Corning® Gorilla® Glass 5 – Corning’s latest glass design was formulated to address breakage – the greatest concern of consumers, according to Corning’s research. The new glass is just as thin and light as previous versions, but has been formulated to deliver dramatically improved damage resistance allowing improved in-field performance. Corning® Gorilla® Glass 5 has been tested for performance when subjected to sharp contact damage.

## Product Information

### Benefits
- Improved drop performance
- High 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
- Wearable devices

### Dimensions
Available Thickness 0.4mm – 1.3mm

### Viscosity
- Softening Point (10^7.6 poises) 884 °C
- Annealing Point (10^13.2 poises) 623 °C
- Strain Point (10^14.7 poises) 571 °C

### Properties
- Density 2.43 g/cm³
- Young’s Modulus 76.7 GPa
- Poisson’s Ratio 0.21
- Shear Modulus 31.7 GPa
- Vickers Hardness (200g load) Unstrengthened 601 kgf/mm²
  Strengthened 638 kgf/mm²
- Fracture Toughness 0.69 MPa m^0.5
- Coefficient of Expansion 78.8 x 10^{-7} °C

### Chemical Strengthening
- Compressive Stress Capability ≥ 850 MPa
- Depth of Compression Capability ≥ 75 µm

### Optical

#### Refractive Index (590 nm)
- Core Glass* 1.50
- Compression Layer 1.51
- Photo-elastic constant 30.1 nm/cm/MPa
*Core index is used for FSM-based measurements since it is unaffected by ion-exchanged 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 is reported for Corning® Gorilla® Glass 5.

<table>
<thead>
<tr>
<th>Reagent</th>
<th>Time</th>
<th>Temperature (°C)</th>
<th>Weight Loss (mg/cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCl – 5%</td>
<td>24 hrs.</td>
<td>95</td>
<td>5.9</td>
</tr>
<tr>
<td>NH₄F:HF – 10%</td>
<td>20 min.</td>
<td>20</td>
<td>1.0</td>
</tr>
<tr>
<td>HF – 10%</td>
<td>20 min.</td>
<td>20</td>
<td>25.2</td>
</tr>
<tr>
<td>NaOH – 5%</td>
<td>6 hrs.</td>
<td>95</td>
<td>2.7</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>7.08</td>
<td>0.009</td>
</tr>
<tr>
<td>163</td>
<td>7.01</td>
<td>0.010</td>
</tr>
<tr>
<td>272</td>
<td>7.01</td>
<td>0.011</td>
</tr>
<tr>
<td>381</td>
<td>7.00</td>
<td>0.010</td>
</tr>
<tr>
<td>490</td>
<td>6.99</td>
<td>0.011</td>
</tr>
<tr>
<td>599</td>
<td>6.97</td>
<td>0.010</td>
</tr>
<tr>
<td>912</td>
<td>7.01</td>
<td>0.012</td>
</tr>
<tr>
<td>1499</td>
<td>6.99</td>
<td>0.012</td>
</tr>
<tr>
<td>1977</td>
<td>6.97</td>
<td>0.014</td>
</tr>
<tr>
<td>2466</td>
<td>6.96</td>
<td>0.014</td>
</tr>
<tr>
<td>2986</td>
<td>6.96</td>
<td>0.014</td>
</tr>
</tbody>
</table>

Terminated coaxial line similar to that outlined in NIST Technical Notes 1520 and 1355-R.
Putting Corning® Gorilla® Glass 5 to the test.

Improved damage resistance on rough surface.

Incremental face drop on 180 grit sandpaper, Corning puck

\[
\text{Normalized Average Height to Failure vs Glass Thickness (mm)}
\]

- Corning® Gorilla® Glass 5
- Corning® Gorilla® Glass 4

- up to 1.8X
- up to 1.5X

Faster chemical strengthening with high Compressive Stress and deeper Depth of Compression.


graph showing comparison of Corning® Gorilla® Glass 5 vs Glass 4

*Results may be varied by thickness and chemical strengthening recipe

Greater damage resistance with deep abrasion.

Lab tests that replicate most common field scratches

- Garnet Test
  - Surrogate for severe use conditions
  - 150 grit sandpaper abrasion
  - ½ cycle (single pass)
  - 1 kg load

- Taber Test
  - Linear CS-17 abrasion
  - 25 cycles/min
  - 1" cycle length
  - 500 cycles
  - 6.7mm contact diameter
  - 850 g load

- Tumble Test
  - Random purse tumble
  - 15 min duration

Pixel-by-pixel Quantitative analysis:

<table>
<thead>
<tr>
<th>Surface Damaged Area (SDA) %</th>
<th>Corning® Gorilla® Glass 5</th>
<th>Corning® Gorilla® Glass 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Deviation (SDA) %</td>
<td>0.73%</td>
<td>0.31%</td>
</tr>
<tr>
<td></td>
<td>0.39%</td>
<td>0.13%</td>
</tr>
<tr>
<td></td>
<td>0.39%</td>
<td>0.22%</td>
</tr>
</tbody>
</table>

*all parts tested without anti-smudge coating to probe glass response only

CORNING

For more information about Corning® Gorilla® Glass 5:
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