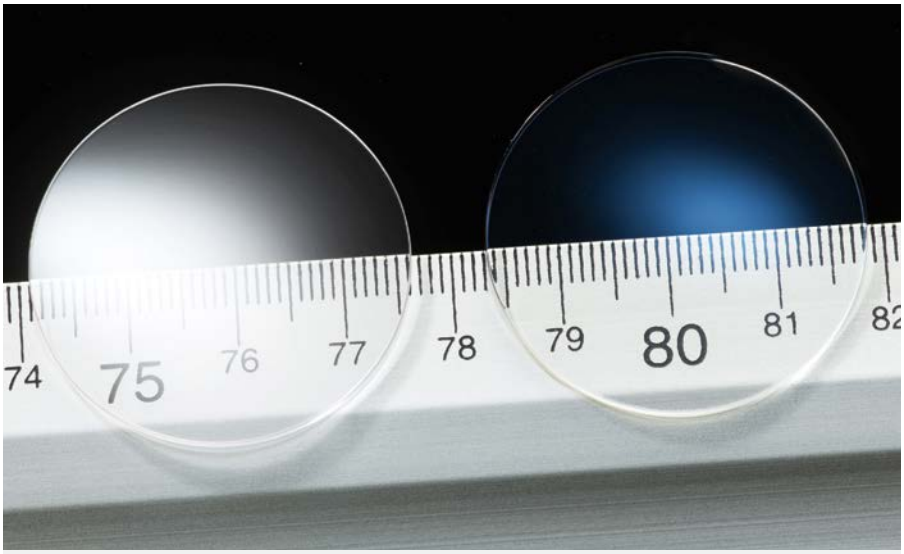
Scratch Resistant AR Coatings

Hard Anti Reflex (AR) Coatings

SCHOTT offers a variety of customized glass products with a specially hard AR coating in reliable and reproducible quality. Hard AR coatings are realized by applying an additional magnetic field in a sputtering machine generating a higher ion density at the sputtering target leading to denser coatings and a higher deposition rate. This results in a hard AR coating, consistent spectral performance, low-defect surfaces and excellent process stability. SCHOTT uses magnetron sputtering or ion beam sputtering (IBS) and its own proprietary processes for hard AR coatings resulting in both substantial scratch resistance and AR characteristics.



Uncoated sapphire | Double side scratch resistant AR coated sapphire

Advantages

- Improved scratch resistance
- AR characteristics
- High long time stability and mechanical & chemical durability

Materials

Selection of coatable material types:

- Sapphire
- Optical glass
- Technical glass (BOROFLOAT® 33, AF 32®, B 270®)
- Thermally or chemically strengthened glass

Applications

Scratch resistant AR coatings delivering both scratch resistance and AR characteristics can be applied in, e.g.:

- Watches
- Endoscopes
- Protective windows
- Displays

Technical Support

Please contact us with your requested filter/coating specifications. Our experienced application team is specifically trained to find the right solution for your application.

Options

- Combination possible with durable anti-fingerprint coating
- Colour of reflection can be adjusted according to customer specifications

Quality Assurance

Quality control is based on statistical process control, as well as on rigorous final inspection. Measurement instruments include a broad choice of spectrophotometers, vision systems, beam deflection, severe scratch resistance test, etc.

Specifications

- Dimensions between 1 mm and 300 mm (diameter) and thickness < 60 mm
- Spectral ranges between 400 nm and 1000 nm

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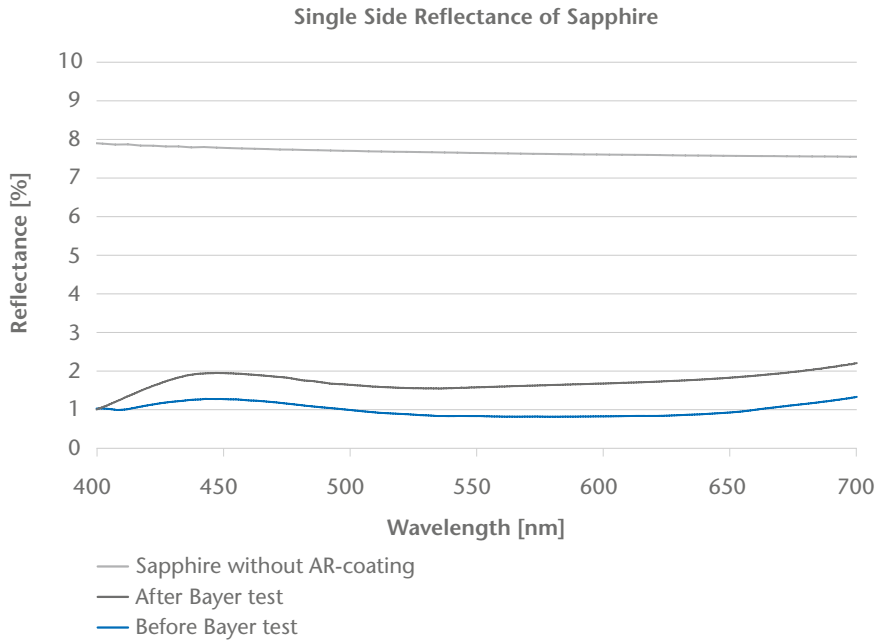
Proof of Scratch Resistance

Scratch resistance is often measured using the so-called *modified* Bayer test (a variation of the original test in ASTM F735) where the hard AR coated substrate is covered by alumina sand and oscillates many thousand times. The optical performance (e. g. reflection or haze) is measured before and after the abrasion test.

The graph below shows the result of a sapphire sample substrate with the following specifications:

- Scratch resistant coating AR for 450 nm to 700 nm
- Reflectance <1.5 % @ 450 nm … 700 nm before abrasion test
- Reflectance <5 % @ 450 nm … 700 nm after abrasion test



Coating is optimized with respect to least change of reflectivity and not with respect to lowest reflectivity.

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