AGC Dragontrail™ Chemically Strengthened Glass

Cover Glass • Displays • Sensors • Scanners

Asahi Glass Corporation (AGC) Dragontrail™ is innovative High Ion-Exchange (HIE™) aluminosilicate glass with superior strength, scratch resistance and a beautiful surface finish that is made by applying a proprietary chemical strengthening and tempering process to the highly even and flat float material.

Dragontrail™ supports low profile and reduced weight portable field and industrial devices with a toughness 6x that of soda lime float. It is environmentally friendly and is produced without the use of lead, arsenic and antimony.

Dragontrail™ is an excellent choice of a transparent and damage resistant window or display enhancement glass that helps to enhance the usable lifetime of high contact touch displays, field and industrial image sensors, document scanners and on board vehicular and avionics displays.

Benefits:

- 6x stronger than soda lime float glass
- Damage and scratch resistant
  - Vicker's hardness 673
  - > 600 MPa strength
  - 35 < Depth of Layer* (DOL) < 45μm
- Sheet Size
  - 48” x 29” (1219.2mm x 736.6mm) standard
  - 60” x 48” (1524mm x 736.6mm) available**
- Thicknesses
  - Stock thicknesses include 0.8mm and 1.1mm
  - Other thicknesses of 0.5 to 5.0mm may be available upon special request**

Applications:

- Display cover glass
- Sensor windows
- Mobile touch device displays
- Scanner beds
- Industrial machine vision
- Obstacle avoidance

* Depth of Layer (DOL) is a measurement of the compressive strength of glass specific to chemically strengthened glass. It is the depth into the surface of glass to which compressive stress is introduced. It is defined as the distance from the physical surface to the zero stress point internal to the glass.

** Minimum order quantity may apply, confirm prior to order placement.

Abrisa Technologies • 200 South Hallock Drive, Santa Paula, CA 93060 • (877) 622-7472
www.abrisatechnologies.com • info@abrisatechnologies.com
## AGC Dragontrail™ Chemically Strengthened Glass

### Cover Glass • Displays • Sensors • Scanners

<table>
<thead>
<tr>
<th>Mechanical Properties</th>
<th>Measurement</th>
<th>Dragontrail™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>g/cm³</td>
<td>2.48</td>
</tr>
<tr>
<td>Young’s Modulus</td>
<td>GPa</td>
<td>74</td>
</tr>
<tr>
<td>Poisson’s Ratio</td>
<td>μ</td>
<td>0.23</td>
</tr>
<tr>
<td>Shear Modulus</td>
<td>GPa</td>
<td>30</td>
</tr>
<tr>
<td>Vickers Hardness (before CS)</td>
<td></td>
<td>596</td>
</tr>
<tr>
<td>Vickers Hardness (after CS)</td>
<td></td>
<td>673</td>
</tr>
</tbody>
</table>

### Thermal Properties

<table>
<thead>
<tr>
<th>CTE (Thermal Expansion)</th>
<th>(50-350°C) x 10⁻⁷ / °C</th>
<th>98</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strain Point</td>
<td>°C</td>
<td>556</td>
</tr>
<tr>
<td>Annealing Point</td>
<td>°C</td>
<td>606</td>
</tr>
<tr>
<td>Softening Point</td>
<td>°C</td>
<td>821</td>
</tr>
</tbody>
</table>

### Optical Properties

| Refractive Index                       | Nd                      | 1.51|
| Photoelastic Constant                  | nm/cm/MPa               | 28.3|

### Electrical Properties

<table>
<thead>
<tr>
<th>Dielectric Constant/Loss Tangent</th>
<th>MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MHz</td>
<td>7.4/0.019</td>
</tr>
<tr>
<td>2400 MHz</td>
<td>7.4/0.011</td>
</tr>
</tbody>
</table>

### Chemical Properties

<table>
<thead>
<tr>
<th>Weight Loss</th>
<th>Mg/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCl 0.1 mol/l - 90° for 20 hrs</td>
<td>0.03</td>
</tr>
<tr>
<td>NaOH 0.1 mol/l - 90° for 20 hrs</td>
<td>0.56</td>
</tr>
<tr>
<td>HF 5% - 25° for 20 hrs</td>
<td>11.8</td>
</tr>
</tbody>
</table>

### ABRISA Technologies
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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, LWHP, 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® 0211 & Eagle XG®
  - SCHOTT AF32, D263® & AS 87
- Other
  - Applied Films & Tints
  - Gasket Application
  - Edge Treatment/Blackening

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
Abrisa Technologies is a recognized global supplier of high quality, fabricated glass components, optical thin film coatings, and custom glass solutions for a wide variety of industries.

Our US based Abrisa Industrial Glass fabrication facility in Santa Paula, CA and our ZC&R Coatings for Optics facility in Torrance, CA serve diverse industries such as microelectronics and displays, semiconductor, military, automotive, aerospace, medical, biomedical and scientific R&D.

We provide custom specialty flat glass and coating products for applications such as: flat panel display, touch and gesture recognition; visible to IR imaging and surveillance; entertainment, indoor and outdoor lighting; advanced instrumentation; and photonics.