

The Essential Guide to Evaluating Expansion Joints

What You Need to Know



Expansion Joint Manufacturers Association advocates for careful inspection of expansion joints and customized maintenance schedules to determine replacement needs. Our checklist and FAQ can help you identify signs of expansion joint failure, and prevent costly downtime.

Use our checklist to find out.

Even the most robust industrial equipment experiences wear and tear. Expansion joints are crucial components in piping systems, allowing for movement and mitigating stress. But how do you know when they're due for replacement?

EJMA advocates for careful inspection, adherence to standards, and robust, customized maintenance schedules to determine replacement needs. Our checklist helps you identify key signs of expansion joint failure, ensuring the integrity of your operations and preventing costly downtime.

Replacement Expansion Joint Checklist:

- ☐ **Visual Signs of Wear:** Look for cracks in welds, bulges, thinning of the material, distortion or yielding of hardware and bellows (squirm), corrosion (rust) or other visible signs of deterioration. These are often the first indicators of a problem.
- ☐ **Leaks or Weeping:** Any sign of fluid escaping or loss in pressure, no matter how small, points to a compromise in the expansion joint's seal. This is a crucial aspect of leak detection.
- ☐ **Hardening or Loss of Flexibility:** A fabric or rubber expansion joint that feels rigid or has lost its ability to flex is no longer effectively absorbing movement, leading to increased stress on your system.
- ☐ **Excessive Vibration or Noise:** Unusual industrial equipment vibration, flow induced vibration or new noises originating near the expansion joint can signal internal damage or improper function.
- ☐ **Misalignment or Stress on Adjacent Piping:** If you notice pipes pulling away, bending, sagging or showing signs of strain near the expansion joint, it may not be performing its compensatory role.
- ☐ **Age of the Expansion Joint:** Even without visible damage, aging expansion joints are more susceptible to failure. Proactive replacement based on recommended service life is a cornerstone of predictive maintenance.
- ☐ **Changes in Operating Conditions:** Has the temperature, pressure, or media of your system changed? These shifts can significantly impact the lifespan of an expansion joint and necessitate earlier replacement.
- ☐ **Overall Pipeline Performance:** An expansion joint is an integral part of piping infrastructure: many times a problem with an expansion joint is hiding a deeper issue in the system. For expansion joints to work, guides, supports and anchors must all work together to have an efficient piping system. If one of these support binds fails, it may cause undue stress and premature failure for an expansion joint. Therefore, it is recommended that all components of the system be inspected.

Don't wait for a critical failure. Proactive maintenance is intelligent engineering.

If your inspection reveals any of these warning signs or if you're due for a routine assessment, contact our experts.

We provide comprehensive expansion joint solutions, from precise diagnostics to efficient, high-performance replacements. At US Bellows, we see expansion joints as dynamic stress mitigators, vital for long-term reliability. Our teams provide engineered expansion joints for optimal performance, safeguarding your piping infrastructure.

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Expansion joints are critical components in maintaining the structural integrity of piping systems. They accommodate movement caused by thermal expansion and contraction, cryogenic or seismic activity, and building settlement, preventing stress and damage to the surrounding structure. To ensure long-term performance and safety, regular inspection and timely replacement of expansion joints is essential. The Expansion Joint Manufacturers Association (EJMA), a globally recognized authority, provides comprehensive standards and recommendations for the design, application, and inspection of expansion joints, and emphasizes the importance of a proactive approach to expansion joint replacement.

1. What's an expansion joint, and why is it important?

An expansion joint in piping is a specialized fitting designed to absorb the dimensional changes in a pipe system while containing the system pressure. They are crucial for preventing cracks and damage caused by temperature changes, settling, or seismic activity. The dimensional changes can be caused by thermal expansion/contraction or vibration. The flexible element of an expansion joint is called a bellows, consisting of several flexible, u-shaped convolutions. The total movement capacity of a bellows is proportional to the number of convolutions it's designed with. These expansion joints are crucial for preventing damage caused by temperature changes, settling or seismic activity to the piping system, equipment, and connected structures, ensuring the long-term integrity of the system.

Expansion Joints are highly engineered products and require special handling as they are made of thin-gauge material. Installations include properly vetting the expansion joint design, manufacturing quality, test and operating procedures.

2. What are the most common signs that your expansion joints are ready to be replaced?

Look for visible signs of deterioration. This often includes cracking the joint welds or tearing in the fabric material, leaks, condensation, loss in pressure, or a noticeable loss of flexibility where the joint feels stiff or brittle. You might also see signs of chipping or crumbling around the edges of a rubber joint.

EJMA breaks down in the typical causes of Metal Expansion Joint failures into the following categories:

- Shipping and handling damage
- Improper installation and/or insufficient protection during and after installation
- Improper anchoring, guiding, support of the piping system
- Anchor failure in service
- Bellows corrosion or erosion
- System over-pressurization (upset condition)
- Vibration on the piping not originally accounted for in the design. Either Mechanical or Flow induced resulting in Fatigue failure
- Excessive bellows movements (greater than the design conditions)
- Packing of particulate matter in the bellows convolution preventing proper movement of the bellows.

3. I see a small crack. Is that a big deal?

Everytime a metal expansion joint compresses or extends, small microscopic cracks are created, which get bigger everytime they cycle. You would want to check the welds first. Once these small cracks become detectable by NDE (non-destructive Examination) methods or even worse through the naked eye, one needs to act.

Even small cracks can be indicators of a larger issue. They can allow water intrusion, leading to further damage. It's best to address them early to prevent more significant, costly repairs down the line.

4. How does age affect expansion joints?

Like any material exposed to the elements and constant movement, expansion joints degrade over time. For both fabric and rubber expansion joints, UV radiation, extreme temperatures, and repeated compression/expansion cycles cause the materials to lose their elasticity and strength, making them more prone to cracking and failure. Most joints have a lifespan, and exceeding it increases the risk of problems.

5. Can I repair an expansion joint, or does it always need replacing?

Minor, isolated damage might be repairable, but often, if you're seeing widespread cracking or significant material breakdown, it's a sign of overall material fatigue. In such cases, a full replacement is usually the most effective and long-lasting solution to restore the joint's function and prevent future issues.

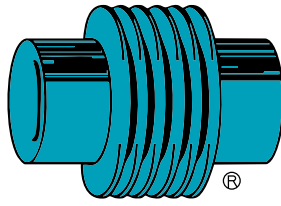
6. How often should I inspect my expansion joints?

Regular inspections are key! For most structures, at least an annual visual inspection is recommended. All bellows expansion joints in service should be inspected periodically for mechanical damage; distortion caused by overpressure, overextension or over compression, cracking, cracking of the bellows attachment welds, corrosion, restriction of movement from foreign material, and any others signs that might indicate premature failure. However, if you notice changes/distortion on the expansion joint, its wise to perform more frequent checks.

7. Who should I contact if I suspect my expansion joints need replacement?

If you observe any of the signs mentioned, it's best to contact a qualified contractor or structural engineer specializing in building envelope or expansion joint systems. US Bellows specializes in installation, maintenance, survey and inspection of fabric, metallic and rubber expansion joints. Schedule time with our expert field service teams to discuss maintenance and service; they can recommend the best course of action, and ensure any necessary repairs or replacements are done correctly.

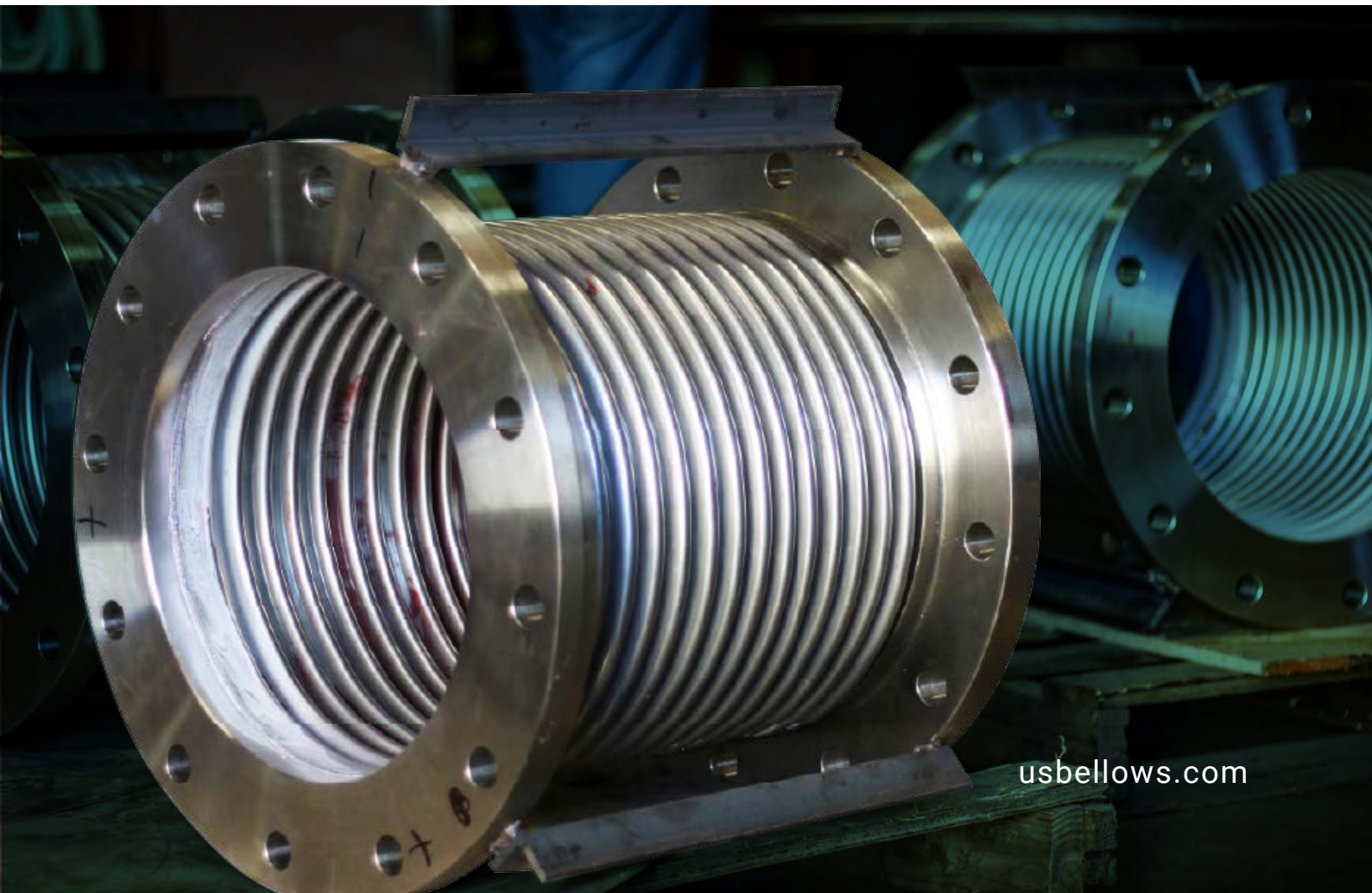
Schedule a Meeting with an Engineer



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EXPANSION JOINTS

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