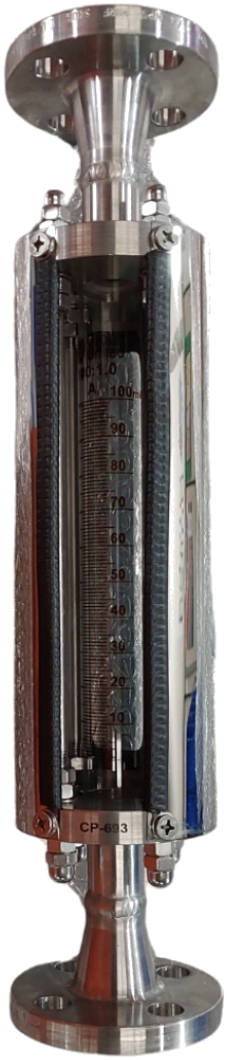
INSTALLATION & OPERATION MANUAL

Calibration Column

MODEL ICP



General Description & Safety

Product Description

Globe United Calibration Columns are precision-engineered cylindrical glass or plastic tubes with marked volume scales. They are installed on the suction side of chemical metering pumps to provide a simple, highly accurate method for verifying and calibrating pump flow rates in critical dosing applications.

Safety Precautions

> **WARNING: Chemical & Pressure Hazard**
>
> Prior to installation, operation, or maintenance, ensure the system is completely depressurized and drained of any hazardous chemicals. Always wear appropriate Personal Protective Equipment (PPE) as dictated by the site's chemical handling protocols and Safety Data Sheets (SDS).

Standard operating pressure is up to 8 bar at ambient temperature. **Pressure ratings for plastic materials (PVC, CPVC, PP, PVDF) must be strictly derated at elevated temperatures.** Metallic units may be rated higher per specific project designs; always refer to the unit's nameplate and approved order documents for exact design limits.

Storage Guidance

Store units indoors in a clean, dry environment. PVC components must be protected from direct UV exposure. O-Rings (small gaskets) must be stored away from ozone sources, direct sunlight, and excessive heat to prevent premature degradation.

Installation Guidelines

Handling & Inspection

Upon receipt, carefully unpack and inspect the column—especially the transparent tube—for any transit damage, cracks, or etching.

> **CAUTION: Lifting Hazard**
>
> **Do not use the tie rods as lifting points** for heavy units, as this may distort the assembly and compromise the pressure seals.

Mounting Orientation

The calibration column must be installed **perfectly vertical** (plumb). Any deviation from vertical will result in an angled fluid meniscus, leading to inaccurate volumetric readings and calibration errors.

Process Connections

1. Connect the bottom drain port to the suction line of the dosing pump, typically between the supply tank isolation valve and the pump inlet.
2. Connect the top vent port back to the supply tank. This allows displaced air or chemical vapor to return safely to the tank during the filling process, preventing pressure buildup or hazardous emissions.

> **Dimensional & Installation Control**
>
> **Please refer exclusively to the approved project General Arrangement (GA) drawing for final construction and installation details.** Detailed installation arrangements, mounting orientations, and dimensional data (OD, overall height, face-to-face) are highly dependent on the selected configuration.

Calibration Procedure

The calibration column is utilized to verify the actual volumetric output of the dosing pump under operating conditions. Follow this step-by-step procedure to perform an accurate calibration test.

Step-by-Step Operation

1. Ensure the top vent line is open and safely routed back to the chemical supply tank.
2. Open the isolation valve between the supply tank and the calibration column. Allow the fluid to fill the column up to the top “zero” mark on the scale.
3. Close the isolation valve to the supply tank. The dosing pump is now isolated from the main tank and will draw exclusively from the calibration column.
4. Start the dosing pump and run it for a specific, timed test duration (typically 30 or 60 seconds, depending on the pump capacity and column volume).
5. Stop the pump precisely at the end of the test duration.
6. Read the consumed volume directly from the fluid meniscus on the column’s printed or engraved scale.
7. Calculate the actual flow rate using the flow-rate formula provided below.
8. Compare the calculated flow rate with the pump’s target set rate. Adjust the pump stroke length or motor speed as necessary, and repeat the test to verify.
9. Once calibration is complete, re-open the supply tank isolation valve to resume normal operation.

Flow Rate Calculation Formula

Use the following formula to convert the consumed volume into a standard hourly flow rate:

Flow Rate (L/hr) = (Consumed Volume (ml) × 3.6) / Test Duration (sec)

Example: If the pump draws 500 ml from the column in a 30-second test, the flow rate is:
Flow Rate = (500 × 3.6) / 30 = 1800 / 30 = **60 L/hr**

Maintenance & Return to Service

Routine Inspection

Regularly inspect the column for any signs of leakage, etching of the transparent tube, or degradation of the O-Rings. Ensure the scale remains legible and clear.

Disassembly & Cleaning

For thorough cleaning or O-Ring replacement, the column may be disassembled. Ensure the unit is completely drained, depressurized, and flushed before loosening the tie rods. Loosen tie rods evenly in a crisscross pattern to avoid uneven stress on the tube and end caps.

> **CAUTION: Overtightening Hazard**
>
> **Do not overtighten the tie rods** during reassembly, especially on glass tube units. Excessive or uneven torque can crack the tube or crush the O-Rings, leading to immediate failure.

Return to Service Procedure

> **WARNING: Leak Check Required**
>
> Before returning the column to hazardous chemical service after any maintenance or reassembly, it is mandatory to perform a low-pressure water leak check to verify seal integrity. **Do not subject the calibration column to pneumatic or air leak testing.**

1. Ensure all tie rods are tightened evenly.
2. Fill the column with clean water at low pressure.
3. Inspect all joints, particularly the O-Ring seals at the end caps, for any signs of moisture or weeping.
4. Once seal integrity is verified, drain the water completely before reintroducing the process chemical.
5. Perform a staged chemical re-pressurization to confirm final integrity under operating conditions.

Troubleshooting Guide

Issue	Probable Cause	Corrective Action
Fluid leakage at end caps	1. Tie rods not tightened evenly 2. O-Ring degraded or damaged 3. Over-pressurization	1. Re-tighten tie rods in a crisscross pattern 2. Replace O-Rings 3. Verify operating pressure is within limits
Inaccurate volume readings	1. Column not installed vertically 2. Air bubbles trapped in fluid 3. Incorrect test duration	1. Check plumb and correct mounting 2. Vent system thoroughly 3. Use a precise timer for calibration
Cloudy or etched tube	1. Chemical incompatibility 2. Abrasive fluid 3. Residue buildup	1. Verify material compatibility with SDS 2. Flush and clean tube 3. Replace tube if permanently etched

Consumable Spares

To ensure continuous and reliable operation, it is recommended to maintain a stock of critical consumable spares. When ordering spare parts, please provide the complete 10-digit model code located on the unit's nameplate, along with the original Globe United Purchase Order (PO) or Sales Order (SO) reference.

> **Ordering Example: ICP-1000-PV-N-01-N-01-F-SS-A-BG**
>
> The O-Ring material (typically PTFE or EPDM) is not embedded in the standard model code. Please explicitly specify the required O-Ring material at the time of enquiry to ensure chemical compatibility.

Contact Information

For technical support, spare parts, or warranty inquiries, please contact Globe United FZE.

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