



Swagelok Western New York

WHITE PAPER

Don't Intermix: Why Mixing Tube Fitting Brands Is a Safety and Liability Risk

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Executive Summary

The Swagelok Tube Fitter's Manual states that genuine Swagelok tube fittings should not be intermixed with components from other manufacturers. Genuine Swagelok tube fittings are qualified as a complete, integrated system; nuts, front ferrules, back ferrules, and bodies are engineered and tested together. Substituting components from another manufacturer, even one that appears dimensionally identical, invalidates that qualification, introduces unquantified failure risk, and, in regulated environments, creates direct legal and compliance liability.

Interchange Versus Intermix

There are two different ways fittings from different manufacturers are used incorrectly, both carrying the same risks.

Interchange – When a tube fitting from one manufacturer is disassembled and reassembled with a fitting from a different manufacturer.

Intermix – Tube fitting components (nut, ferrules, body) from two different manufacturers are mixed to create a single fitting, or a tube fitting from one manufacturer is installed on another manufacturer's component (valve, hose etc.).

Why Fittings Look Interchangeable But Are Not

The Engineered System

A compression tube fitting appears simple: a body, a nut, and one or two ferrules. Every dimension in this system is interdependent. The ferrule cone angles, the body bore geometry, the nut thread pitch, and the ferrule material hardness, are all co-designed and co-validated. Changing any one component changes the system.

Genuine Swagelok tube fittings are tested and qualified to ASTM standards and, as a complete assembly, to internal qualification protocols that encompass pressure cycling, vibration, thermal cycling, and bend loading.

However, it is important to note that every tube fitting manufacturer has their own design and manufacturing process; there is no industry-wide design standard for tube fittings.

There are no products from other manufacturers that are reliably proven to be “Swagelok-compatible.” Every manufacturer has a different tube fitting design, machining practices and tolerances, and raw material standards, and thus should not be considered identical or interchangeable.

The most diligent stock separation and identification practices still risk the potential introduction of accidental intermix to the final product being manufactured for the end customer.

Where Tolerances Diverge

Component	Critical Variable	Effect of Mismatch
Front ferrule	Cone angle (°)	Incomplete seal contact
Back ferrule	Back ferrule presence	Incompatible with single ferrule design
Body	Bore chamfer geometry	Ferrule mis-seating
Nut	Thread length	Ferrule engagement with body
Tube OD tolerance	Hardness range	Ferrule cold-weld failure

The Three Failure Modes of Intermixed Fittings

Intermixed or interchanged fittings may result in:

- Inconsistent or incompatible sealing surfaces due to differences in design, geometry, tolerances, and material properties
- Reduced sealing effectiveness from mismatched swaging mechanisms and torque requirements
- Compromised performance and increased risk of fatigue failure

For these reasons, interchanging and intermixing tube fitting components can lead to unpredictable performance, increased costs, and potential safety hazards. Intermix and interchange may also void your warranty. For example, fittings intermix and interchange will void Swagelok's Limited Lifetime Warranty, regardless of whether alternative components are labeled as "Swagelok-compatible," resulting in even higher costs if and when a problem occurs.

Regulatory and Liability Exposure

While there are no industry-wide design standards for tube fittings, there are specification standardizations that must be understood and adhered to.

The International Association of Oil & Gas Producers' (IOGP) Joint Industry Program 33 (JIP33) specifications aim to reduce variation throughout the supply chain and enable greater capital cost control. Specification S-716 covers small-bore tubing and fittings emphasizing that:

- "Fittings shall be from a single manufacturer."
- "Intermixing of tube fittings from different manufacturers shall not be acceptable."
- "Interchanging of tube fittings from different manufacturers shall not be acceptable."

OSHA 29 CFR 1910.119 (Process Safety Management (PSM)) requires that equipment in highly hazardous chemical service be maintained in accordance with manufacturer's specifications and good engineering practices. Using components that the manufacturer explicitly does not qualify — as Swagelok's documentation makes clear — constitutes a deviation from manufacturer specifications.

The **EPA's Risk Management Program (40 CFR Part 68) and Leak Detection and Repair (LDAR) requirements (40 CFR Parts 60 and 63)**, are Clean Air Act regulations designed to control hazardous air emissions and prevent chemical catastrophes. Under these regulations, companies must develop and maintain mechanical integrity programs that use qualified equipment, suitable for the process application, to avoid fugitive emissions. An intermixed fitting would be considered unqualified equipment as it cannot be documented to satisfy the Quality and Assurance requirement of the EPA Risk Management Program.

As per LDAR requirements, threaded and compression connectors are an explicitly regulated component category subject to monitoring for fugitive Volatile Organic Compound (VOC) or Hazardous Air Pollutant (HAP) emissions.

In short, intermixing fittings creates a serious regulatory compliance issue which can quickly compound into an emissions and safety risk.

Conclusion and Recommendations

Genuine Swagelok tube fittings are precision-engineered components, and the qualification data that justifies every pressure rating, temperature limit, and vibration specification applies only to the system as designed using Swagelok body, nut, and ferrules and assembled per Swagelok's procedures.

Swagelok Western New York has offices and warehouses located in Buffalo, Rochester and Syracuse to locally-service customers in western and central New York, and from northern Pennsylvania to New York's north country.

Our fluid system experts, from sales to field engineers to fabrication technicians, consult on-site with customers, assess their existing or planned systems and recommend the components and materials to meet the customer's desired results.

In addition, Swagelok Western NY provides robust training programs and hands-on support to ensure customers' new-hires and existing associates are properly trained on Swagelok tube fitting installation and the risks of improper installation.

Single-sourcing your tube fittings from one reliable supplier is a good way to avoid potential interchange and intermix, even by accident.

Avoiding interchange / intermix is an industry best practice. The cost of enforcement is low: the cost of non-compliance is not:

- Unpredictable performance
- Increased costs
- Environmental releases
- Safety hazards
- Warranty voidance

Treat component intermixing as the engineering non-conformance it is and manage it accordingly.

Watch this video to learn more: [Risks of Intermixing or Interchanging Tube Fittings](#)

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