Accu-Glass

FLOW RESTRICTION APPLICATION GUIDE

APPLICATIONS

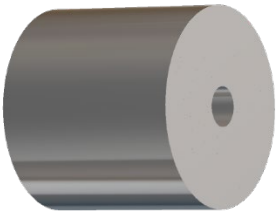
- Portable infusion Pumps
- Disposable Blood Pressure Transducers (DPT)
- Fast Saline Flush Devices
- Precision Fluid Delivery

FEATURES

- Made to a specified flow rate
- Clean, precise all-glass material
- Precision central bore over a wide range of temperatures
- Custom outer diameters
- Flow rate accuracy better than ISO-28620

BENEFITS

- Unmatched reliability for stable pharmaceutical flow control
- 100% automated flow testing
- Designed to meet your specific flow rate, so no need to establishing bore tolerances
- Long-term stability with the ability to withstand aggressive sterilization methods



Choosing a Flow Restrictor

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

Length

We economical 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 ASTM type III Soda lime. We use Schott AR-GLAS material for its superior properties and quality. We can also produce in Type 1 borosilicate N51A 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

AR-GLAS®

Technical Data

Glass Type/Application	soda-lime glass Pharmaceutical primary packaging, general technical application		
Physical Data (approx. value)	Coefficient of mean linear thermal expansion		
	α(20°C; 300°C) acc. to ISO 7991	9.1 · $10^{-6}K^{-1}$	
	Transformation Temperature T_g	525	°C
	Glass temperature at viscosity η in dPa · s		
	10^{13} (annealing point).....	530	°C
	$10^{7.6}$ (softening point)	720	°C
	10^{4} (working point)	1040	°C
	Density ρ 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