# Accu-Glass

# FLUSH DEVICE APPLICATION GUIDE

## APPLICATIONS

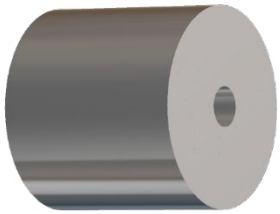
- Disposable Blood Pressure Transducers (DPT)
- Fast Saline Flush Devices
- Prevention of excessive fluid flow rates during flushing or blood pressure monitoring.

## FEATURES

- Precisely controlled saline flow rate to prevent over or under infusion through tube sets
- Rapid passage of air during device setup
- Does not require power, electronic or software control
- Clean, precise all-glass material
- Flow rate accuracy better than ISO-28620

## BENEFITS

- Unmatched reliability for stable pharmaceutical flow control
- Precision central bore holds over a wide range of temperatures and conditions
- 100% automated flow testing available
- Designed to meet your specific flow rate, rather than dimensional controls
- Long-term stability with the ability to withstand aggressive sterilization methods



## *Choosing a Flow Restrictor for a Flush Device*

### Flow Rate

The flow rate of a restrictor is determined by the central bore diameter and the pressure differential. Our flow restrictors accommodate flow rates as low as 0.06 mL/Hr at 100 mm Hg pressure differential, and higher than 1400 mL/Hr at higher pressures.

Our available 100% flow rate testing ensures accuracy will within ISO-28620 requirements.

### Length

We economically produce lengths of 8 mm and 9.5 mm at high volume. We can also accommodate custom lengths.

### Material Type

The most typical glass type for flow restrictors is EP (3.2.1B) / USP <660> Type III Soda lime glass. We produce restrictors using Type I borosilicate for specific applications.

These glasses have high chemical resistivity and exceptionally low rates of thermal expansion.

### Bonding

A range of sealing or bonding methods can be used to mount our flow restrictors. These include silicone O-rings and a variety of UV curable adhesives.

### Sterilization

Our glass may be sterilized by a range of methods, including Ethylene Oxide, radiation, moist heat, dry heat, vaporized hydrogen peroxide, or gas plasma. This robustness enables ensures that the glass will not limit flexibility in choosing the final product's sterilization

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# AR-GLAS®

**Technical Data**

| | | | |
|---|---|---|---|
| **Glass Type/Application** | soda-lime glass<br>Pharmaceutical primary packaging, general technical application | | |
| **Physical Data**<br>(approx. value) | Coefficient of mean linear thermal expansion | | |
| | $\alpha$(20°C; 300°C) acc. to ISO 7991 ..... | 9.1 · $10^{-6}K^{-1}$ | |
| | Transformation Temperature $T_g$ ..... | 525 | °C |
| | Glass temperature at viscosity $\eta$ in dPa · s | | |
| | $10^{13}$ (annealing point)..... | 530 | °C |
| | $10^{7.6}$ (softening point) ..... | 720 | °C |
| | $10^{4}$ (working point) ..... | 1040 | °C |
| | Density $\rho$ at 25°C ..... | 2.50 | g · $cm^{-3}$ |
| **Chemical Data** | Hydrolytic resistance | | |
| | acc. to ISO 719 ..... | Class | HGB 3 |
| | acc. to Ph. Eur. ..... | Type | III |
| | acc. to USP..... | Type | III |
| | Acid resistance (DIN 12116) ..... | Class | S 1 |
| | Alkali resistance (ISO 695) ..... | Class | A 2 |
| | ASTM E 438 ..... | Type | II |

**Chemical Composition**
(main components in approx. weight %)

| $SiO_2$ | $B_2O_3$ | $Al_2O_3$ | $Na_2O$ | $K_2O$ | BaO | CaO | MgO |
|---|---|---|---|---|---|---|---|
| 69 | 1 | 4 | 13 | 3 | 2 | 5 | 3 |

The heavy metal content for the elements lead, cadmium, mercury and hexavalent chromium is below 100 ppm.

# Corning® 51-A Tubing

CORNING

Chemical and Physical Characteristics for Corning® 51-A Amber Borosilicate Glass Tubing

## Table 1: Glass Composition (approximate oxide weight [%])

| Oxide Component | Symbol | Corning® 51-A Tubing |
|---|---|---|
| Silicon Dioxide | $SiO_2$ | 70.2 |
| Boron Oxide | $B_2O_3$ | 10.5 |
| Aluminium Oxide | $Al_2O_3$ | 5.8 |
| Calcium & Magnesium Oxide | CaO + MgO | 1.0 |
| Sodium Oxide | $Na_2O$ | 5.8 |
| Potassium Oxide | $K_2O$ | 1.3 |
| Iron Oxide | $Fe_2O_3$ | 1.0 |
| Barium Oxide | BaO | 1.4 |
| Titanium Dioxide | $TiO_2$ | 3.0 |

## Table 2: Chemical Resistance Classifications

| | | |
|---|---|---|
| Hydrolytic Resistance (Glass Grain) | EP (3.2.1B) / USP <660> | Type 1 |
| Hydrolytic Resistance (Glass Grain) | ISO 720 | HGA1 |
| Soluble Alkali Test | JP 7.01 | Complies |
| Acid Resistance Class | DIN 12116 | Class S1 |
| Alkali Resistance Class | ISO 695 | Class A2 |
| ASTM Laboratory Glass Class | ASTM E 438 | — |

## Table 3: Physical Properties

| Name | Unit | Corning® 51-A Tubing |
|---|---|---|
| Average Linear T.E.C. | $10^{-7}$ $K^{-1}$ | 52 |
| Density | g $cm^{-3}$ | 2.36 |
| Relative Refractive Index | (number) * | 1.50 |

* λ at 587.6nm