

# SapphirEX Durable Coatings

## Sapphire-Like Optical and Tribological Performance From the Sapphire Experts



SapphirEX is a tribological coating with unrivaled optical performance for rugged environments. It provides many of the scratch and wear resistant benefits of single crystal sapphire and can be used to protect silicate glasses and other ceramics, but also plastics and metals for certain applications. SapphirEX is made of  $\text{Al}_2\text{O}_3$ , just like Rubicon Technology's other cutting edge sapphire products, but is polycrystalline and can be produced for a fraction of the cost.

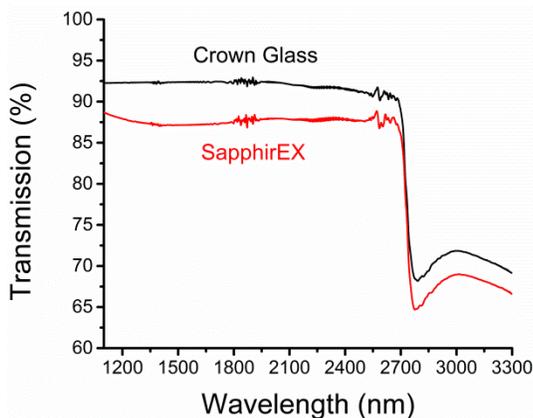
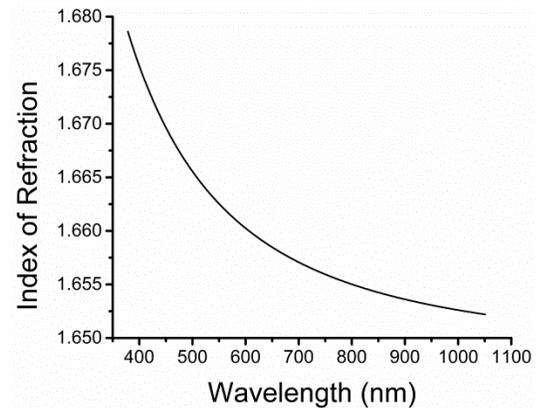
<b>Hardness (Oliver &amp; Pharr, GPa)</b>	Tunable 17 to 27 GPa
<b>Hardness (Vickers)</b>	Tunable 1700 to 2500
<b>Coefficient of Friction (diamond)</b>	< 0.20
<b>Roughness (RMS)</b>	4 nm
<b>Surface Reflectivity</b>	6.5% ( $\lambda = 632.8 \text{ nm}$ )
<b>Available Thicknesses</b>	100 nm – 5 $\mu\text{m}$

### Optical Clarity

Just like Rubicon Technology's industry leading sapphire, SapphirEX offers exceptional optical performance for visible and near-infrared light. In addition to scratch and wear resistance comparable to single crystal sapphire, SapphirEX's lower index of refraction reduces losses in

optical transmission due to reflection at surfaces.

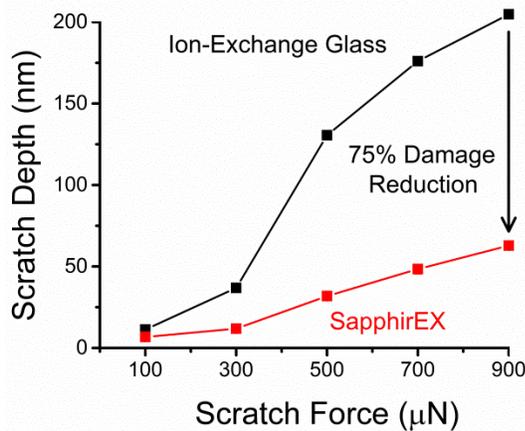
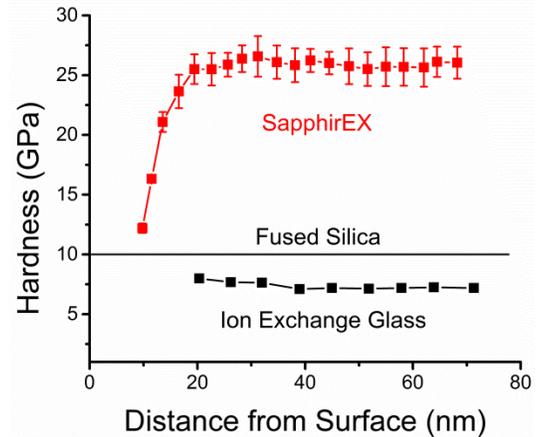
Unlike other tribological coatings, SapphirEX does not discolor the underlying substrate. Because it does not absorb visible or near-infrared light, it is suitable for applications ranging from extending the lifetime of displays to precision infrared optics.



# SAPPHIR<sup>EX</sup>

## Tribological Performance

Instrumented indentation measurements demonstrate the superior hardness of SapphirEX over other materials, including those specifically engineered for hardness. SapphirEX is 3 times harder than an industry leading ion-exchange glass and more than 2 times harder than fused silica, which in the form of sand is a leading cause of damage in many real world environments.



SapphirEX confers significant wear and scratch resistance to underlying substrates, even those already strengthened against wear. Instrumented scratch measurements with a sharpened diamond demonstrate that SapphirEX reduces scratch depth by 75% compared to an industry leading ion-exchange glass.

## To Inquire About Your Application

SapphirEX coatings are suitable for wide range of applications where strength and resistance to chemical and mechanical erosion are critical and where broad optical transmission is essential. SapphirEX is available in a variety of formulations and can be produced in thicknesses from 100 nm to more than 5 µm. Unlike other exotic polycrystalline ceramics, SapphirEX can be produced in high volume and avoids re-engineering existing solutions. Potential applications include defense, scanning, consumer electronics, mobile communications, industrial and semiconductor processing.

### Contact:

Tom D'Arcy  
Optical Sales Manager  
(603) 978-7884  
[tdarcy@rubicontechnology.com](mailto:tdarcy@rubicontechnology.com)  
<http://www.rubicontechnology.com>

Shakeel Dalal, PhD  
Process Development Engineer  
(630) 482-6030  
[sdalal@rubicontechnology.com](mailto:sdalal@rubicontechnology.com)  
<http://www.rubicontechnology.com>

# SAPPHIREX