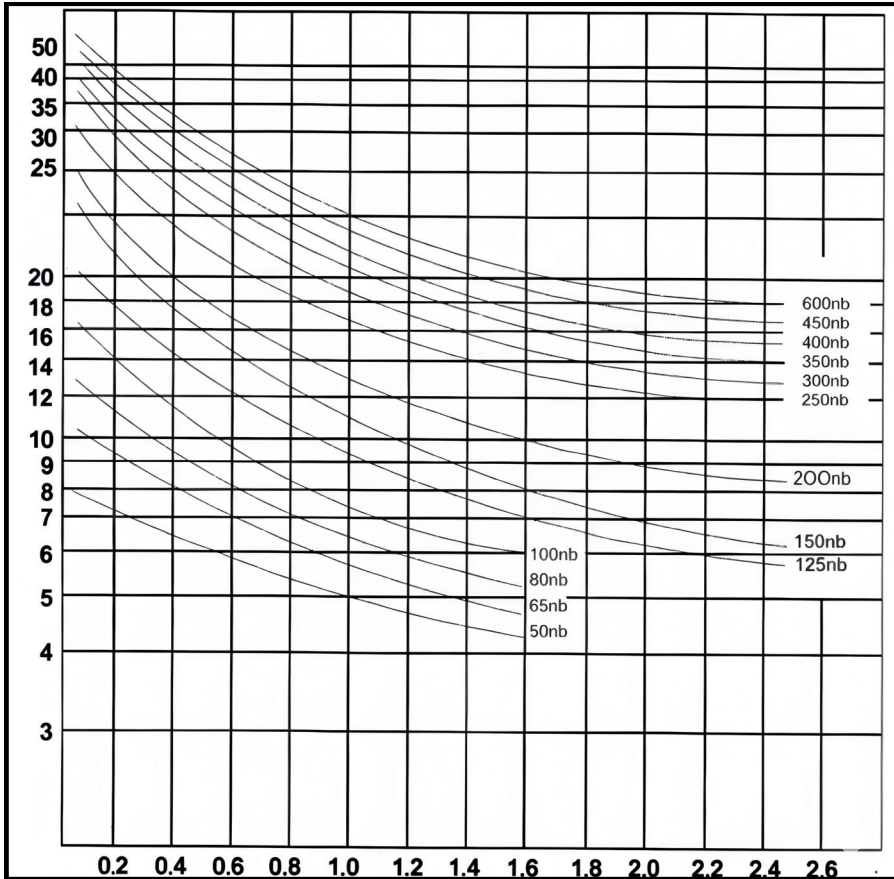
Water and other Liquids

Up to Ø 150 NB - 500 mm/s - 125 mm of Ø

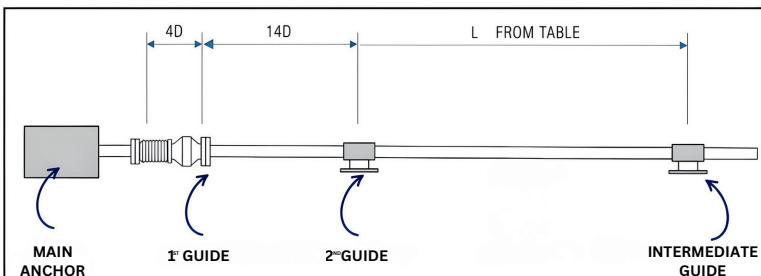
Over Ø 150 NB - 2500 mm/s

EXPANSION JOINTS HANDLING & INSTALLATION

RECOMMENDED INTERMEDIATE GUIDE SPACING

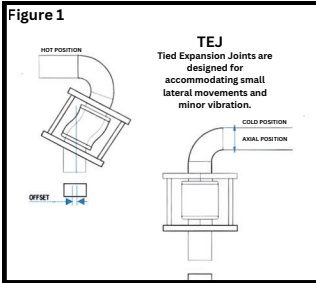


L-GUIDE SPACING IN METRES



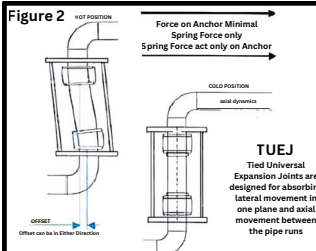
PIPE EXPANSION JOINTS: DESIGN AND APPLICATION FOR PIPING SYSTEM MOVEMENT

Figure 1



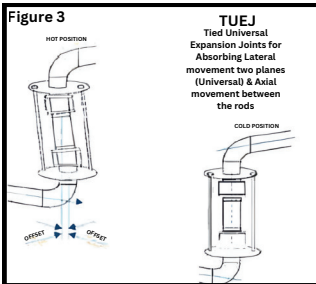
Represents the TEJ Tied Expansion Joint. It is well suited to allow small amounts of lateral deflection and vibration. SKM Tied assemblies do not transmit pressure thrust loads onto the pipeline.

Figure 2



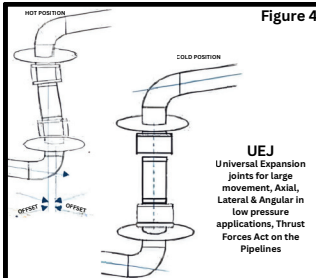
Represents a TUEJ used to absorb lateral deflection in a single plane. Wherever feasible, the Expansion Joint should be designed to fill the entire piping leg so that the expansion of this leg is absorbed within the tie rods as axial movement.

Figure 3



Represents a TUEJ used to absorb lateral deflection in a two-plane configuration. As the Expansion Joint can absorb lateral deflection in any direction, the two horizontal piping legs may lie at any angle in the horizontal plane.

Figure 4



Represents a UEJ. This design is suitable for accommodating large combined movements (Axial, Lateral, or Angular) in low-pressure applications. As this assembly does not contain tie rods, the full Pressure Thrust is transmitted onto the main anchors and adjacent equipment.

PIPE EXPANSION JOINTS: DESIGN AND APPLICATION FOR PIPING SYSTEM MOVEMENT

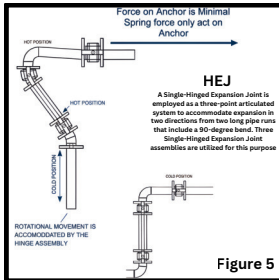


Figure 5

Represents three HEJ Hinged Expansion Joints. For controlled expansion from two long runs of pipe at 90°, this 3-point articulated system transmits very low loads onto the pipeline while absorbing very large movements.

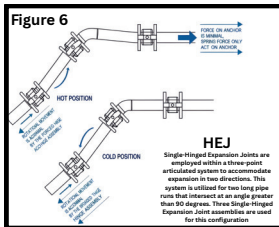


Figure 6

Represents three HEJ Hinged Expansion Joints. For controlled expansion from two long runs of straight pipe at an angle greater than 90°. As in Figure 5, this articulated system, using three SKM Expansion Joints, transmits very low loads onto the pipeline.

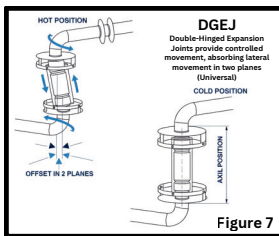


Figure 7

Represents DGEJ Double Gimbal Expansion Joints, for highly controlled lateral deflection in two planes. Double Gimbal assemblies do not transmit pressure thrust loads onto the pipeline. Double Gimbal type expansion joints offer all the advantages of Double Hinged Expansion Joints and additionally they allow lateral movement in any direction.

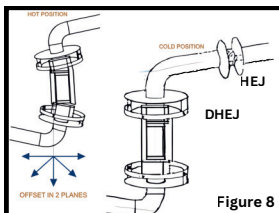
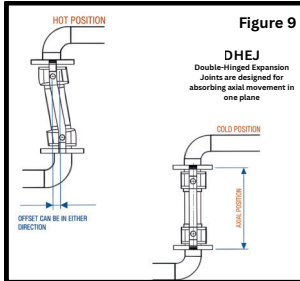


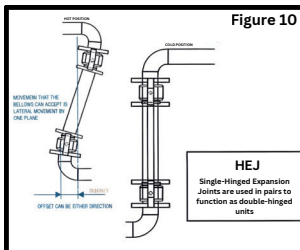
Figure 8

Represents DGEJ used with one HEJ. For controlled expansion from two long runs of pipe in two planes, this 3-point multi-planar articulated system transmits very low loads onto the pipeline while absorbing very large movement.

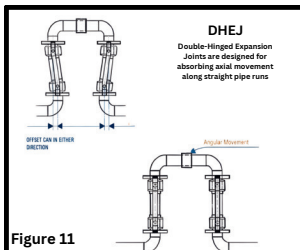
PIPE EXPANSION JOINTS: DESIGN AND APPLICATION FOR PIPING SYSTEM MOVEMENT



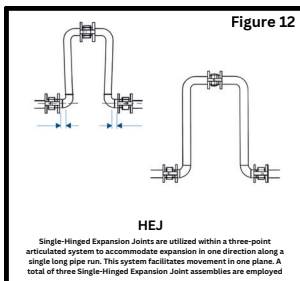
Represents DHEJ Double Hinged Expansion Joints. For controlled lateral deflection in one plane, Double Hinged assemblies do not transmit pressure thrust loads onto the pipeline.



Represents two HEJ Hinged Expansion Joints used to absorb large amounts of lateral deflection in one plane at a 90° pipe leg. The two SKM Expansion Joints function like Double Hinged bellows, with each moving at an angle.

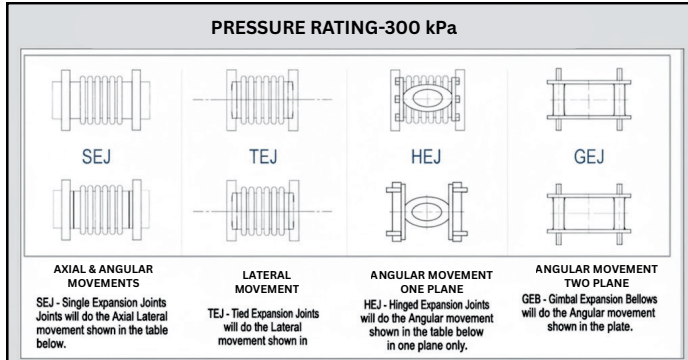


Represents two DHEJ used to absorb large amounts of axial movement in a long, straight run of pipe. This expansion joint configuration acts as a very flexible pipe loop, requiring a directional anchor to control the pipe motion.



Represents three HEJ used to absorb medium to large amounts of axial movement in a long, straight run of pipe. Like the DHEJ shown, this SKM Expansion Joint configuration acts as a very flexible pipe loop but is more stable. (See also figure 5 to 8).

EXPANSION JOINT DATA TABLE



DIA Φ	SKM EJ Length FF	SKM EJ Length WW	Non-concurrent Movements			Axial Spring Rate N/mm	Lateral Spring Rate N/mm	Angular Spring Rate N/mm/Deg	Pressure Thrust KN	Torsional Rotation Deg.
			Axial (mm)	Lateral (mm)	Angular (mm)					
50	150	240	30	12	10	20	12	0.4	1.5	0.13
65	180	240	32	12	10	20	24	0.4	2	0.12
80	180	240	34	12	10	21	31	0.5	2.5	0.10
90	190	240	36	12	10	23	36	0.5	3	0.099
100	190	340	36	12	10	42	48	0.9	4	0.094
125	220	340	45	12	10	47	62	1.6	6	0.098
150	220	340	48	11	10	48	92	2.2	9	0.087
200	230	340	50	10	9	50	132	2.8	15	0.081
250	250	340	54	10	9	53	162	3.9	22	0.068
300	280	400	64	9	9	68	190	7	31	0.061
350	280	400	70	9	8	75	198	13	36	0.051
400	280	450	70	8	8	88	265	28	46	0.046
450	300	450	70	6	8	98	433	35	56	0.040
500	300	450	72	5	7	110	690	48	70	0.036
550	300	450	72	4	7	127	991	59	85	0.033
600	300	450	72	4	7	133	68	56	99	0.029

Face-to-Face Length
of the Assembly

Movement Rating of
the Expansion Joints

EJs act like springs. The Spring Rate
is the force, measured in Newtons,
required to deflect the bellows per
millimeter. (Note: 9.8 N ≈ 1 Kg)

Unrestrained EJ exert a thrust force.
Pressure Thrust is The axial force
generated at the Rated Pressure. No
Thrust applies TEJ, HEJ, & GEJ

Example:

350 NB - SEJ - 300 - WWL

Size of Expansion Joint:

350 NB

Type:

Single Expansion Joint

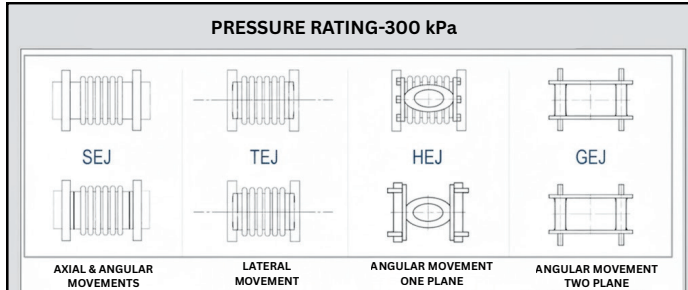
Rated Pressure:

300 kPa

End Connection:

Weld End/Weld End (WW)

EXPANSION JOINT DATA TABLE



DIA Φ	SKM EJ Length FF	SKM EJ Length WW	Non-concurrent Movements			Axial Spring Rate N/mm	Lateral Spring Rate N/mm	Angular Spring Rate N/mm/Deg	Pressure Thrust KN	Torsional Rotation Deg.
			Axial (mm)	Lateral (mm)	Angular (mm)					
50	150	240	30	12	10	20	12	0.4	1.5	0.13
65	180	240	32	12	10	20	24	0.4	2	0.12
80	180	240	34	12	10	21	31	0.5	2.5	0.10
90	190	240	36	12	10	23	36	0.5	3	0.099
100	190	340	36	12	10	42	48	0.9	4	0.094
125	220	340	45	12	10	47	62	1.6	6	0.098
150	220	340	48	11	10	48	92	2.2	9	0.087
200	230	340	50	10	9	50	132	2.8	15	0.081
250	250	340	54	10	9	53	162	3.9	22	0.068
300	280	400	64	9	9	68	190	7	31	0.061
350	280	400	70	9	8	75	198	13	36	0.051
400	280	450	70	8	8	88	265	28	46	0.046
450	300	450	70	6	8	98	433	35	56	0.040
500	300	450	72	5	7	110	690	48	70	0.036
550	300	450	72	4	7	127	991	59	85	0.033
600	300	450	72	4	7	133	68	56	99	0.029

The data provided above serves as a general guideline and may vary depending on actual operating conditions. **Please contact us to optimize the design for your specific application.**

- Maximum test pressure is 1.5 times the working pressure.
- Standard materials: **Carbon Steel, SA-240 Gr. 304/316/321.**
- Other alloys (**Inconel, Incoloy etc.**) available upon request.
- **SEJ, UEJ, XJ, and DXJ** types generate thrust forces (see table).
- Proper anchoring and guiding are essential for safe use.
- SKM can supply expansion joints up to **15,000 kPa, large diameters, and 1,100 °C.**

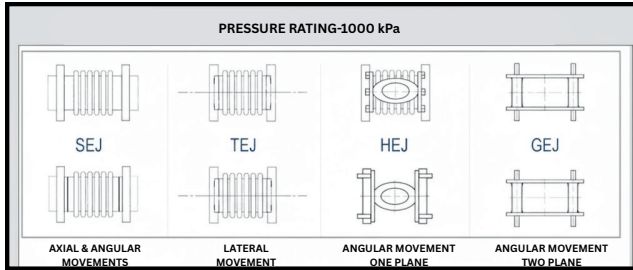
EXPANSION JOINT DATA TABLE

PRESSURE RATING - 300 kPa

DIA Φ	SKM EJ Length FF	SKM EJ Length WW	Non-concurrent Movements			Axial Spring Rate N/mm	Lateral Spring Rate N/mm	Angular Spring Rate N/mm/Deg	Pressure Thrust KN
			Axial (mm)	Lateral (mm)	Angular (mm)				
650	800	910	96	68	14	178	166	186	131
700	800	910	96	68	13	196	186	270	150
750	800	910	96	68	13	232	222	334	167
800	800	910	96	67	13	254	265	410	198
850	800	910	96	67	13	262	279	514	228
900	800	910	98	66	13	292	290	584	254
950	800	910	102	66	13	380	350	922	286
1000	1100	910	102	66	13	486	409	1186	308
1050	1100	910	104	72	12	552	576	1730	344
1100	1200	1220	108	72	12	604	697	2034	370
1150	1200	1220	108	72	12	694	763	2446	401
1200	1400	1320	110	78	11	780	818	2614	443
1250	1400	1320	110	82	11	938	993	3336	386
1300	1400	1520	112	82	11	1264	1023	4044	523
1350	1400	1520	114	86	11	1952	1180	4866	567
1400	1400	1520	114	86	11	2412	1333	5322	602
1450	1400	1520	114	86	10	3156	1559	5606	646
1500	1400	1520	114	86	10	3554	1802	6030	686
1550	1400	1520	114	82	10	4144	1990	5886	729
1600	1400	1520	114	82	10	4784	2022	7052	776
1650	1400	1520	114	80	10	5552	2267	7548	831
1700	1400	1520	114	80	10	6122	2432	7782	870
1750	1600	1520	114	80	10	6544	2676	8254	912
1800	1600	1720	116	86	10	6616	2608	8864	952
1850	1600	1720	116	86	9	6672	3040	9544	1016
1900	1600	1720	116	84	9	6992	3211	10314	1077
1950	1600	1720	116	84	9	7002	3337	10984	1139
2000	1600	1720	116	79	9	7252	3603	12126	1201
2050	1800	1920	116	84	9	7558	4047	13414	1271
2100	1800	1920	116	84	8	7656	4391	14124	1330
2150	1800	1920	116	82	8	7984	4551	14802	1396
2200	1800	1920	116	82	8	8182	4774	15506	1454
2250	1800	1920	116	80	8	8482	4997	16040	1509
2300	1800	1920	116	78	8	8864	5247	16854	1583
2350	1800	1920	116	78	8	9288	5565	17550	1657
2400	1800	1920	116	78	8	9392	5803	18440	1718
2450	1800	1920	116	74	7	9618	6002	19232	1791
2500	1800	1920	116	72	7	9984	6371	19974	1858



EXPANSION JOINT DATA TABLE



DIA Φ	SKM EJ Length FF	SKM EJ Length WW	Non-concurrent Movements			Axial Spring Rate N/mm	Lateral Spring Rate N/mm	Angular Spring Rate N/mm/Deg	Pressure Thrust KN	Torsional Rotation Deg.
			Axial (mm)	Lateral (mm)	Angular (mm)					
50	150	240	30	12	10	20	12	0.4	1.5	0.13
65	180	240	32	12	10	20	24	0.4	2	0.12
80	180	240	34	12	10	21	31	0.5	2.5	0.10
90	190	240	36	12	10	23	36	0.5	3	0.099
100	190	340	36	12	10	42	48	0.9	4	0.094
125	220	340	45	12	10	47	62	1.6	6	0.098
150	220	340	48	11	10	48	92	2.2	9	0.087
200	230	340	50	10	9	50	132	2.8	15	0.081
250	250	340	54	10	9	53	162	3.9	22	0.068
300	280	400	64	9	9	68	190	7	31	0.061
350	280	400	70	9	8	75	198	13	36	0.051
400	280	450	70	8	8	88	265	28	46	0.046
450	300	450	70	6	8	98	433	35	56	0.040
500	300	450	72	5	7	110	690	48	70	0.036
550	300	450	72	4	7	127	991	59	85	0.033
600	300	450	72	4	7	133	68	56	99	0.029

Type of Expansion Joint

Single Expansion Joint

Fitting Type Attached to each
end of line SKM EJ Assemblies

Weld end

Diameter of Expansion Joint

350 NB

Rated Pressure

300 KPa

- The SKM data shown above serves as a general guideline and depends on the actual working conditions. **Contact Us to Optimize Your Design.**
- Standard flanges, pipe, and hardware are supplied in Carbon Steel.
- Standard SKM EJ are supplied in SA-240 Gr. 304, 316, and 321.
- Incoloy, Inconel, and other alloys available upon request.
- SEJ and UEJ manufactured by SKM generate the pressure thrust noted in the table above.
- Correct anchoring and guiding must always be used.
- Pressure to 15,000 kPa, larger diameters and temperatures up to 1,100 °C available.

These are specially designed assemblies

- SKM Multi-ply, Toroidal, Pressure-Balanced, and Rectangular EJ are also available.
- Add an extra 150 mm to HEJ and 200 mm for GEJ for hardware.

SKM EJ Accessories or optional Hardware

- Liner - L** is added to the part number.
- Cover - C** is added to the part number.
- Vanstone - V** is added to the part number.
- Special - X** is added to the part number.

EXPANSION JOINT DATA TABLE

PRESSURE RATING - 1000 kPa

DIA Φ	SKM EJ Length FF	SKM EJ Length WW	Non-concurrent Movements			Axial Spring Rate N/mm	Lateral Spring Rate N/mm	Angular Spring Rate N/mm/Deg	Pressure Thrust KN
			Axial (mm)	Lateral (mm)	Angular (mm)				
650	330	460	56	6	6	596	1573	939	437
700	330	460	56	6	6	657	17252	1364	500
750	350	460	57	5	6	777	20646	1687	557
800	350	460	59	5	6	851	24664	2071	660
850	370	480	60	5	6	878	23570	2596	760
900	370	480	60	5	6	978	268979	2949	847
950	370	480	62	5	6	1273	32522	4856	953
1000	370	480	62	4	6	1628	38056	5989	1027
1050	370	480	63	4	6	1849	62896	8737	1147
1100	390	500	63	3	5	2023	74130	10272	1233
1150	390	500	63	3	5	2325	80287	12352	1337
1200	390	500	61	3	5	7613	94683	13201	1477
1250	420	530	65	3	5	3142	110977	16847	1620
1300	420	530	65	3	5	4234	113720	20422	1743
1350	420	530	65	3	5	6539	119021	24573	1890
1400	420	530	65	3	4	8080	123941	26876	2006
1450	420	530	65	3	4	10573	144959	28310	2153
1500	420	550	67	3	4	11906	167614	30452	2286
1550	440	550	68	3	4	13882	185078	33259	2430
1600	440	550	68	3	4	16022	818805	35561	32583
1650	440	550	68	3	4	18599	210803	38107	2770
1700	440	550	68	2	4	20509	226185	39299	2900
1750	440	550	68	2	3	21922	248877	41683	3040
1800	440	550	68	2	3	22164	270453	44763	3173
1850	440	550	68	2	3	22351	301301	48197	3386
1900	440	550	67	2	3	23423	328532	52086	3590
1950	440	580	67	2	3	23457	338269	55489	3798
2000	450	580	67	2	3	24294	353651	61236	4003

EXTERNALLY PRESSURIZED EXPANSION JOINT

The Externally Pressurized Expansion Joint (XJ) manufactured by SKM is suited for large amounts of axial deflection in long, straight runs of pipe.

The XJ Style Joint is Designed Primarily to Fit the Following Applications:

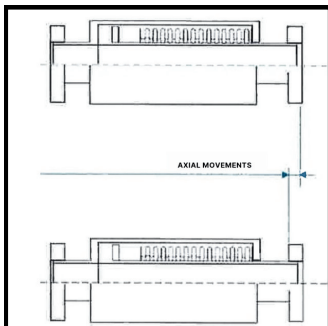
In long, straight pipeline runs that are properly guided and anchored, XJ expansion joints can effectively handle pressure thrust.

In areas such as tunnels or locations where articulated joints cannot be used, and where significant axial expansion must be absorbed, it's often more cost-effective to install a single XJ-type expansion joint rather than dividing the pipeline into multiple sections with standard expansion joints, anchors, and guides.

A single XJ joint is preferred when using more than two conventional SKM expansion joints is impractical due to the risk of squirming when a certain length-to-diameter ratio is exceeded.

At high pressures, even short expansion joints may become unstable. Using an XJ type joint, which maintains the bellows under compression, helps stabilize the system and prevents this issue.

In environments where solid materials are likely to collect inside the bellows of standard expansion joints, an XJ type joint can be used instead. It captures solids between the outer shell and the bellows, helping avoid buildup. These joints can also be equipped with drains or manholes to support regular cleaning and maintenance of the bellows area.

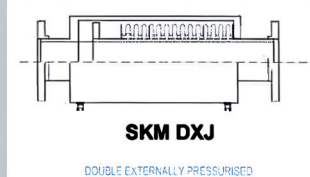
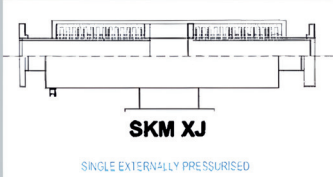


XJ Externally Pressurized Expansion Joints manufactured by SKM are suited for larger amounts of axial deflection in long straight runs of pipe.



EXTERNALLY PRESSURIZED EXPANSION JOINT

PRESSURE RATING - 1000KPA



DIA Φ	XJ LENGTH FF & WW 100MM MOVEMENT	DXJ LENGTH FF & WW 100MM MOVEMENT	DXJ LENGTH FF & WW 200MM MOVEMENT	DXJ LENGTH FF & WW 300MM MOVEMENT	DXJ LENGTH FF & WW 400MM MOVEMENT	Pressure Thrust KN
40	700	900	1100	1800	2200	9
50	700	900	1100	1800	2200	9
65	700	900	1100	1800	2200	12
80	700	900	1100	1800	2200	15
100	700	900	1100	1800	2200	24
125	700	900	1100	1800	2200	36
150	700	900	1100	1800	2200	64
200	700	900	1100	1800	2200	94
250	700	900	1100	1800	2200	144
40	700	900	1100	1800	2200	18
50	700	900	1100	1800	2200	18
65	700	900	1100	1800	2200	24
80	700	900	1100	1800	2200	30
100	700	900	1100	1800	2200	48
125	700	900	1100	1800	2200	72
150	700	900	1100	1800	2200	128
200	700	900	1100	1800	2200	188
250	700	900	1100	1800	2200	288

Part Number Format : 100 XJ - FF - 2000 - 100

Represent: 100 NB Externally Pressurized Flanged Flange, 2000 kPa, 100 mm Movement.

D → Drain port included (e.g. 100 XJ-FF-2000-100D)

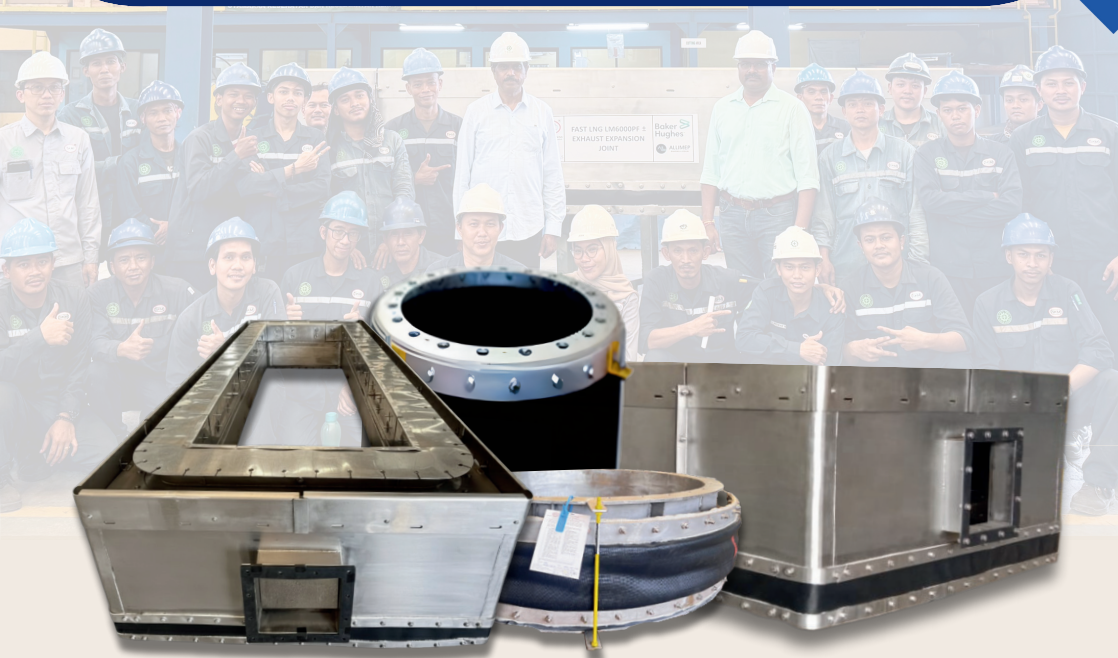
V → Vanstone Flange (e.g. 100 XJ-FF-2000-100V)

S → Special Design (e.g. 100XJ-FF-2000-100S)



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FABRIC EXPANSION JOINTS



FABRIC EXPANSION JOINTS

Fabric expansion joints are highly flexible components made from specially woven fabrics that are coated or laminated with selected elastomers or fluoropolymers, depending on the application.

They are commonly used to insulate, reduce mechanical loads, and protect against abrasion. One of the key advantages of fabric expansion joints is their ability to absorb multi-directional movements simultaneously with minimal reactive forces, while requiring very little installation space.

Fabric expansion joints are easily customizable to suit specific operating conditions and are lightweight, making them easy to transport and install. Compared to metallic expansion joints, fabric expansion joints offer greater adaptability and cost-efficiency for certain low-pressure, high-temperature, or vibration-sensitive applications.

- **Type:** Circular and rectangular.
- **Dimension:** All sizes are available, with or without steel parts.

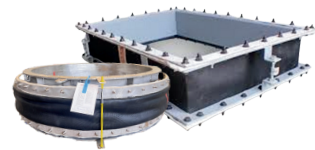
For installation in existing duct and/or pipework, the fabric expansion joints are supplied with either a closed or open-ended band.

- **Temperature:** Up to **+1,200 °C**
- **Pressure:** Up to **0.3 bar**

Selection of the optimum construction for fabric expansion joints depends on a number of factors that need to be considered for the application; generally speaking, there are no "standard" designs.

Fabric expansion joints are available in many configurations with single-layer or multi-layer fabric elements. The multi-layer expansion joint is generally made from:

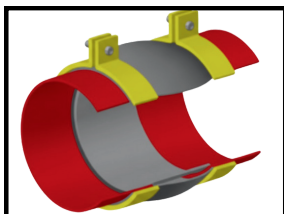
- Internal material: To avoid abrasion.
- Insulation material: to resist high temperature.
- Sealing foil: for gas-tight construction.
- Outer cover: Protection against mechanical loads.
- Reinforcement: Ensuring strong construction in the area where bolts are fixed.



DESIGN STYLE

Fabric expansion joints are typically supplied either as a "belt" type or with integral flanges. The preferred configuration depends on the installation requirements and system operating temperature.

For low-temperature applications, simple flanged arrangements are commonly used. These are typically installed against flanges mounted directly onto the ductwork, providing an effective and straightforward solution in such conditions.



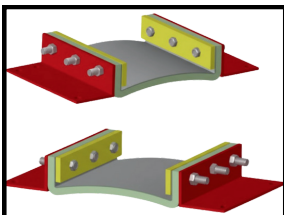
Belt-type expansion joints, attached directly onto the outside of the duct using clamping bands, are normally used for:

- Low Temperatures (**Up to 300°C**).
- Low-to-medium velocity.
- Low-to-medium dust.



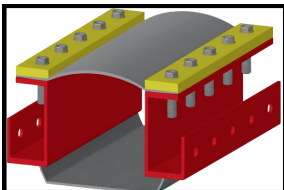
Convolute fabric expansion joints, attached directly onto the outside of the duct using clamping bands, are normally used for:

- Large movement with low velocity.
- Low dust content.
- Low temperature.



Fabric expansion joints mounted on vertical flanges are typically used in systems with:

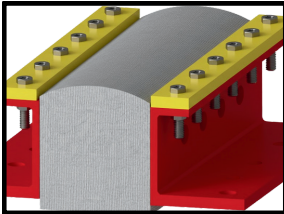
- Low flow velocity.
- Low dust content.
- Low temperature (**Up to 450°C**).



Fabric expansion joints mounted on parallel flanges are typically used in ductwork with:

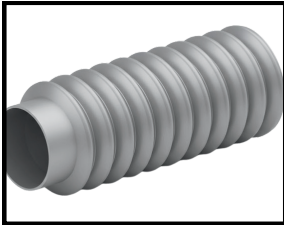
- Medium temperature range (**Up to 500°C**).
- Higher flow velocities.
- Medium dust content in the flow.

DESIGN STYLE



Fabric expansion joints mounted on parallel flanges with insulation bolster are typically used in plants with:

- High temperatures (**Up to 600°C**).
- High dust content.
- High flow.



Fabric expansion joints with floating sleeve construction are typically used in plants with:

- Medium to high temperatures (**Up to 600°C**).
- Very high dust content.
- Low to high flow velocities.

In this booklet, we provide a general overview of our capabilities in designing and supplying fabric expansion joints for commonly encountered applications.

In addition to the standard styles featured, we also offer custom-engineered solutions for specialized applications, such as:

- "Picture-frame" expansion joints.
- Pantographic linkage assemblies.
- Pipe penetration seals.
- "Dog-bone" seals for low-pressure ductwork transporting condensates or fluids.

These tailored designs address complex requirements across a variety of industries. Further technical details and design support are available upon request.





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RUBBER EXPANSION JOINTS





RUBBER EXPANSION JOINTS

A rubber expansion joint is a flexible connector used in piping systems to absorb movement, vibration, and misalignment caused by thermal expansion, contraction, or pressure changes. Made from durable rubber materials such as EPDM, Neoprene, or Nitrile, these joints are designed to accommodate axial, lateral, and angular movements.

They are reinforced with fabric or metal to enhance strength and flexibility, and they help reduce noise, vibration, and the risk of leaks while protecting the piping system from stress. Commonly used in HVAC, water treatment, oil and gas, and industrial applications, they extend the life of the piping system.

TYPE OF RUBBER EXPANSION JOINTS

10 Single Sphere

10R Single Sphere

5 Single Sphere

20 Twin Sphere

Double Sphere Threaded Unions Style 30

Flexible Rubber Pipe Style 50

Single Arch Expansion Joint Style 60

Spool Type Expansion Joint Style 75



RUBBER EXPANSION JOINTS

10 Single Sphere

This Expansion Joint is designed to absorb vibration, thermal movement, and pressure fluctuations in piping systems.

Key Features:

- Single Sphere Design: Enhances flexibility and pressure absorption.
- Construction materials:
 - Body: Synthetic Rubber.
 - Reinforcement: Nylon Cord.
 - Wire: Hard Steel Wire.
 - Flanges/Fittings: Zinc-Plated Mild Steel.
- Performance Rating (General Conditions):
- Temperature Range: **Up to 110 °C (230 °F).**
- Pressure Rating (Varies by pipe size and temperature):
 - **DN25 - DN300 (1" - 12"): Up to 15 bar (232 psi).**
 - **DN350 & Above (14" and up): Up to 8 bar (125 psi).**

Note: Pressure limits decrease as temperature increases.

Ideal for:

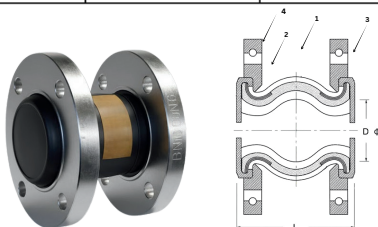
- HVAC Systems.
- Water and wastewater treatment.
- Oil & gas, chemical, and industrial piping applications.

STRUCTURE

Item #	Bagian (Part)	Material
1	(Body)	(Synthetic Rubber)
2	(Reinforcement)	(Nylon Cord)
3	(Wire)	(Hard Steel Wire)
4	(Fitting)	(Mild Steel Zn. Pltd.)

GENERAL CONDITION

Temp in C (F)	DN 25 (1") - DN 300 (12")	DN 350 (14") and up
77 (170)	16 (232)	8 (125)
82 (180)	14 (200)	7.5 (115)
88 (190)	12 (175)	7 (105)
93 (200)	10 (150)	6 (95)
99 (210)	8 (125)	3 (40)
104 (220)	6 (100)	2 (35)
110 (230)	5 (75)	1 (25)



RUBBER EXPANSION JOINTS

10 Single Sphere

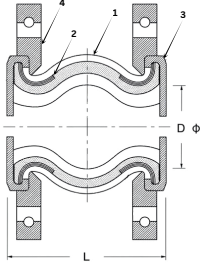
MOVEMENT ABSORPTION AND OPERATING CONDITION

Diameter (D) mm (in)	L (mm)	Allowanle Movement (mm)				Operating Condition
		Axial Compression (mm)	Axial Elongation (mm)	Transverse Deflection (mm)	Angular Deflection	Mas. Press. Bars (psi)
25 (1)	95	8	4	8	15°	16 (232)
32 (1.25)	95	8	4	8	15°	16 (232)
40 (1.5)	95	8	5	8	15°	16 (232)
50 (2)	105	8	6	8	15°	16 (232)
65 (2.5)	115	12	6	10	15°	16 (232)
80 (3)	130	12	10	10	15°	16 (232)
100 (4)	135	18	10	12	15°	16 (232)
125 (5)	170	18	10	12	15°	16 (232)
150 (6)	180	18	14	12	15°	16 (232)
200 (8)	205	25	14	22	15°	16 (232)
250 (10)	240	25	14	22	15°	16 (232)
300 (12)	260	25	16	22	15°	16 (232)
350 (14)	265	25	16	22	15°	10 (150)
400 (16)	265	25	16	22	15°	10 (150)
450 (18)	265	25	16	22	15°	10 (150)
500 (20)	265	25	16	22	15°	10 (150)
550 (22)	265	25	16	22	15°	10 (150)
600 (24)	265	25	16	22	15°	10 (150)
650 (26)	265	25	16	22	15°	10 (150)
700 (28)	265	25	16	22	15°	10 (150)
750 (30)	265	25	16	22	15°	6 (100)
800 (32)	265	25	16	22	15°	6 (100)
900 (36)	265	25	16	22	15°	6 (100)
1000 (40)	265	25	16	22	15°	6 (100)
1200 (48)	265	25	16	22	15°	6 (100)

- **Application Fluid:** Water, warm water, seawater, weak acids, alkalis, etc.
- **Available Flange Drilling:** JIS, DIN, ANSI, BS, and other standard drilling patterns.
- **Available Materials:** Chloroprene (Neoprene), Nitrile, EPDM, CSM (Hypalon), Butyl, Natural Rubber, etc.
- **Bursting Pressure:**
 - 64 bar (928 psi) for DN25-DN300 at ambient temperature.
 - 40 bar (580 psi) for DN350-DN700 at ambient temperature.
 - 24 bar (348 psi) for DN750-DN1200 at ambient temperature.
- **For specific rubber material temperature versus pressure ratings, please contact us.**

RUBBER EXPANSION JOINTS

10R Single Sphere



STRUCTURE

Item #	Bagian (Part)	Material
1	(Body)	(Synthetic Rubber)
2	(Reinforcement)	(Nylon Cord)
3	(Wire)	(Hard Steel Wire)
4	(Fitting)	(Mild Steel Zn. Pltd.)

GENERAL CONDITION

Temp C (F)	DN 25 (1") - DN 300 (12")	DN 350 (14") and up
77 (170)	16 (232)	8 (125)
82 (180)	14 (200)	7.5 (115)
88 (190)	12 (175)	7 (105)
93 (200)	10 (150)	6 (95)
99 (210)	8 (125)	3 (40)
104 (220)	6 (100)	2 (35)
110 (230)	5 (75)	1 (25)

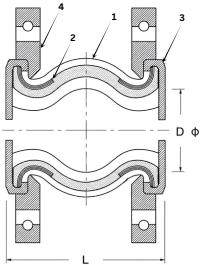
- **Application Fluid:** Water, warm water, seawater, weak acids, alkalis, etc.
- **Available Flange Drilling:** JIS, DIN, ANSI, BS, and other standard drilling patterns.
- **Available Materials:** Chloroprene (Neoprene), Nitrile, EPDM, CSM (Hypalon), Butyl, Natural Rubber, etc.
- **Bursting Pressure:**
 - 64 bar (928 psi) from DN25 - DN300 at ambient temperature.
 - **For specific rubber material temperature versus pressure ratings, please contact us.**

MOVEMENT ABSORPTION AND OPERATING CONDITION

Diameter (D) mm (in)	L (mm)	Allowance Movement (mm)				Operating Condition
		Axial Compression (mm)	Axial Elongation (mm)	Transverse Deflection (mm)	Angular Deflection	Mas. Press. Bars (psi)
25 (1)	150	12 (1/2)	9 (3/8)	12 (1/2)	15°	16 (232)
32 (1.25)	150	12 (1/2)	9 (3/8)	12 (1/2)	15°	16 (232)
40 (1.5)	150	12 (1/2)	9 (3/8)	12 (1/2)	15°	16 (232)
50 (2)	150	12 (1/2)	9 (3/8)	12 (1/2)	15°	16 (232)
65 (2.5)	150	12 (1/2)	9 (3/8)	12 (1/2)	15°	16 (232)
80 (3)	150	12 (1/2)	9 (3/8)	12 (1/2)	15°	16 (232)
100 (4)	150	15 (5/8)	9 (3/8)	12 (1/2)	15°	16 (232)
125 (5)	150	15 (5/8)	9 (3/8)	12 (1/2)	15°	16 (232)
150 (6)	150	15 (5/8)	9 (3/8)	12 (1/2)	15°	16 (232)
200 (8)	150	15 (5/8)	9 (3/8)	12 (1/2)	15°	16 (232)
250 (10)	200	19 (3/4)	12 (1/2)	19 (3/4)	15°	16 (232)
300 (12)	200	19 (3/4)	12 (1/2)	19 (3/4)	15°	16 (232)
350 (14)	200	19 (3/4)	12 (1/2)	19 (3/4)	15°	10 (150)
400 (16)	200	19 (3/4)	12 (1/2)	19 (3/4)	15°	10 (150)
450 (18)	200	19 (3/4)	12 (1/2)	19 (3/4)	15°	10 (150)
500 (20)	200	19 (3/4)	12 (1/2)	19 (3/4)	15°	10 (150)
600 (24)	250	19 (3/4)	12 (1/2)	19 (3/4)	15°	10 (150)

RUBBER EXPANSION JOINTS

5 Single Sphere



STRUCTURE

Item #	Bagian (Part)	Material
1	(Body)	(Synthetic Rubber)
2	(Reinforcement)	(Nylon Cord)
3	(Wire)	(Hard Steel Wire)
4	(Fitting)	(Mild Steel Zn. Pltd.)

GENERAL CONDITION

Temp C (F)	DN 25 (1") - DN 300 (12")	DN 350 (14") and up
77 (170)	16 (232)	8 (125)
82 (180)	14 (200)	7.5 (115)
88 (190)	12 (175)	7 (105)
93 (200)	10 (150)	6 (95)
99 (210)	8 (125)	3 (40)
104 (220)	6 (100)	2 (35)
110 (230)	5 (75)	1 (25)

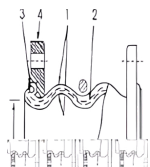
- **Application Fluid:** Water, warm water, seawater, weak acids, alkalis, etc.
- **Available Flange Drilling:** JIS, DIN, ANSI, BS, and other standard drilling patterns.
- **Available Materials:** Chloroprene (Neoprene), Nitrile, EPDM, CSM (Hypalon), Butyl, Natural Rubber, etc.
- **Bursting Pressure:**
 - 64 bar (928 psi) from DN25 - DN300 at ambient temperature.
 - **For specific rubber material temperature versus pressure ratings, please contact us.**

MOVEMENT ABSORPTION AND OPERATING CONDITION

Diameter (D Φ) mm (in)	L (mm)	Allowanle Movement (mm)				Operating Condition
		Axial Compression (mm)	Axial Elongation (mm)	Transverse Deflection (mm)	Angular Deflection	Mas. Press. Bars (psi)
25 (1)	130	30	20	20	35°	16 (232)
32 (1.25)	130	30	20	20	35°	16 (232)
40 (1.5)	130	30	20	20	35°	16 (232)
50 (2)	130	30	20	20	35°	16 (232)
65 (2.5)	130	30	20	20	30°	16 (232)
80 (3)	130	30	20	20	30°	16 (232)
100 (4)	130	30	20	20	25°	16 (232)
125 (5)	130	30	20	20	25°	16 (232)
150 (6)	130	30	20	20	15°	16 (232)
200 (8)	130	30	20	20	15°	16 (232)
250 (10)	130	30	20	20	10°	16 (232)
300 (12)	130	30	20	20	10°	16 (232)

RUBBER EXPANSION JOINTS

20 Twin Sphere



STRUCTURE

Item #	Bagian (Part)	Material
1	(Body)	(Synthetic Rubber)
2	(Reinforcement)	(Nylon Cord)
3	(Wire)	(Hard Steel Wire)
4	(Fitting)	(Mild Steel Zn. Pltd.)
5	(Root Ring)	(Mild Steel Zn. Pltd.)

GENERAL CONDITION

Temp C (F)	DN 25 (1") - DN 300 (12")	DN 350 (14") and up
77 (170)	16 (232)	8 (125)
82 (180)	14 (200)	7.5 (115)
88 (190)	12 (175)	7 (105)
93 (200)	10 (150)	6 (95)
99 (210)	8 (125)	3 (40)
104 (220)	6 (100)	2 (35)
110 (230)	5 (75)	1 (25)

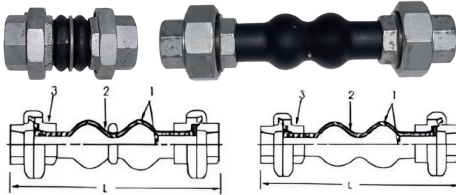
- **Application Fluid:** Water, warm water, seawater, weak acids, alkalis, etc.
- **Available Flange Drilling:** JIS, DIN, ANSI, BS, and other standard drilling patterns.
- **Available Materials:** Chloroprene (Neoprene), Nitrile, EPDM, CSM (Hypalon), Butyl, Natural Rubber, etc.
- **Bursting Pressure:**
 - 64 bar (928 psi) from DN25 - DN300 at ambient temperature.
 - **For specific rubber material temperature versus pressure ratings, please contact us.**

MOVEMENT ABSORPTION AND OPERATING CONDITION

Diameter (D ϕ) mm (in)	L (mm)	Allowable Movement (mm)				Operating Condition
		Axial Compression (mm)	Axial Elongation (mm)	Transverse Deflection (mm)	Angular Deflection	Mas. Press. Bars (psi)
25 (1)	120	50	30	35	40°	16 (232)
25 (1)	175	50	30	35	40°	16 (232)
32 (1.25)	175	50	30	35	40°	16 (232)
40 (1.5)	175	50	30	35	40°	16 (232)
50 (2)	175	50	30	35	40°	16 (232)
65 (2.5)	175	50	30	35	40°	16 (232)
80 (3)	175	50	30	35	40°	16 (232)
100 (4)	225	57	35	40	35°	16 (232)
125 (5)	225	57	35	40	35°	16 (232)
150 (6)	225	57	35	40	35°	16 (232)
200 (8)	325	63	35	45	30°	16 (232)
250 (10)	325	63	35	45	30°	16 (232)
300 (12)	325	63	35	45	30°	16 (232)
350 (14)	350	40	30	30	20°	10 (150)
400 (16)	350	40	30	30	20°	10 (150)
450 (18)	350	40	30	30	20°	10 (150)
500 (20)	350	40	30	30	20°	10 (150)
600 (24)	350	40	30	30	10°	10 (150)

RUBBER EXPANSION JOINTS

Double Sphere Threaded Unions Style 30



FEATURES

- Superb vibration absorption.
- Effective for large eccentricity, thermal and bending angle.
- Low-cost installation and operation.
- BSPP, BSPT, and NPT threaded unions available.

STRUCTURE

Item #	Bagian (Part)	Material
1	(Body)	(Synthetic Rubber)
2	(Reinforcement)	(Nylon Cord)
3	(Female threaded Unions)	(Malleable Steel)

MOVEMENT DURING VIBRATION AND OPERATING CONDITION

Diameter (D ϕ) mm (in)	L (mm)					Operating Condition		
		Axial Compression (mm)	Axial Elongation (mm)	Transverse Deflection (mm)	Angular Deflection	Max. Pressure Kg/cm ² (PSIG)	Max. Temperature C (F)	Vacuum Rating mm Hg(in)
15 (1/2)	200	22	6	22	45°	10 (150)	60 (140)	405 (16.20)
20 (3/4)	200	22	6	22	45°	10 (150)	60 (140)	405 (16.20)
25 (1)	200	22	6	22	45°	10 (150)	60 (140)	405 (16.20)
32 (5/4)	200	22	6	22	45°	10 (150)	50 (122)	405 (16.20)
40 (3/2)	200	22	6	22	45°	10 (150)	40 (104)	405 (16.20)
50 (2)	200	22	6	22	45°	10 (150)	30 (86)	405 (16.20)
65 (5/2)	240	22	6	22	45°	10 (150)	20 (68)	405 (16.20)
80 (3)	240	22	6	22	45°	10 (150)	20 (68)	405 (16.20)

Flexible Rubber Pipe Style 50

FEATURES

- Superb vibration absorption.
- Effective for large eccentricity, thermal and bending angle.
- Low-cost installation and operation.
- BSPP, BSPT, and NPT threaded unions available.

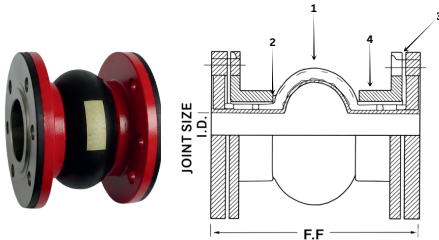
AVAILABLE DIMENSIONS

- Dimensions from 1 1/2" - 24".
- 23", 18", 24" long, and other lengths are also available.



RUBBER EXPANSION JOINTS

Single Arch Expansion Joint Style 60



STRUCTURE

Item #	Bagian (Part)	Material
1	(Body)	(Butyl or other elastomers also available)
2	(Reinforcement)	(Nylon Tire Cord)
3	(Rubber Flange)	(Butyl or Other elastomers)
4	(split Retaining Rings)	(Cast ductile iron flanges, various drillings available)

FEATURES

- Mold construction.
- No material rings embedded.
- Single arch design with a double arch movement.
- For heavy duty use.
- Can be furnished with filled or unfilled arch.
- Filled arch prevents materials from obstructing the arch, and the allowable movement is reduced by half.

OPERATING CONDITION AND MOVEMENT

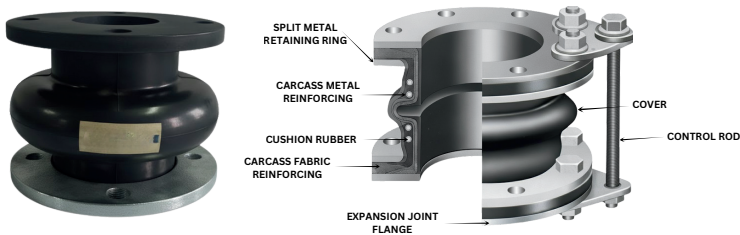
Joint size I.D. mm (in)	Face To Face (in)	Max Pressure/Max Vacuum		Max Temperatur (F)	Allowable Movement			
		(PSIG)	(inHg)		Axial		Deflection	
					Compression (in)	Elongation (in)	Lateral (in)	Angular (Degree)
50 (2)	6	150	15	250	1-3/4	3/4	3/4	35
65 (5/2)	6	150	15	250	1-3/4	3/4	3/4	30
80 (3)	6	150	15	250	1-3/4	3/4	3/4	30
100 (4)	6	150	15	250	1-3/4	3/4	3/4	25
125 (5)	6	150	15	250	1-3/4	3/4	3/4	25
150 (6)	6	150	15	250	1-3/4	3/4	1	20
200 (8)	6	150	15	250	1-3/4	3/4	1	15
250 (10)	8	150	15	250	1-3/4	3/4	1	15
300 (12)	8	150	15	250	1-3/4	3/4	1	15
350 (14)	8	130	10	250	2	7/8	1-1/8	12
400 (16)	8	110	10	250	2	7/8	1-1/8	12
450 (18)	8	110	10	250	2	7/8	1-1/8	9
500 (20)	8	110	10	250	2	7/8	1-1/8	9
600 (24)	10	100	10	250	2-1/4	1	1-1/8	9

REMARKS

- Available flange, drilling, and synthetic elastomers, please refer to style 10.

RUBBER EXPANSION JOINTS

Spool Type Expansion Joint Style 75

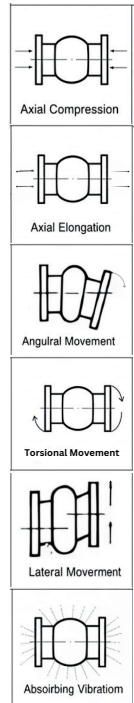


FEATURE

- This unit is made of natural or synthetic elastomers, reinforced with nylon, and supplied with metal internal rings for strength.
- Both filled and unfilled arch available.
- **Please consult the factory for special materials, larger sizes or other working pressures.**

OPERATING CONDITION AND MOVEMENT

Joint size I.D. mm (in)	Face To Face (in)	Max Pressure/Max Vacuum		Max Temperatur (F)	Allowable Movement			
		(PSIG)	(inHg)		Axial		Deflection	
					Compression (in)	Elongation (in)	Lateral (in)	Angular (Degree)
50 (2)	6	165	26	250	7/16	1/4	1/2	19
65 (5/2)	6	165	26	250	7/16	1/4	1/2	15
80 (3)	6	165	26	250	7/16	1/4	1/2	13
100 (4)	6	165	26	250	7/16	1/4	1/2	10
125 (5)	6	165	26	250	7/16	1/4	1/2	8
150 (6)	6	165	26	250	7/16	1/4	1/2	6
200 (8)	6	140	26	250	7/16	3/8	1/2	6
250 (10)	8	140	26	250	11/16	3/8	1/2	5
300 (12)	8	140	26	250	11/16	3/8	1/2	5
350 (14)	8	85	15	250	11/16	3/8	1/2	4
400 (16)	8	65	15	250	11/16	3/8	1/2	4
450 (18)	8	65	15	250	11/16	3/8	1/2	3
500 (20)	8	65	15	250	13/16	7/16	1/2	3



EVENT AND ACTIVITIES - OGA

SKM also actively participates in Oil and Gas Asia (OGA) exhibitions, and we have successfully opened our booth there. The response from visitors has been overwhelmingly positive, with strong interest in our products and solutions.

By showcasing sample bellows and related equipment, we provide clients and partners the opportunity to experience firsthand the quality, durability, and reliability of our products. These events strengthen our industry presence, create valuable networking opportunities, and enable us to directly engage with customers, thereby better understanding their needs.



TRAINING AND DEVELOPMENT

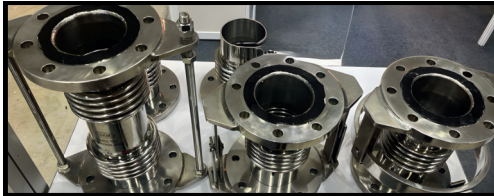
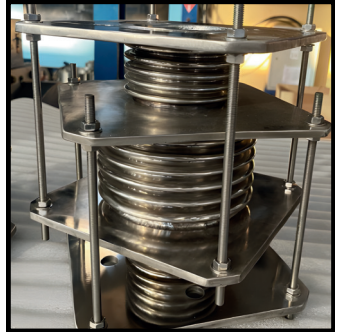
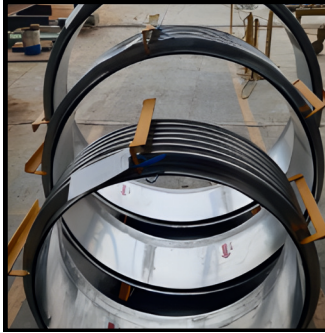


At SKM, we place a strong emphasis on training and development to support our clients throughout the project lifecycle. We provide end-user training, comprehensive documentation, and handover support to ensure smooth operations. Our team also works closely with clients to address and resolve technical challenges related to expansion joints, ensuring reliability, safety, and long-term performance.





OUR EXPANSION JOINT GALLERY





NOTES



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STANDARD EXPANSION JOINTS SPECIFICATION SHEET			
Customer		Date:	page
Project		Prepared:	
Item or Tag Number			
Quantity			
Size			
Style or Type (Single, universal, hinged, gimbal etc..)			
End connection		Thickness/Flange Rating	
*Pressure		Design	
		Operating	
		Test	
*Temperature		Design	
		Operating	
		Installation	
Media		Media	
		Flow Velocity	
		Flow Direction	
Movement & Cycle Life	Installation	Axial Extension	
		Axial Compression	
		Lateral	
		Angular	
		No of cycles	
	Design	Axial Extension	
		Axial Compression	
		Lateral	
		Angular	
		No of cycles	
	Operating	Axial Extension	
		Axial Compression	
		Lateral	
		Angular	
		No of cycles	
Material		Bellows	
		Liner	
		Cover	
Dimensions		Over All Length (OAL)	
		Maximum OD	
		Minimum ID	
Spring Rate		Maximum Axial Spring Rate	
		Maximum Lateral Spring Rate	
		Maximum Angular Spring Rate	
Quality Assurance		Bellows Long Seam Weld	
		Bellows attachment weld	
		Piping	
*Required Code			
Applicable codes and Standards B31.1, B31.3 & Section VIII Div. 1			

Special Note: This format developed based on EJMA 11th Edition incase customer has additional information to design Expansion joints please feel free to attach to this format





NOTES



STANDARD RECTANGULAR EXPANSION JOINTS SPECIFICATION SHEET		
Customer	Date:	Page:
Project	Prepared:	
Item or Tag Number		
Quantity		
Size (Long Side & Short Side)		
Orientation (Horizontal/ Vertical/ Inclined)		
Style or Type		
Corner Type		
End connection	Thickness/Flange Rating	
*Pressure	Design	
	Operating	
*Temperature	Design	
	Operating	
	Installation	
Media	Media	
	Flow Velocity	
	Flow Direction	
Movement & Cycle Life	Axial Extension	
	Axial Compression	
	Lateral (Parallel to short side)	
	Lateral (Parallel to Long side)	
	Angular (Parallel to short side)	
Material	Angular (Parallel to Long side)	
	Bellows	
	Liner	
	Cover	
Dimensions	Over All Length (OAL)	
Maximum Spring Rates	Lateral (Parallel to short side)	
	Lateral (Parallel to long side)	
	Angular (Parallel to short side)	
	Angular (Parallel to long side)	
Quality Assurance	Bellows Long Seam Weld	
	Bellows attachment weld	
	Piping	
*Required Code		
Applicable codes and Standards B31.1, B31.3 & Section VIII Div. 1		

Special Note: This format developed based on EJMA 11th Edition incase customer has additional information to design Expansion joints please feel free to attach to this format





NOTES

Appendix L:



Expansion Joint Specification Sheet

Prepared By:
Non-Metallic Expansion Joint Division
Fluid Sealing Association

		YOUR CUSTOMER	
		DATE:	THSI SHEET NO.
		PROPOSAL NUMBER:	
		CUSTOMER NAME:	
		PROJECT NAME:	
		INQUIRY/JOB NUMBER	
		ITEM NO. TAG NO.	
		QUANTITY REQUIRED:	
YOUR COMPANY	COMPANY NAME:		
	MAILING ADDRESS:		
SIZE	CITY, STATE/PROVINCE, ZIP/POSTAL CODE, COUNTRY:		
	NAME OF PERSON SUBMITTING DATA:	PHONE NO.	
FLOWING MEDIUM	PIPE SIZE OF APPLICATION: Nominal pipe size or the inside diameter of the connecting flange.	INCHES	
	INSTALLED LENGTH: Is the space between connecting pipe flanges. Indicate limitations, if any.	INCHES	
PRESSURES	FLOWING MEDIUM: Indicate chemical. If flowing medium is corrosive, abrasive, or viscous, explain in detail.		
	TYPE OF MEDIUM: Indicate if liquid, gas, slurry, solids, etc.		
MOVEMENTS	TEMPERATURE OF FLOWING MEDIUM: Indicate both operating and maximum temperatures at the expansion joint.	OPERATE	MAXIMUM
	TEMPERATURE OF SURROUNDING ATMOSPHERE: Indicate both minimum and maximum temperatures of atmosphere at the expansion joint.	MINIMUM	MAXIMUM
MISCELLANEOUS	OPERATING PRESSURE AT THE JOINT: Actual pressure in which system works in normal conditions.	POSITIVE	NEGATIVE
	DESIGN OR TEST PRESSURE OF THE SYSTEM: Highest/most severe pressure expected during operation.	POSITIVE	NEGATIVE
	SURGE PRESSURE OF THE SYSTEM: Increased pressure due to pump starts, valve closing, etc.	POSITIVE	NEGATIVE
	AXIAL COMPRESSION AT JOINT: In inches as a result of pipe extension - expansion.	INCHES	
	ACTUAL ELONGATION AT JOINT: In inches as a result of pipe contraction.	INCHES	
	LATERAL DEFLECTION AT JOINT: In inches.	INCHES	
	ANGULAR MOVEMENT AT JOINT: In inches.	DEGREES	
	TORSIONAL MOVEMENT AT JOINT: In inches.	DEGREES	
	PIPE FLANGE DRILLING: Indicates specific standard such as 150# ANSI B16.5. If special, provide: Flange O.D., Bolt, Circle, Number and Size of Holes.	SPECIFICATION	
	MATING PIPE FLANGE THICKNESS: In inches.	INCHES	
	LOCATION OF JOINT INSTALLATION: Indoors or Outdoors.		
	RETAINING RINGS: Are required on all installations. Reusable, they need not be ordered with replacement or spare expansion joints.	YES OR NO	
	CONTROL UNIT ASSEMBLIES: Are recommended for use in all expansion joint applications. Control units must be used when piping support or anchoring is insufficient.	YES OR NO	
	HYDRISTATIC TEST OF JOINT REQUIRED BY MANUFACTURER OF PRODUCT:	YES OR NO	



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OUR CLIENT





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OUR CLIENT



GRAMA BAZITA
Engineering Solutions

PT ASPROS BINAREKA



PT CIKARANG LISTRINDO
POWER COMPANY



PRefChem



SHIBAURA GROUP

NOTES

This image shows a full page of white paper with horizontal dashed lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

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[illegible]

This image shows a full page of a document template designed for handwritten notes or essays. It features approximately 20 evenly spaced, thin grey horizontal lines across the entire width of the page. The margins are consistent on all sides, providing ample space for writing. There are no pre-printed questions, headings, or other markings on the page.

NOTES

This image shows a full page of white paper with horizontal dashed lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.



PT. SK METALINDO

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“

**WE ARE YOUR
TECHNOLOGY
PARTNER!**

”

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