



## AFLEX METAL BELLOWS MAINTENANCE PROCEDURES

Metal bellows assemblies are designed for long-term operation under specified conditions with minimal intervention. When installed and operated within design parameters, bellows are generally considered maintenance-free. However, periodic inspections are recommended to ensure continued safe operation and to identify any signs of abnormal wear, damage, or environmental factors that may affect performance.

### GENERAL GUIDELINES

- Bellows assemblies require no routine maintenance under normal operating conditions.
- Scheduled visual inspections should form part of the site's general piping or plant maintenance routines.
- Maintenance actions are typically limited to inspection and ensuring surrounding equipment does not impose unexpected loads or movements on the bellows.

### INSPECTION PROCEDURE

Recommended Frequency:

- Visual inspection during routine shutdowns or at least annually, unless site conditions suggest otherwise.

- Inspection Steps:

1. Visual Examination:

- Inspect bellows convolutions for deformation, cracks, corrosion, or leaks.

2. Attachment Points:

- Check welds, flanges, and tie rods for cracks, corrosion, or loose fasteners.

3. Alignment and Supports:

- Verify pipe alignment remains within design tolerances. Confirm supports are intact.

4. Movement Check:

- Ensure bellows are free to absorb designed movement and are not restricted.

5. Protective Components:

- Inspect liners, covers, and insulation for damage or corrosion.

### CORRECTIVE ACTIONS

- If leaks, cracks, severe deformation, or excessive corrosion are detected:
  - Isolate the system.
  - Replace the bellows assembly (bellows are generally non-repairable components).
- If alignment or support issues are identified:
  - Rectify pipe misalignment or faulty supports before restarting the system.



### OPERATIONAL CONSIDERATIONS

- Ensure system pressure, temperature, and movement stay within the bellows design limits.
- Avoid excessive vibration, torsional loads (unless designed for torsion), or over-extension beyond rated movement.

### RECORD KEEPING

- Document inspection findings, including:
  - Date of inspection
  - Observations
  - Corrective actions (if any)
- Retain inspection records as part of the plant maintenance log.

### IMPORTANT NOTES

- Bellows are not designed for field modification.
- If damage or defects are suspected, consult the manufacturer before attempting repairs or replacements.
- Replacement bellows should match the original design specifications to maintain system integrity.