Soda-Lime Glass

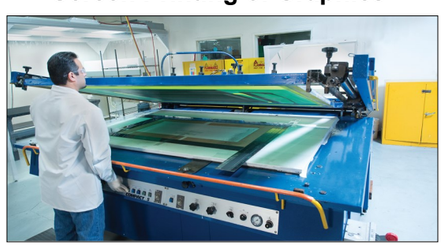
Glass Fabrication

Coating Deposition

CNC Machining

Strengthening - Chemical & Heat

Screen Printing of Graphics



Abrisa Technologies, a member of HEF Photonics, is a globally recognized technology glass fabrication and optical thin film coating company with expertise in high volume manufacturing and engineering capabilities, delivering Total Solutions that provide excellent performance, fitness-for-use and economies of scale.

Our US based, state-of-the-art ISO 9001:2015 and ITAR registered facilities include Abrisa Industrial Glass in Santa Paula, CA and ZC&R Coatings for Optics in Torrance CA. These two divisions produce solutions from cut-to-order coated glass components to custom complex and ready-to-install fabricated, strengthened, optically coated, electronically enabled and branded sub-assemblies.

Our Total Solutions serve a variety of markets including Micro-Electronics, Defense and Avionics, Display, Industrial Automation, Optical Sensors, Imaging, Photonics, Medical & Dental, Life Science and more.

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ABRISA TECHNOLOGIES
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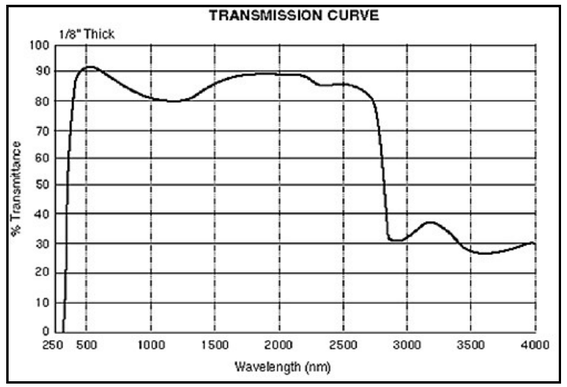
Your Total Solution Partner

Soda-Lime Glass

Clear & Tinted Soda-Lime Glass provides high light transmission, can be AR coated for super high transmission, can be chemically strengthened, and has good flatness.

Soda-lime glass is the most prevalent type of glass and is prepared by melting he raw materials, such as soda, lime, silica, alumina, and small quantities of fining agents in a glass furnace at temperatures up to 1675°C.

Soda-Lime sheet glass is made by floating molten glass on a bed of molten tin. This method gives the sheet uniform thickness and very flat surfaces. Soda-lime glass is the base material for most clear, colored and patterned glass types.



Soda-Lime Glass is:

- Less Expensive than other glass with specialized properties such as borosilicates and aluminosilicates.
- Soda-Lime glass is chemically stable, preventing corrosion and therefore chemically compatible.
- Soda-Lime is a hard glass, so it has some abrasion resistance, and more so if chemically strengthened.
- If heat tempered, soda-lime glass can be less vulnerable to thermal shock.
- Soda-Lime glass is a good insulator as it does not transmit electricity well due to its high specific resistivity and low dielectric constant.
- Soda-Lime glass is highly transmissible making it an excellent choice where light transmission is required.

Dimensions:

- Thicknesses: 0.02” – 1” (0.55mm – 25.4mm)
- Sizes: Up to 96” x 72” (2440mm x 1830mm)
- Other sizes may be available upon request

Soda-Lime Glass

Thermal Properties	Measurement	Explanation
Thermal Coefficient of Expansion	**(0/300°C): 8.6 x 10^{-6}/°C**	How much a material's volume changes as it heats or cools
Annealing Point	**1015°F/546°C**	The temperature where residual stress in a material is reduced within several minutes
Softening Point	**340°F/726°C**	The temperature at which a material slumps under its own weight
Strain Point	**957°F/514°C**	The temperature where residual stress in a material is reduced within several hours

Mechanical Properties	Measurement	Explanation
Density	**2.44 g/cm^3 @ 20°C/68°F**	Mass per unit of volume
Knoop Hardness	**585 Kg/mm^2 + 20**	Measures hardness and resistance to indentation
Hardness Mohs Scale	**6-7**	Measures scratch resistance
Modulus of Elasticity (Young's)	**7.2 x 10^{10} Pa**	How stiff a material is
Modulus of Rigidity	**3.0 x 10^{10} Pa**	How much shear a material can handle
Bulk Modulus	**4.3 x 10^{10} Pa**	How compression-resistant a material is
Poisson's Ratio	**.22**	How much a material stretches in one direction and narrows in another when it's pulled in two different

Optical Properties	Measurement	Explanation
Refractive Index • **1µm, 2µm**	**1.523 (435nm), 1.513 (645nm)**	The measurement of how much light passes through a material instead of being reflected

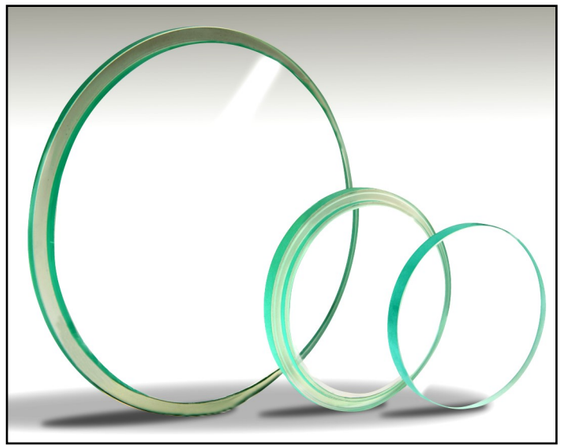
Chemical Properties	Measurement	Explanation
Hydrolytic Resistance	**Class 3**	How likely a material is to contaminate chemicals in contact with it (its chemical durability)
Acid Resistance	**N/A**	
Alkali Resistance	**N/A**	

Soda-Lime Glass

Electrical Properties	Measurement
Dielectric Constant How much a material is affected by a magnetic	**7.75 @ 20°C E**
Specific Resistivity How well a material resists conducting electricity	**7.94 x 10^{17} to 7.94 x 10^{18} µohm·cm**

Features:

- Can be chemically strengthened to increase mechanical strength*
- Can be heat strengthened or heat tempered to increase thermal shock resistance and mechanical strength
- Can be machined, optically coated, chemically etched, sandblasted, colored, or laminated
- Good flatness and surface quality due to float process
- The lowest cost solution for sheet fabricating glass components



**Mechanical strength is the general ability of a material to withtand stress and strain. The mechanical strength of tempered or chemically strengthened glass can be 4 times as much as ordinary glass.*

Options

Coatings:

- Custom V-Coat, Multi-band, Broadband AR
- AR Coatings to MIL-C-14806 A
- ITO/IMITO for EMI Shielding, Heater, LC Devices
- Custom SWP, LWP, Bandpass, UV & NIR Blocker
- Broad/Narrowband Scanning Mirror Coatings
- Deposition onto Filters, Silicon & Other Materials
- Autoclavable, Bio or Chemically Compatible

Substrates:

- **Fabrication to Shape & Size**
  - Cut & Seam or Circle Ground to Size & Shape
  - Precision CNC - Holes, Bevels, Steps, Notches
- **Damage Resistant Substrates**
  - HIE™ Aluminosilicates
    - AGC Dragontrail™
    - Corning® Gorilla®
    - SCHOTT AS 87
  - Chemically Strengthened Soda Lime Float
- **Low Expansion Chemically Resistant Substrates**
  - SCHOTT Borofloat® 33
- **Ultra Thin and Wafer Substrates**
  - AGC EN-A1
  - Corning® Eagle XG®
  - SCHOTT AF32, D263® & AS 87
- **Other**
  - Applied Films & Tints
  - Gasket Application
  - Edge Treatment/Blackening
  - Laser Marking (QR & Barcodes, S/N)

Easy-to-Clean & Anti-Fog Solutions:

- Oleo/Hydrophobic Options
- ITO Heater, HTAF Anti-Fog Solutions

Graphics & Bus Bars:

- Color Matched Epoxy Ink
- Non-Conductive Ink
- High Temperature Frit Ink
- Deadfront Ink - Partially Transmissive
- Infrared IR Transmitting Ink
- Silver Epoxy, Silver Frit, CrNiAu Bus Bars