



Chemical Compatibility Prevents Expansion Joint Failure in a Reclaimed Water Facility Ventilation System

Application:

Holz Rubber Company engineered a custom rubber expansion joint for a ventilation system handling oil-saturated process air at a reclaimed water treatment facility.

Ventilation and flue duct systems in municipal and industrial water treatment facilities are exposed to demanding operating conditions that may include elevated temperatures, airborne contaminants, petroleum-based oils, corrosive vapors, vibration, and thermal expansion.

Selecting the correct expansion joint elastomer is critical for maintaining system integrity, preventing leaks, and maximizing equipment service life. When incompatible rubber compounds are used, premature expansion joint failure can occur—even when the mechanical design is otherwise sound.

Problem:

Facility personnel reported that a flue duct rubber expansion joint was leaking during normal operation. A system evaluation determined that the tube (gas-side) material used in the existing expansion joint was chemically incompatible with the petroleum-based oil present in the ventilation system.

As the incompatible elastomer was continuously exposed to the process media, the rubber began to deteriorate internally, allowing oil to penetrate the body of the expansion joint.

This resulted in:

- Swelling of the rubber bellows
- Loss of structural integrity
- Oil saturation throughout the expansion joint body
- Oil weeping through the outer cover
- Leakage onto the floor below the ductwork, creating an avoidable safety hazard

The expansion joint had not failed because of age or excessive movement—it failed because the wrong elastomer had been selected for the application.

Solution:

Holz Rubber's Sales Engineer and local distributor reviewed the complete operating specifications, including:

- Process media
- Operating pressure
- Operating temperature
- Ventilation system design
- Chemical compatibility requirements

After evaluating the application, Holz Rubber determined that the existing elastomer was unsuitable for continuous exposure to petroleum-based oils.





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Solution:

Rather than duplicating the failed expansion joint, Holz engineered a custom replacement utilizing:

- A Nitrile (Buna-N) tube for exceptional resistance to petroleum-based oils
- A durable Neoprene cover for outstanding weather, ozone, and environmental resistance
- Materials specifically selected for the facility's operating environment

Because Nitrile elastomers offer excellent compatibility with petroleum-based products, the new expansion joint was designed to provide significantly longer service life while preventing internal deterioration and oil migration through the joint body.

Results:

Correct Material Selection

Extended Expansion Joint Service Life

Improved Plant Safety

Increased System Reliability

Engineered for Long-Term Performance



Why Elastomer Compatibility Matters:

One of the most common causes of rubber expansion joint failure is selecting an elastomer that is incompatible with the system media. Even a properly designed expansion joint can fail prematurely when exposed to chemicals or oils that attack the rubber compound. When specifying an industrial rubber expansion joint, engineers should evaluate:

- Chemical compatibility
- Process media
- Operating temperature
- Operating pressure
- Thermal movement
- Ozone and UV exposure
- Abrasion resistance
- Service life requirements

Selecting the proper elastomer can dramatically improve expansion joint performance while reducing maintenance costs, equipment failures, and unplanned downtime.

Holz Rubber Specializes In:

- Chemical-Resistant Rubber Expansion Joints
- Nitrile (Buna-N) Expansion Joints
- Neoprene Expansion Joints
- Wastewater Treatment Expansion Joints
- Reclaimed Water Facility Expansion Joints
- Flue Duct Expansion Joints
- Ventilation System Expansion Joints
- Chemical Compatibility Analysis
- Expansion Joint Failure Analysis
- Custom Elastomer Selection

"Experience the Difference"

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