Corning® Gorilla® Glass 3 with Native Damage Resistance™ is an alkali-aluminosilicate thin sheet glass that is better able to survive the real-world events that most commonly cause glass failure. With its new core composition, this glass enables improved damage resistance and toughness by helping to prevent the deep chips and scratches that cause glass to break.

Product Information

Benefits
- Glass designed with improved native damage resistance,
  - Enhances retained strength after use
  - High resistance to scratch and sharp contact damage
  - Superior surface quality

Applications
- Ideal protective cover for electronic displays in:
  - Smartphones
  - Laptop and tablet computer screens
  - Mobile devices
- Touchscreen devices
- Optical components
- High strength glass articles

Dimensions
Available thicknesses 0.4 mm - 2.0 mm

Viscosity
- Softening Point (10^7.6 poises) 900 °C
- Annealing Point (10^13.2 poises) 628 °C
- Strain Point (10^14.7 poises) 574 °C

Properties
- Density 2.39 g/cm^3
- Young’s Modulus 69.3 GPa
- Poisson’s Ratio 0.22
- Shear Modulus 28.5 GPa
- Vickers Hardness (200 g load)
  - Un-strengthened 534 kgf/mm^2
  - Strengthened 649 kgf/mm^2
- Fracture Toughness 0.66 MPa m^0.5
- Coefficient of Expansion 75.8 x 10^-7/°C

Chemical Strengthening
- Compressive stress $\geq 950$ MPa @ 40 µm DOL
- Depth of Layer $\geq 50$ µm

Optical

Refractive Index (590 nm)
- Core glass* 1.50
- Compression layer 1.51

Photo-elastic constant 31.9 nm/cm/MPa
* Core index is used for FSM-based measurements since it is unaffected by ion-exchange conditions.

Chemical Durability
Durability is measured via weight loss per surface area after immersion in the solvents shown below. Values are highly dependent upon actual testing conditions. Data reported is for Corning’s Gorilla Glass 3 with NDR™.

<table>
<thead>
<tr>
<th>Reagent</th>
<th>Time</th>
<th>Temperature</th>
<th>Weight Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCl - 5%</td>
<td>24 hrs</td>
<td>95</td>
<td>0.6</td>
</tr>
<tr>
<td>NH4F:HF - 10%</td>
<td>20 min</td>
<td>20</td>
<td>2.1</td>
</tr>
<tr>
<td>HF - 10%</td>
<td>20 min</td>
<td>20</td>
<td>12.3</td>
</tr>
<tr>
<td>NaOH - 5%</td>
<td>6 hrs</td>
<td>95</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Electrical

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>Dielectric Constant</th>
<th>Loss Tangent</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>7.59</td>
<td>0.022</td>
</tr>
<tr>
<td>163</td>
<td>7.48</td>
<td>0.022</td>
</tr>
<tr>
<td>272</td>
<td>7.44</td>
<td>0.021</td>
</tr>
<tr>
<td>381</td>
<td>7.42</td>
<td>0.022</td>
</tr>
<tr>
<td>490</td>
<td>7.38</td>
<td>0.021</td>
</tr>
<tr>
<td>599</td>
<td>7.37</td>
<td>0.022</td>
</tr>
<tr>
<td>912</td>
<td>7.30</td>
<td>0.023</td>
</tr>
<tr>
<td>1499</td>
<td>7.26</td>
<td>0.023</td>
</tr>
<tr>
<td>1977</td>
<td>7.23</td>
<td>0.023</td>
</tr>
<tr>
<td>2466</td>
<td>7.20</td>
<td>0.024</td>
</tr>
<tr>
<td>2986</td>
<td>7.19</td>
<td>0.025</td>
</tr>
</tbody>
</table>

Terminated coaxial line similar to that outlined in NIST Technical Notes 1520 and 1355-R.

Corning® Gorilla® Glass 3 with NDR™ / Product Information Sheet / E_050613

* Core index is used for FSM-based measurements since it is unaffected by ion-exchange conditions.
Putting Gorilla® Glass 3 with NDR™ to the Test.

**Greater damage resistance**

![Graph showing critical load for different types of glass.](image)

It takes more load to initiate radial cracks in the glass.

**Greater retained strength**

![Graph showing normalized ring-on-ring failure load.](image)

Devices benefit from greater retained strength.

**Enables the use of thinner cover glass**

![Graph showing load to failure vs. thickness.](image)

Scratches are less visible

**Knoop Visual Scratch Test**

After Ion Exchange

![Visual scratch test images.](image)

**Enables greater strength**

![Graph showing failure probability vs. strength.](image)

Corning Gorilla Glass 3 with NDR™ exhibits tighter strength distribution.

**Scratches are less visible**

For more information:

Email: gorillaglass.com

Web: www.corninggorillaglass.com

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