

# Scratch Resistant AR Coatings

## Hard Anti Reflex (AR) Coatings

SCHOTT offers a variety of customized glass products with a special hard coating in reliable and reproducible quality. Hard 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 coating, consistent spectral performance, low-defect surfaces and excellent process stability.

SCHOTT uses magnetron sputtering and its own proprietary process for hard AR coatings resulting in both scratch resistance and AR characteristics.

## Advantages

- improved scratch resistance
- additional AR characteristics
- high long time stability and durability

## Materials

Selection of coat able material types:

- Sapphire
- Optical glass
- Borosilicate glass (Borofloat® 33, AF 32®, B 270®)

## Applications

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

- protective windows
- endoscopes
- watches
- displays

## Technical Support

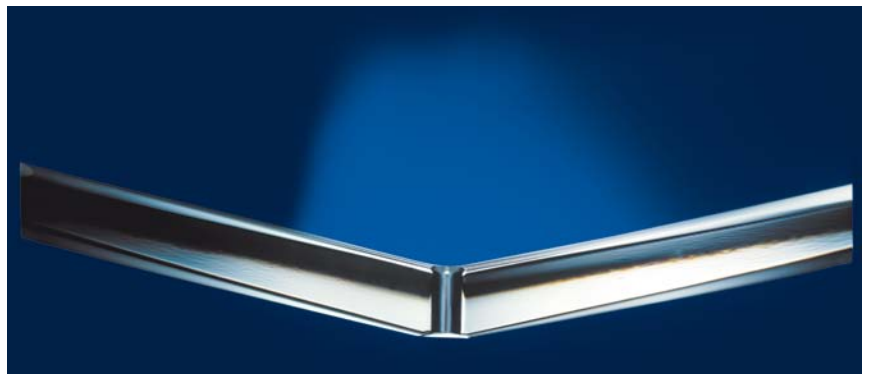
Please contact us with your requested filter/coating specifications. Our experienced application team is specifically trained to find the right solution for your application.

For more information please contact:

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## 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, Bayer test, etc.

## Specifications

- Dimensions between 1 mm and 200 mm (diameter) and thickness <40 mm
- Spectral range between 400 nm and 3000 nm

## Proof of Scratch Resistance

Scratch resistance is often measured after performing the so-called Bayer test (often as variation of the original test in ASTM F735) where the hard AR coated substrate is covered by sand and oscillates many thousand times with several hundred rounds per minute. The optical performance (e. g. reflection) is measured before and after the Bayer abrasion test.

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

- hard coated AR for 450 nm to 700 nm
- reflection <1.5% @ 450 nm ... 700 nm before abrasion test
- reflection <5% @ 450 nm ... 700 nm after abrasion test

