

Gage Glass

The L. J. Star name is known for high quality sight glasses. Now, that same commitment to quality is available to you for all your replacement gage glass and accessory requirements! L. J. Star stocks a full line of glass, gaskets and shields for Armored Glass Gages. In most cases your order will be shipped on the same or next business day.

The Ilmadur patented I-420 gage glass provides superior quality:

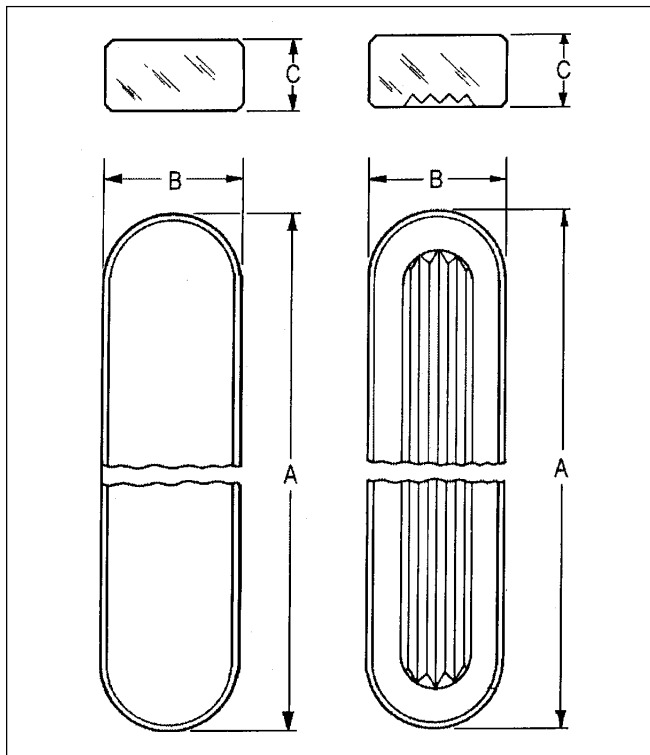
- ✓ Better visual clarity
- ✓ Greater chemical resistance
- ✓ More thermal shock resistance
- ✓ Higher pressure safety factors (due to tighter tolerances)
- ✓ Only gage glass specifically manufactured to Mil Spec
- ✓ Packaged for safe and easy replacement handling

L. J. Star's direct partnership with Ilmadur Glass provides better technical support, custom solutions and customer support. The new state-of-the-art production facility allows for better quality control, which results in the highest quality available. In fact, this new equipment allows for eight times tighter tolerances than the Military Specification requires. This results in greater pressure capabilities and safety.

L. J. Star replacement borosilicate gage glass is manufactured exclusively to MIL G 16356-D standards.



Sizes 1 through 9 are stocked and available for immediate delivery. Other sizes are available upon request. Orders can easily be processed via fax, e-mail, or through the www.ljstar.com website with its easy-to-use e-commerce. For high-pressure applications, L. J. Star offers gage glass with a 0.002 flatness tolerance. For difficult applications where the fluid is erosive or corrosive to the glass, shields such as Mica or PCTFE (Kel-F®) can be incorporated. Make sure to complete your order with our full line of in-stock gaskets and mica shields.



Glass Size	Dimensions in Inches			Max Pressure/Temperature Ratings		
	A	B	C	Saturated Steam or Hot Water Service		Non-Steam & Non-Corrosive Service
				Transparent or Reflex (No Shield)	Transparent W/Mica Shield	Transparent or Reflex
1	4.5	1.347	.688	500 PSIG @ 470° F	1500 PSIG @ 536° F	4000 PSIG @ 100° F
2	5.5					
3	6.5					
4	7.5			35 Bar @ 243° C	103 Bar @ 280° C	276 Bar @ 38° C
5	8.625					
6	9.875					
7	11.0					
8	12.625					
9	13.375					

Gaskets and shields are available for the full range of gage glass sizes 1 through 9 with the most popular gasket materials in stock for quick delivery.



- Non-Asbestos
- Gylon®
- Graphite
- Others

Gaskets and Shields in Stock!

IImadur® - Borosilicate Glass I-420

Chemical Composition

77 percent by weight SiO₂
 11 percent by weight B₂O₃
 5 percent by weight Na₂O
 4 percent by weight Al₂O₃
 1 percent by weight K₂O
 1 percent by weight ZrO₂

Chemical Properties

- Water resistance tested to DIN-ISO 719 (at 98° C):
 HGB 1 with a typical consumption of 0.03 ml hydrochloric acid [c(HCl) = 0.01 mol/l] per one gram glass grit
- Water resistance tested to DIN-ISO 720 (at 121° C):
 HGA 1 with a typical consumption of 0.03 ml hydrochloric acid [c(HCl) = 0.02 mol/l] per gram glass grit
- Alkali resistance tested to DIN 52 322 (according to ISO 695):
 Class A2 with a typical mass loss of 100 mg/dm²
- Acid resistance tested to DIN 12 116: class 1
- Acid resistance tested to DIN-ISO 1776 with a typical alkali delivery of 50 µg Na₂O/dm²

Physical Properties

- Mean linear thermal expansion:
 α (20° C...300° C) = 4.2 ± 0.1 x 10⁻⁶ K⁻¹
- Density at 20° C:
 ρ = 2.28 g/cm³
- Mean thermal conductivity (20° C...100° C): λ = 1.4 W m⁻¹ K⁻¹
- Working point:
 ϑ_{f1} = 1225° C at a viscosity of η_{f1} = 10⁴ dPa · s
- Littleton/Softening point:
 ϑ_{f2} = 810° C at a viscosity of η_{f2} = 10^{7.6} dPa · s
- Annealing point:
 ϑ_{f3} = 580° C at a viscosity of η_{f3} = 10¹³ dPa · s
- Strain point:
 ϑ_{f4} = 520° C at a viscosity of η_{f4} = 10^{14.7} dPa · s
- Transformation temperature:
 t_g = 560° C
- Maximum permissible operating temperature: 500° C, under prestressed conditions only 280° C
- Modules of elasticity:
 E = 66GPa

Tolerances

(inches)	Standard	HP
Length (A)	-0.031	-0.031
Width (B)	-0.040	-0.040
Thickness (C)	-0.032	-0.004

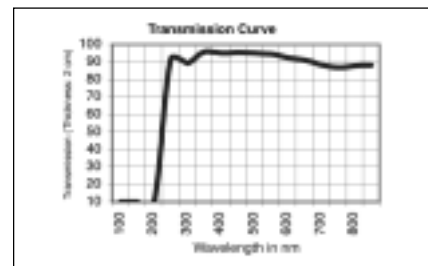
Flatness (e)

A ≤ 6.5	0.002	0.002
7.5 < A ≤ 8.6	0.003	0.002
9.875 < A ≤ 13.375	0.005	0.002

Parallelism ≤ 0.003 ≤ 0.003

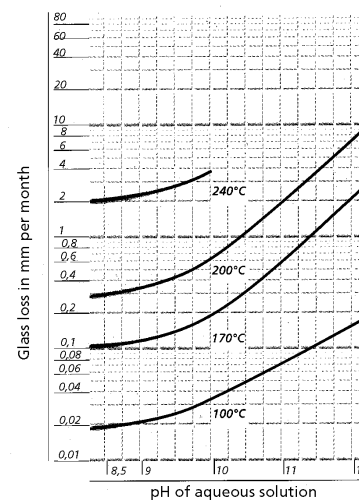
Optical Properties

- Refractive Index
 λ = 587.6 nm n_D = 1.4816
 λ = 480.0 nm n_F = 1.4869
 λ = 546.0 nm n_E = 1.4831
 λ = 644.0 nm n_C = 1.4802



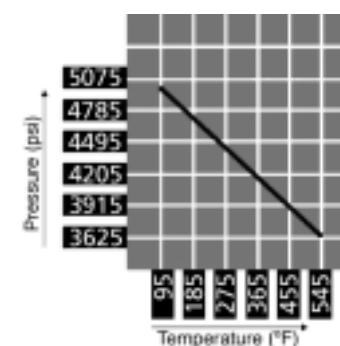
For properties and compositions where no tolerances are given, these are rounded off long-term average values which are subject to small variations resulting from the manufacturing process.

Glass Loss by Boiler Water



Glass loss, shown here for unprotected sight and gage glasses, depends mainly on the pH and the temperature of the boiler water.

Pressure / Temperature



Pressure/temperature diagram for transparent gage glasses in application without any significant glass attack.



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