

# Стекло дисплеев EAGLE, Astra, Lotus

## Технические характеристики

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Череповец (8202)49-02-64  
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## Exceptional Dimensional Stability and Surface Quality in Thin, Large-Size Sheets

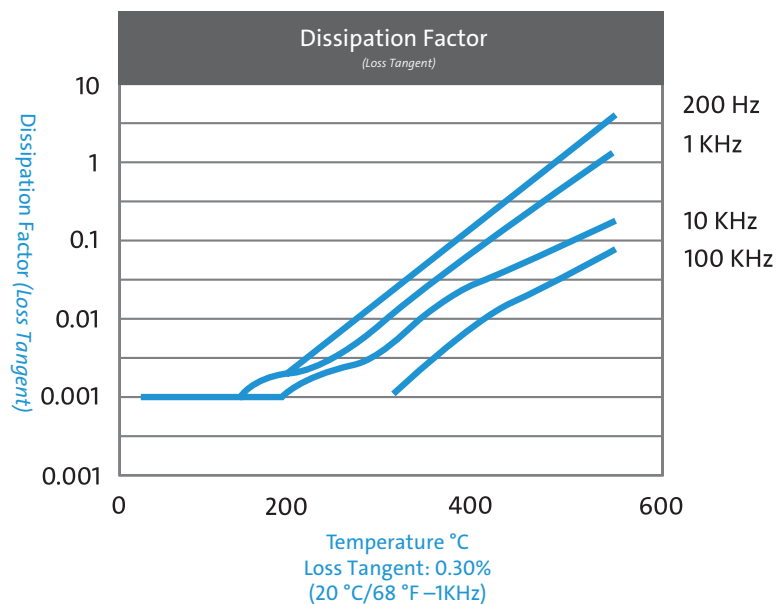
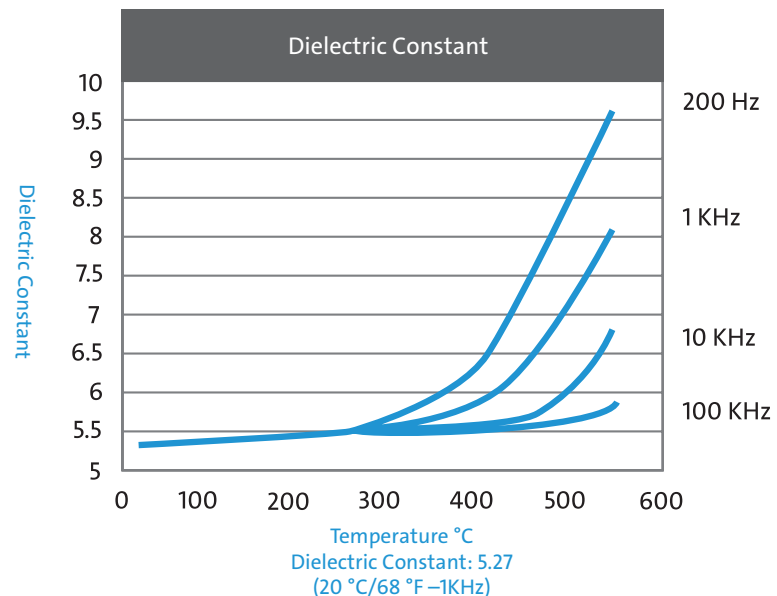
Corning® EAGLE XG® Glass is considered the most widely used and trusted glass by the world's leading panel makers, and was the first glass composition to include no heavy metals. Available in the widest variety of form factors, EAGLE XG® Glass can be made as thin as 0.25 mm up to Gen 5.5, 0.3 mm up to Gen 6, 0.4 mm up to Gen 8.5, and 0.5 mm up to Gen 10.5 to enable thinner, lighter, and curved display panels.

## Product & Material Information

Corning® EAGLE XG® Glass is produced to the following type specifications:

| Material Information  |                                                  |                                       |
|-----------------------|--------------------------------------------------|---------------------------------------|
| Glass Type            | Alkaline Earth Boro-Aluminosilicate              |                                       |
| Forms Available       | Fusion Drawn Sheet                               |                                       |
| Principle Uses        | Substrates for active-matrix flat panel displays |                                       |
| Mechanical Properties | Density (20°C)                                   | 2.38 g/cc <sup>3</sup>                |
|                       | Young's Modulus                                  | 73.6 GPa                              |
|                       | Shear Modulus                                    | 30.1 GPa                              |
|                       | Poisson's Ratio                                  | 0.23                                  |
| Thermal Expansion     | Coefficient of Thermal Expansion (0 - 300°C)     | 31.7x10 <sup>-7</sup> / °C            |
|                       | Room Temperature to Setting Point                | 35.5x10 <sup>-7</sup> / °C (25-675°C) |
| Viscosity             | Working Point (10 <sup>4</sup> poises)           | 1293°C                                |
|                       | Softening Point (10 <sup>7.6</sup> poises)       | 971°C                                 |
|                       | Annealing Point (10 <sup>13</sup> poises)        | 722°C                                 |
|                       | Strain Point (10 <sup>14.5</sup> poises)         | 669°C                                 |
| Electrical Properties | Log <sup>10</sup> Volume Resistivity             | 12.9 ohm-cm<br>at 250°C               |
|                       |                                                  | 8.8 ohm-cm<br>at 500°C                |
| Optical Properties    | Birefringence Constant                           | 331 (nm/cm) / (kg/mm <sup>2</sup> )   |

## Electrical



## Chemical Durability

Chemical durability is measured via weight loss per surface area after immersion. Values are highly dependent upon actual testing conditions. Unless otherwise noted, concentrations refer to weight percent

| Reagents                                | Time   | Temp | Weight Loss (mg/cm <sup>2</sup> ) |
|-----------------------------------------|--------|------|-----------------------------------|
| HCl - 5%                                | 24 hrs | 95°C | 0.79                              |
| HNO <sub>3</sub> - 1M                   | 24 hrs | 95°C | 0.49                              |
| HF - 10%                                | 20 min | 20°C | 5.18                              |
| NH <sub>4</sub> F:HF - 10%              | 20 min | 20°C | 0.84                              |
| 1HF:10HNO <sub>3</sub>                  | 3 min  | 20°C | 1.48                              |
| 1HF:100HNO <sub>3</sub>                 | 3 min  | 20°C | 0.16                              |
| DI H <sub>2</sub> O                     | 24 hrs | 95°C | 0.00                              |
| Na <sub>2</sub> CO <sub>3</sub> - 0.02N | 6 hrs  | 95°C | 0.16                              |
| NaOH - 5%                               | 6 hrs  | 95°C | 1.83                              |

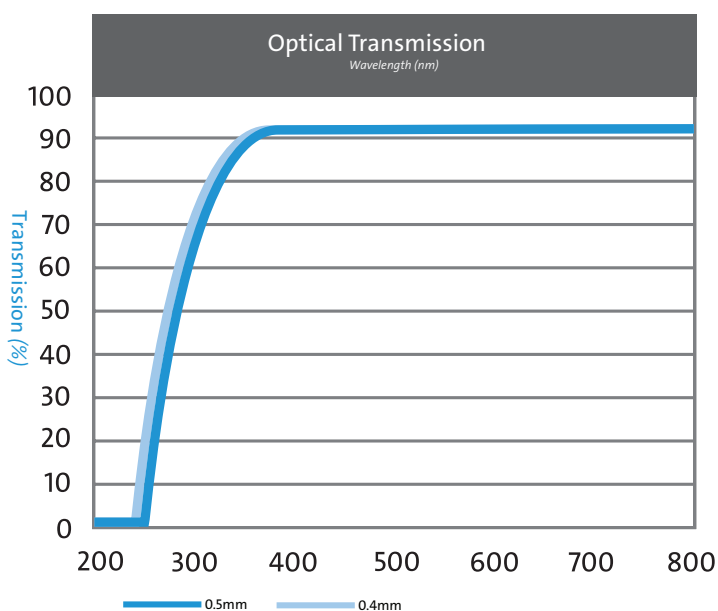
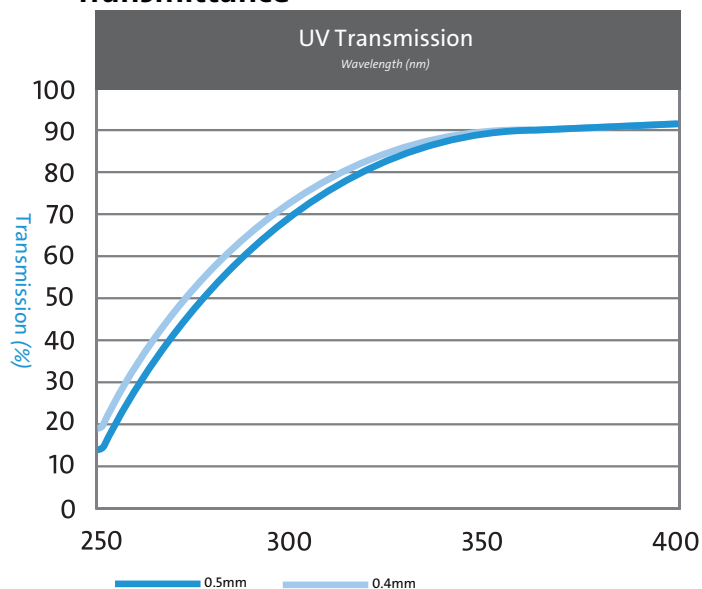
Total alkali content is approximately: 0.1wt%  
(Typical <0.05wt%)

## Weathering: 1

Weathering is defined as corrosion by atmospheric-borne gases and vapor such as water and carbon dioxide. Glasses rated 1 will almost never show weathering effects; those rated 2 will occasionally be troublesome, particularly if weathering products cannot be removed; those rated 3 require more careful consideration.

| Optical Wavelength | Refractive Index |
|--------------------|------------------|
| 435.8nm            | 1.5198           |
| 467.8nm            | 1.5169           |
| 480nm              | 1.5160           |
| 508.6nm            | 1.5141           |
| 546.1nm            | 1.5119           |
| 589.3nm            | 1.5099           |
| 643.8nm            | 1.5078           |

## Transmittance



## Thermal Conductivity

Thermal conductivity is a calculated value, and is equal to the product of the thermal diffusivity multiplied by specific heat multiplied by density of the glass.

| Temp (°C) | Diffusivity (cm <sup>2</sup> /sec) | Specific Heat(J/gm-°K) | Conductivity (W/cm-°K) |
|-----------|------------------------------------|------------------------|------------------------|
| 23        | 0.00601                            | 0.768                  | 0.0109                 |
| 100       | 0.00572                            | 0.896                  | 0.0122                 |
| 200       | 0.00546                            | 0.998                  | 0.0129                 |
| 300       | 0.00530                            | 1.067                  | 0.0134                 |
| 400       | 0.00522                            | 1.110                  | 0.0137                 |
| 500       | 0.00518                            | 1.154                  | 0.0142                 |

# CORNING

Astra™ Glass

## High-Performance Display Glass Optimized for Enabling High Resolution

As Corning's newest high-performance display glass, Corning® Astra™ Glass is a composition balanced to accommodate stringent customer needs for high resolution across a broad range of processing temperatures. Astra Glass features a blend of low total pitch variation, low total thickness variation, and low sag to enable high-performance and high-resolution applications.

With an ideal blend of attributes and attractive panel economics, Corning Astra Glass is ideally suited to perform well in oxide thin-film transistor (TFT) backplane manufacturing processes, including Oxide-OLED and Oxide-LCD tablets and notebooks, or next-generation 8K LCD and OLED TVs.

## Product & Material Information

Corning® Astra™ Glass is produced to the following type specifications:

| Product Specifications |                             |           |
|------------------------|-----------------------------|-----------|
| Maximum Size           | Gen 10.5 Substrate          |           |
| Thickness Tolerance    | ± 0.02 mm                   |           |
| Thickness Ranges       | ≤ 9µm (150mm Moving Window) |           |
| Edges                  | R-Beveled                   |           |
| Corner Cuts            | 1.5 ± 1.0 mm                |           |
| Orientation Corner(s)  | Various                     |           |
| Squareness             | ± 0.03 mm                   |           |
| Sheet Warp             | ≤ 0.20 mm                   |           |
| Waviness               | Cut off: 0.8-8 mm           | ≤ 0.06 µm |
|                        | Cut off: 0.8-25 mm          | ≤ 0.33 µm |

| Substrate Inspection & Packaging |                                                                                                                            |                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Scratch & Stain                  | Pattern Surface                                                                                                            | None visible using 5K lux or 10K lux   |
|                                  | Back Surface                                                                                                               | 1.5K or 5K Limit Sample using 1.5K lux |
| Inclusions                       | ≤ 0.1 mm                                                                                                                   |                                        |
| Edge Chips                       | ≤ 1.0 mm                                                                                                                   |                                        |
| Edge Cracks                      | None visible using 1.5K lux                                                                                                |                                        |
| Packaging                        | Corning® DensePak® (products larger than 730 x 920 mm)                                                                     |                                        |
| Quality Area                     | Scratch, stain and inclusion fault criteria apply to all except a border area on each substrate which has a width of 10 mm |                                        |

| Material Information  |                                                                               |                           |
|-----------------------|-------------------------------------------------------------------------------|---------------------------|
| Glass Type            | Alkaline Earth Boro-Aluminosilicate                                           |                           |
| Forms Available       | Fusion Drawn Sheet                                                            |                           |
| Principle Uses        | Substrates for high-performance displays with a-Si and oxide-TFT technologies |                           |
| Mechanical Properties | Density (20°C)                                                                | 2.52 g/cm³                |
|                       | Young's Modulus                                                               | 81 GPa                    |
|                       | Shear Modulus                                                                 | 33 GPa                    |
|                       | Poisson's Ratio                                                               | 0.23                      |
| Thermal Expansion     | Coefficient of Thermal Expansion (0 - 300°C)                                  | 33 x 10 <sup>-7</sup> /°C |
| Viscosity             | Softening Point (10 <sup>7.6</sup> poises)                                    | 1013°C                    |
|                       | Annealing Point (10 <sup>13</sup> poises)                                     | 778°C                     |
|                       | Strain Point (10 <sup>14.7</sup> poises)                                      | 725°C                     |
| Electrical Properties | Log <sub>10</sub> Volume Resistivity                                          | at 25°C 25.2 ohm-cm       |
|                       |                                                                               | at 250°C 14.1 ohm-cm      |
|                       |                                                                               | at 500°C 9.7 ohm-cm       |
|                       | Dielectric Constant (20°C, 1kHz)                                              | 5.82                      |
|                       | Loss Tangent (20°C, 1kHz)                                                     | 0.2%                      |

| Dimensional Measurement |      |           |         |            |                    |            |      |          |            |
|-------------------------|------|-----------|---------|------------|--------------------|------------|------|----------|------------|
|                         | Size | Thickness | Chamfer | Corner Cut | Orientation corner | Squareness | Warp | Waviness | Compaction |
| Laser Gauge             | X    | X         |         |            |                    | X          |      |          |            |
| Calipers                | X    |           |         |            |                    |            |      |          |            |
| Micrometer              |      | X         |         |            |                    |            |      |          |            |
| Scale Loupe             |      |           | X       | X          | X                  |            |      |          |            |
| Squareness Gauge        |      |           |         |            |                    | X          |      |          |            |
| Warp Gauge              |      |           |         |            |                    |            | X    |          |            |
| Profilometer            |      |           |         |            |                    |            |      | X        |            |
| Compaction Gauge        |      |           |         |            |                    |            |      |          | X          |

| Visual Inspection |                                                                |              |            |          |          |
|-------------------|----------------------------------------------------------------|--------------|------------|----------|----------|
|                   | Pattern Surface                                                | Back Surface | Inclusions | Chips    | Cracks   |
| Environment       | Darkened Clean Room                                            |              |            |          |          |
| Light Source      | Halogen (10K lux), Halogen (5K lux), or Flourescent (1.5K lux) |              |            |          |          |
| Brightness        | 5K or 10K lux                                                  | 1.5K lux     | 1.5K lux   | 1.5K lux | 1.5K lux |
| Method            | Automated                                                      |              |            |          |          |

| Thermal Conductivity                                                                                                                                               |                     |             |                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|---------------------|
| Thermal conductivity is a calculated value, and is equal to the product of the thermal diffusivity multiplied by specific heat multiplied by density of the glass. |                     |             |                     |
| Temp (°C)                                                                                                                                                          | Diffusivity (cm²/s) | Cwp (J/kgK) | Conductivity (W/mK) |
| 100                                                                                                                                                                | 0.0059              | 770.3       | 1.128               |
| 200                                                                                                                                                                | 0.0057              | 906.9       | 1.285               |
| 300                                                                                                                                                                | 0.0055              | 949.2       | 1.303               |
| 400                                                                                                                                                                | 0.0055              | 1016.9      | 1.402               |
| 500                                                                                                                                                                | 0.0054              | 1066.6      | 1.446               |

| Chemical Durability                                                                                                                                                                                          |        |      |                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|----------------------|
| Chemical durability is measured via weight loss per surface area after immersion. Values are highly dependent upon actual testing conditions. Unless otherwise noted, concentrations refer to weight percent |        |      |                      |
| Reagents                                                                                                                                                                                                     | Time   | Temp | Weight Loss (mg/cm²) |
| HCl - 5%                                                                                                                                                                                                     | 24 hrs | 95°C | 0.09                 |
| HNO <sub>3</sub> - 1M                                                                                                                                                                                        | 24 hrs | 95°C | 0.06                 |
| HF - 10%                                                                                                                                                                                                     | 20 min | 20°C | 5.18                 |
| 110BHF                                                                                                                                                                                                       | 5 min  | 30°C | 0.38                 |
| 1HF:10HNO <sub>3</sub>                                                                                                                                                                                       | 3 min  | 20°C | 1.56                 |
| 1HF:100HNO <sub>3</sub>                                                                                                                                                                                      | 3 min  | 20°C | 0.17                 |
| DI H <sub>2</sub> O                                                                                                                                                                                          | 24 hrs | 95°C | 0.00                 |
| Na <sub>2</sub> CO <sub>3</sub> - 0.02N                                                                                                                                                                      | 6 hrs  | 95°C | 0.11                 |
| NaOH - 5%                                                                                                                                                                                                    | 6 hrs  | 95°C | 1.58                 |

The logo for Corning Lotus NXT Glass is located in the top left corner. It features the word "CORNING" in a large, bold, sans-serif font, with "Lotus™ NXT Glass" in a smaller, regular sans-serif font below it. The text is white and set against a dark, rectangular background that has a subtle gradient and is overlaid on a larger image of glass panels.

## Highest-Advantaged, Premium Glass for High-Performance Displays

Corning® Lotus™ NXT Glass is our highest-advantaged glass, specially formulated for high-temperature processing. It is designed to withstand high-temperature processing requirements with exceptional dimensional stability, resulting in heightened resolutions, more energy-efficient displays, and better yields. Lotus™ NXT Glass features a High Young's Modulus, High UV transmission, and our highest annealing point.

### Product & Material Information

Corning® Lotus™ NXT Glass is produced to the following type specifications:

| Product Specifications |                                        |
|------------------------|----------------------------------------|
| Maximum Size           | Gen 10 Substrate                       |
| Major Thicknesses      | 0.3 mm, 0.4 mm, 0.5 mm, 0.6 mm, 0.7 mm |
| Thickness Tolerance    | ± 0.02 mm                              |
| Thickness Ranges       | ≤ 9µm (150mm Moving Window)            |
| Edges                  | R-Beveled                              |
| Corner Cuts            | 1.5 ± 1.0 mm                           |
| Orientation Corner(s)  | Various                                |
| Squareness             | ± 0.3mm                                |
| Sheet Warp             | ≤ 0.20 mm                              |
| Waviness               | Cut off: 0.8-8 mm    ≤ 0.06 µm         |
|                        | Cut off: 0.8-25 mm    ≤ 0.33 µm        |

| Substrate Inspection & Packaging |                                                                                                                             |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Scratch & Stain                  | Pattern Surface <i>None visible using 5K lux or 10K lux</i>                                                                 |
|                                  | Back Surface <i>1.5K or 5K Limit Sample using 1.5K lux</i>                                                                  |
| Inclusions                       | ≤ 0.1 mm                                                                                                                    |
| Edge Chips                       | ≤ 1.0 mm                                                                                                                    |
| Edge Cracks                      | None visible using 1.5K lux                                                                                                 |
| Packaging                        | Polypropylene Slotted Cases<br>(=<730 x 920mm)                                                                              |
|                                  | Corning® DensePak®<br>(products larger than 730 x 920mm)                                                                    |
| Quality Area                     | Scratch, stain and inclusion fault criteria apply to all except a border area on each substrate which has a width of 10 mm. |

| Material Information  |                                              |                            |
|-----------------------|----------------------------------------------|----------------------------|
| Glass Type            | Alkaline Earth Boro-Aluminosilicate          |                            |
| Forms Available       | Fusion Drawn Sheet                           |                            |
| Principle Uses        | Substrates for High-Performance Displays     |                            |
| Mechanical Properties | Density (20°C)                               | 2.59 g/cm <sup>3</sup>     |
|                       | Young's Modulus                              | 83 GPa                     |
|                       | Shear Modulus                                | 34 GPa                     |
|                       | Poisson's Ratio                              | 0.23                       |
| Thermal Expansion     | Coefficient of Thermal Expansion (0 - 300°C) | 35 x 10 <sup>-7</sup> / °C |
| Viscosity             | Softening Point (10 <sup>7.6</sup> poises)   | 1043°C                     |
|                       | Annealing Point (10 <sup>13</sup> poises)    | 806°C                      |
|                       | Strain Point (10 <sup>14.5</sup> poises)     | 752°C                      |
| Electrical Properties | Log <sub>10</sub> Volume Resistivity         | 25.7 ohm-cm<br>at 25°C     |
|                       |                                              | 14.3 ohm-cm<br>at 250°C    |
|                       |                                              | 9.4 ohm-cm<br>at 500°C     |
|                       | Dielectric Constant (20°C, 1kHz)             | 6.17                       |
|                       | Loss Tangent (20°C, 1kHz)                    | 0.15%                      |

|                    |                                   |                        |
|--------------------|-----------------------------------|------------------------|
| Optical Properties | Refractive Index (at 589.3nm)     | 1.526                  |
|                    | Dispersion Constant               | 61.7                   |
|                    | Birefringence Constant            | 283 (nm/cm) / (kg/mm²) |
|                    | Transmittance (from 400 to 800nm) | >90%                   |

| Visual Inspection |                                                                |              |            |          |          |
|-------------------|----------------------------------------------------------------|--------------|------------|----------|----------|
|                   | Pattern Surface                                                | Back Surface | Inclusions | Chips    | Cracks   |
| Environment       | Darkened Clean Room                                            |              |            |          |          |
| Light Source      | Halogen (10K lux), Halogen (5K lux), or Flourescent (1.5K lux) |              |            |          |          |
| Brightness        | 5K or 10K lux                                                  | 1.5K lux     | 1.5K lux   | 1.5K lux | 1.5K lux |
| Method            | Automated                                                      |              |            |          |          |

| Dimensional Measurement |      |           |         |            |                    |             |      |          |                      |
|-------------------------|------|-----------|---------|------------|--------------------|-------------|------|----------|----------------------|
|                         | Size | Thickness | Chamfer | Corner Cut | Orientation Corner | Square ness | Warp | Waviness | Compaction Variation |
| Laser Gauge             | X    | X         |         |            |                    | X           |      |          |                      |
| Calipers                | X    |           |         |            |                    |             |      |          |                      |
| Micrometer              |      | X         |         |            |                    |             |      |          |                      |
| Scale Loupe             |      |           | X       | X          | X                  |             |      |          |                      |
| Squareness Gauge        |      |           |         |            |                    | X           |      |          |                      |
| Warp Gauge              |      |           |         |            |                    |             | X    |          |                      |
| Prolifometer            |      |           |         |            |                    |             |      | X        |                      |
| Compaction Gauge        |      |           |         |            |                    |             |      |          | X                    |

| Chemical Durability                                                                                                                                                                                          |        |      |                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|----------------------|
| Chemical durability is measured via weight loss per surface area after immersion. Values are highly dependent upon actual testing conditions. Unless otherwise noted, concentrations refer to weight percent |        |      |                      |
| Reagents                                                                                                                                                                                                     | Time   | Temp | Weight Loss (mg/cm²) |
| HCl - 5%                                                                                                                                                                                                     | 24 hrs | 95°C | 0.04                 |
| HNO <sub>3</sub> - 1M                                                                                                                                                                                        | 24 hrs | 95°C | 0.03                 |
| HF - 10%                                                                                                                                                                                                     | 20 min | 20°C | 5.81                 |
| 110BHF                                                                                                                                                                                                       | 5 min  | 30°C | 0.34                 |
| 1HF:10HNO <sub>3</sub>                                                                                                                                                                                       | 3 min  | 20°C | 1.67                 |
| 1HF:100HNO <sub>3</sub>                                                                                                                                                                                      | 3 min  | 20°C | 0.17                 |
| DI H <sub>2</sub> O                                                                                                                                                                                          | 24 hrs | 95°C | 0.00                 |
| Na <sub>2</sub> CO <sub>3</sub> - 0.02N                                                                                                                                                                      | 6 hrs  | 95°C | 0.10                 |
| NaOH - 5%                                                                                                                                                                                                    | 6 hrs  | 95°C | 1.46                 |

| Thermal Conductivity                                                                                                                                               |                     |                       |                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------|------------------------|
| Thermal conductivity is a calculated value, and is equal to the product of the thermal diffusivity multiplied by specific heat multiplied by density of the glass. |                     |                       |                        |
| Temp (°C)                                                                                                                                                          | Diffusivity (cm²/s) | Specific Heat(J/g-°K) | Conductivity (W/cm-°K) |
| 23                                                                                                                                                                 | 0.0061              | 0.759                 | 0.0116                 |
| 100                                                                                                                                                                | 0.0060              | 0.820                 | 0.0130                 |
| 200                                                                                                                                                                | 0.0057              | 0.903                 | 0.0137                 |
| 300                                                                                                                                                                | 0.0057              | 0.965                 | 0.0150                 |
| 400                                                                                                                                                                | 0.0056              | 1.010                 | 0.0159                 |
| 500                                                                                                                                                                | 0.0056              | 1.044                 | 0.0159                 |

**По вопросам продаж и поддержки обращайтесь:**

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