



Swagelok® Ammonia Sampler

Contributing to enhanced safety, accuracy, and efficiency in ammonia sampling

Swagelok®

Ammonia Sampling: An Overview

Ammonia is commonly used by chemical plants and refineries in the production of fertilizers, plastics, textiles, petroleum, and more. To avoid severe stress corrosion cracking in storage tanks and product quality concerns, anhydrous ammonia is sampled to verify a water content of 0.2% to 0.5%.

- This is traditionally done using standard methods such as CGA G2.2, where a 100 mL sample of liquid ammonia is dispensed and then allowed to evaporate
- By measuring the residual water, the water content of the sample can be easily calculated
- Traditional sampling methods have a variety of



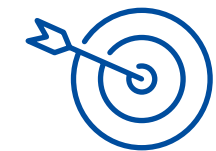
Ammonia Sampling Challenges

There are many challenges with manual ammonia sampling methods:



Operators must wear a significant amount of personal protective equipment (PPE)—goggles, gloves, respirator, chemical suit—due to potential exposure to liquid ammonia and vapors

- Ammonia can cause severe skin burns, eye irritation, and is toxic if inhaled
- Ammonia released into the air can negatively impact the environment



Accuracy of sampling results can vary based on many variables, such as:

- As the cold ammonia fills warm glass containers, it immediately begins to boil and evaporate, making it difficult to fill residue tubes to the graduation line
- Inconsistent rates of heating can lead to inconsistency in sample results
- Inadequate flushing of residual water and old sample from the transport line



Manual ammonia sampling is challenging to perform efficiently

- The processes must be performed with precision to fill a warm residue tube just as ammonia boils off
- Manual sampling procedures often require up to 8 hours until a measurement can be taken



Semiautomated, Closed-Loop Sampling

The Swagelok® ammonia sampler features a unique design that increases safety by minimizing the operator's exposure to liquid and vaporized ammonia, introduces consistency into the sampling operation, and expedites the sampling process significantly.

It addresses the issues inherent to manual sampling by utilizing a closed sampling fixture, prechilling the residue tube, semiautomating the process by which the residue tube is filled, and by controlling the heating cycle.

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Closed Sample Fixtures

The Swagelok® ammonia sampler features closed sample fixtures, which **improve safety** by limiting operator exposure and environmental impact.

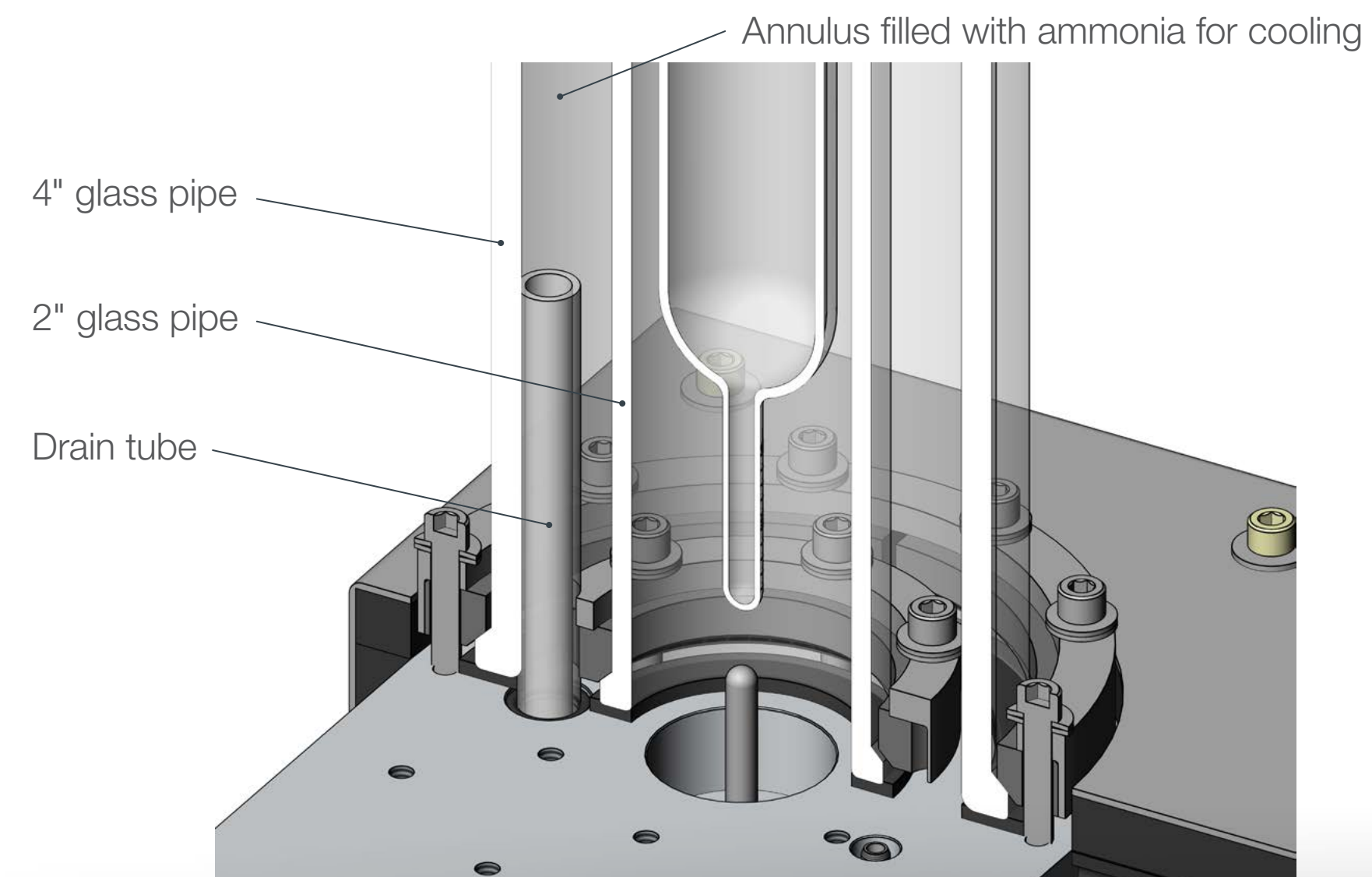
- Closed sample design reduces the need for operator PPE
- Made using transparent glass pipes so operators can monitor conditions
- Available in single- or dual-fixture designs



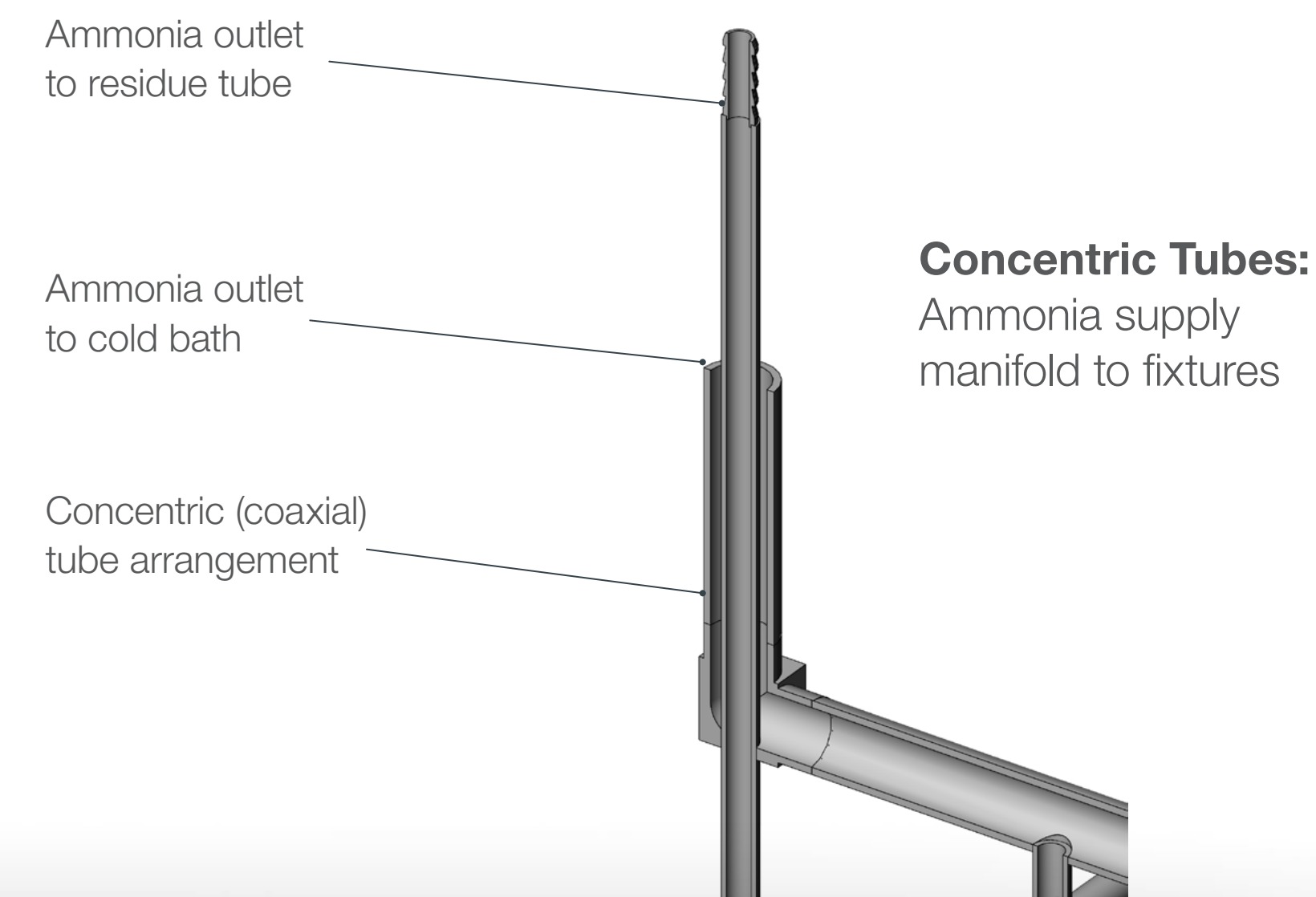
Prechilled Residue Tubes

Cold ammonia is used to fill the space between the two glass pipes, creating a cold bath to draw heat out of the fixture and residue tube, preventing aggressive boiling that threatens fill **accuracy**.

- Fill level of cold bath is controlled using an elevated drain tube
- Filling cold bath clears supply line of older ammonia, ensuring fresh sample



- Ammonia fast loop chills sampling valves
- Concentric tubes prechill sample lines

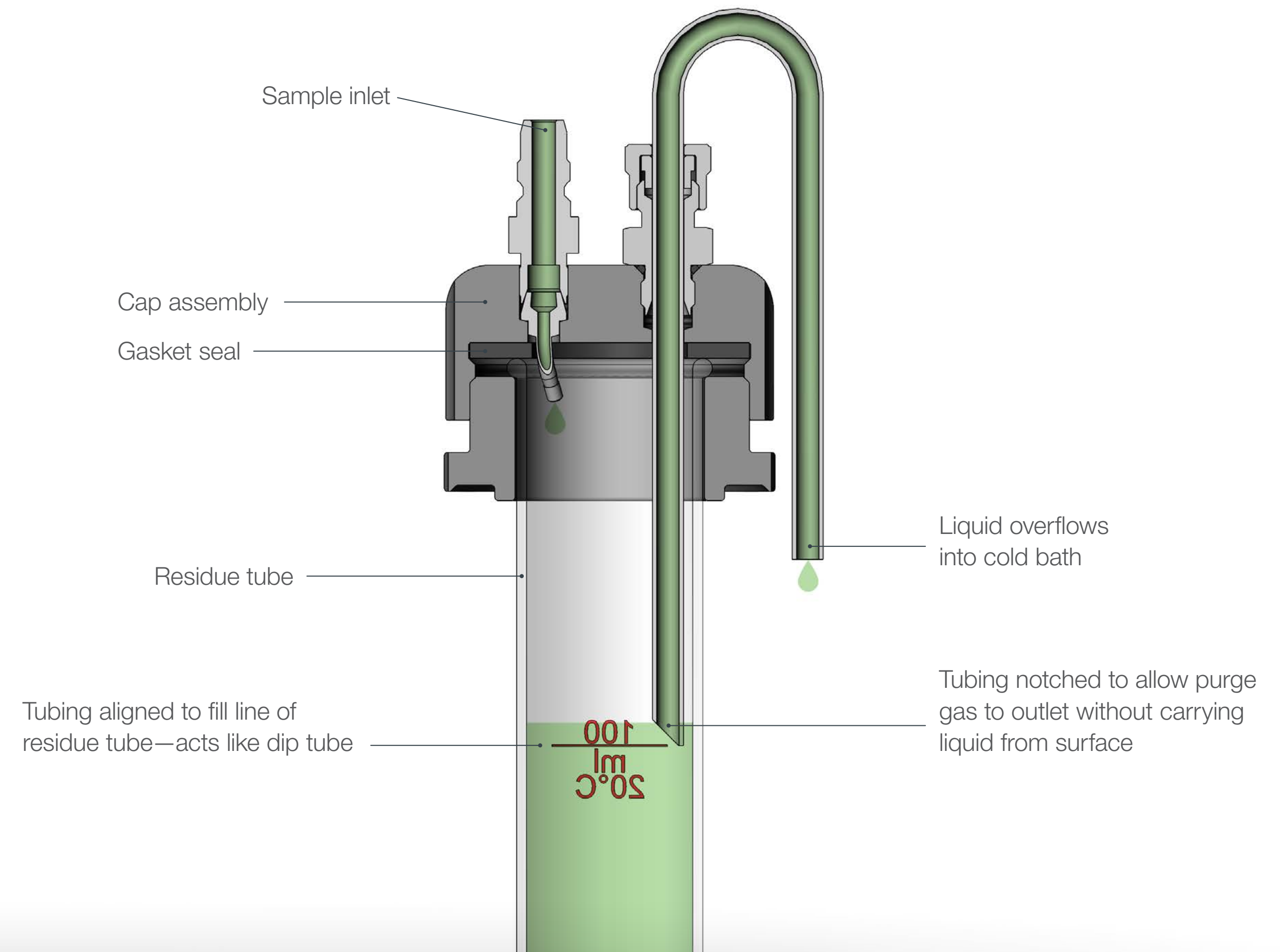


Semiautomated Sample Dispensing

A cap assembly is fitted to the residue tube to **assist with the filling process**. When dispensing the sample, the ammonia fills the residue tube until the level reaches the bottom of the overflow tube.

- Cap assembly seals on top of residue tube and controls fill level
- Overflow empties into cold bath, ensuring consistent sample size
- 100 mL or 250 mL residue tube sizes are available

The fill level of the cold bath is controlled using an elevated drain tube. As the cold bath fills, the ammonia will reach the top of the drain tube and spill over to the drain connection. The PVC cap assembly is fitted to the residue tube to assist with the filling process. This cap assembly includes an overflow tube, which is aligned to the fill line on the residue tube. When dispensing the sample, the ammonia fills the residue tube until the level reaches the bottom of the overflow tube. At that point, the gas trapped in the top of the residue tube prevents the residue tube from filling any further, and the flow of ammonia is forced through the overflow tube and out. The overflow spills into the cold bath, ensuring a consistent sample size.



Accurate, User-Friendly, Single-Handle Operation

The Swagelok® ammonia sampler is designed for **simple operation**, featuring a single handle for controlling sampler valve functionality.

- Geared mechanism allows control of four valves with a single handwheel
- Handwheel can be set to “Off,” “Purge,” “Chill,” or “Sample”
- Additional control valves provided for adjustability during commissioning and maintenance



Touchscreen Controls for Efficient Control

A heater is used to evaporate samples in a controlled manner at a constant temperature. The remaining water is then measured after ammonia evaporation. A **touchscreen interface** is used to control all heater operations.

- Easy-to-use, intuitive operator interface
- On-screen, step-by-step instructions
- Relay outputs for remote heater status monitoring



Swagelok's closed-loop sampling unit is designed to **minimize hazardous exposure** to the operator, **expedite consistency** into the sampling operation, and **expedite** the gathering of results. It adheres to the highest quality and safety standards and can be customized for a variety of industrial environments to meet specific customer needs.

Learn more about how the Swagelok ammonia sampler can improve:

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Designed for Safety

Traditional ammonia sampling methods potentially expose operators to dangerous ammonia liquid/vapor, requiring full PPE. The Swagelok ammonia sampler **minimizes operator exposure** and **environmental impact**.

- Glass fixture design allows sample to be dispensed without exposing the technician while allowing for visual confirmation of process steps
- Closed-fixture design limits ammonia flashing into the environment
- Sampler can be installed at the sample point, eliminating hazardous transportation throughout the plant
- The unit is hazardous area-rated (Class 1, Div 2, Group B or ATEX Zone 2)
- Factory testing ensures high degree of leak integrity



Designed for Accuracy

Manual processes rely on the skills and judgment of the operator, which can cause inaccuracies. It is also difficult to control the rate of evaporation, which can also cause inaccurate results. The Swagelok ammonia sampler is built to **deliver consistent results**.

- Single-handle control makes valve operation easy, minimizing opportunity for sampling error
- Prechilled residue tube design allows for greater accuracy and prevents aggressive ammonia boiling
- Filling cold bath clears the supply line of older ammonia, ensuring a fresh sample
- Residue tube cap assembly prevents overfilling, keeping sample sizes consistent
- Controlled heating cycle for a consistent rate of sample evaporation



Designed for Efficiency

In manual sampling processes, it is difficult to fill a warm residue tube precisely as ammonia boils off. Evaporation also takes a significant amount of time—operators retrieve samples by hand and leave them under heat sources until results can be measured eight or more hours later. The Swagelok® ammonia sampler makes the process **more efficient**.

- Sampler requires less time to produce results, allowing for quicker adjustment to processes to correct product composition
- Quicker access to results can mean quicker process adjustments that reduce rates of off-spec product and corrosion damage, minimizing costs
- Sampler is simple to install and is semiautomated, making it quicker and easier to conduct sampling and produce accurate results
- Intuitive touchscreen controls and on-screen, step-by-step instructions simplify use
- Relay outputs allow remote status monitoring
- Easily accessible valve packings offer simplified adjustment to help prevent leaks

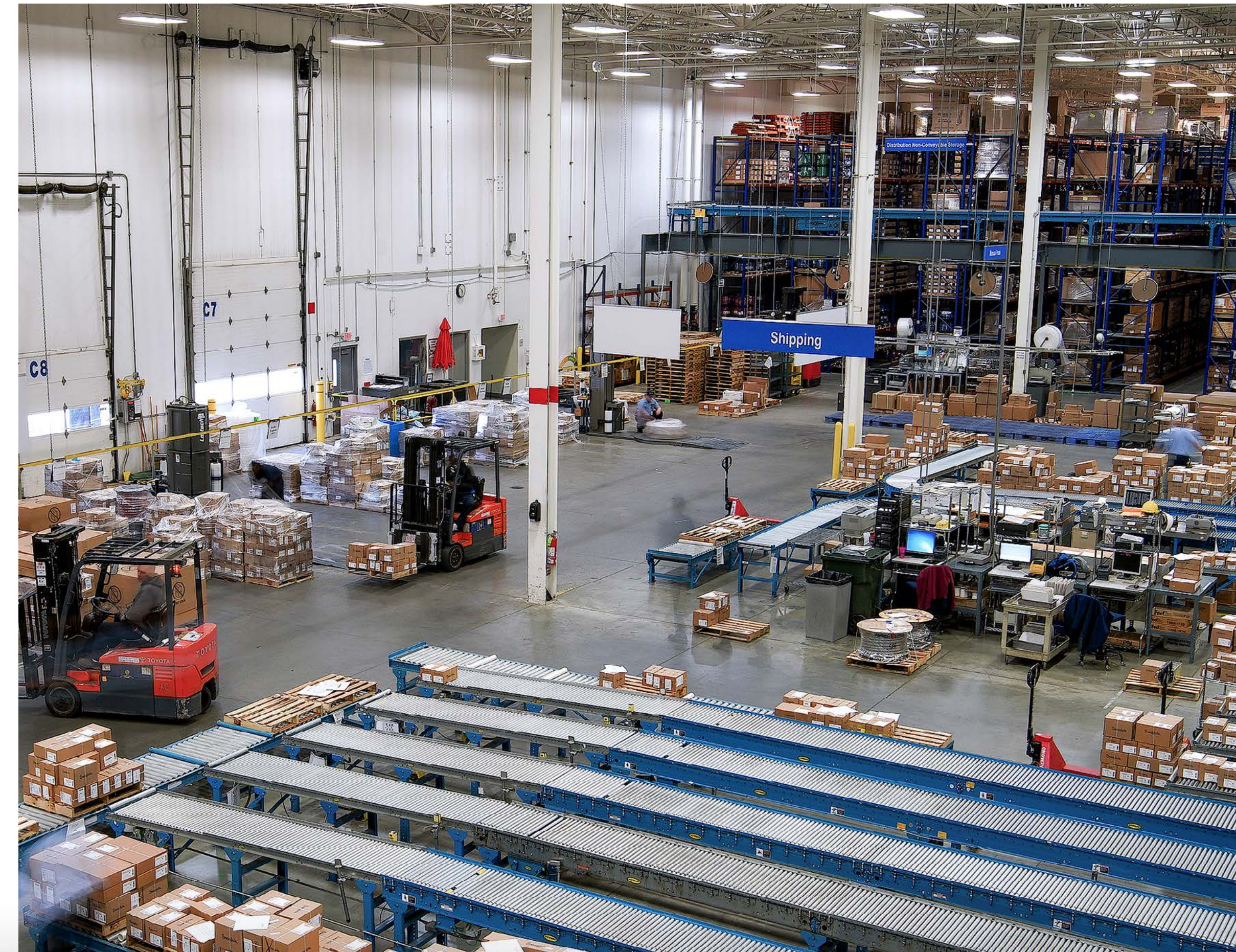


Our Supply Chain and Quality

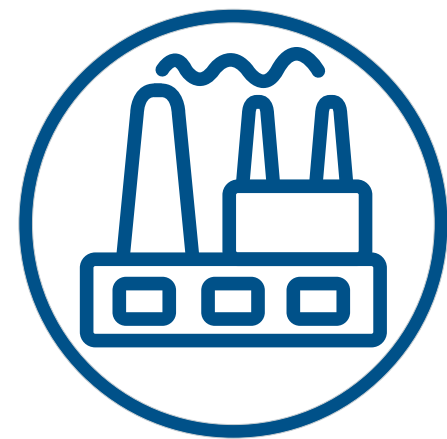
With Swagelok, you get global reach with localized support. That means wherever you are operating, we are positioned to support your success with:

- A deep understanding of your business needs and application requirements
- Local stocked inventory and personalized onsite support and services
- Associates that know the culture, speak the language, and understand regional needs
- Access to manufacturing, field engineering, technical services, logistical support, and special expertise to assist you

Our global distribution network spans more than 70 countries with more than 200 sales and service centers, 20 manufacturing facilities, five global tech centers, and 9400 associates—ensuring you have the products and support when and where you need it.



Global Distribution Network



20 Manufacturing Centers

The Swagelok advantage starts with highly reliable components machined from high-quality raw materials



Distribution Warehouses

Deliver direct to your local sales and service center with 99% inventory and shipping accuracy



200 Sales and Service Centers

Autoreplenishment and sales forecasting support regional inventory levels so you have access to what you need



100 000s of Customers Worldwide

Enjoy fast access to the products that keep plants and processes running safely and reliably



Our authorized sales and service centers collaborate with customers to supply:

- Short lead times on assemble-to-order products
- A robust supply of make-to-order products
- Engineer-to-order products for unique needs

Traceability and Quality

Raw material traceability is an integral part of Swagelok's overall quality system throughout all phases of material receipt, manufacturing, processing, storage, and delivery. All fittings are marked with the Swagelok name, material type, and trace identifier.

The quality system our fittings are manufactured under has been approved by:

- ISO 9001:2000
- UN/ECE R110
- METI/KHK
- Canadian Registrations
- CSA NGV 3.1 and 4.6
- ASME N and NPT
- The U.S. Navy
- DNV GL
(Det Norske Veritas)
- American Bureau
of Shipping
- The Bureau Veritas
- Lloyd's Register



A Promise as Strong as Our Products

The Swagelok Limited Lifetime Warranty demonstrates our relentless commitment to quality and our customers. Every Swagelok product is backed by this promise for the life of the product, so you can rest assured that your fluid system investment is protected.







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