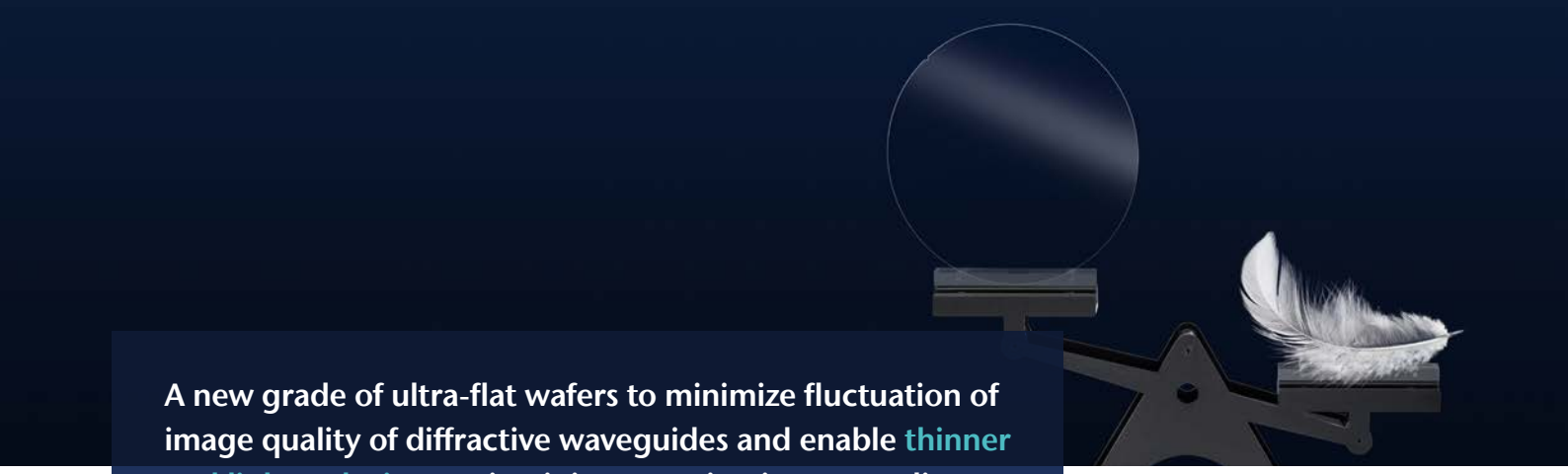


A new grade of ultra-flat wafers to minimize fluctuation of image quality of diffractive waveguides and enable thinner and lighter devices maintaining stunning image quality.

SCHOTT RealView® ultra

Planar high-refractive-index glass wafers are the backbone of leading Augmented and Mixed Reality devices. The AR industry is now trying to push the limits for optical properties while keeping the weight as low as possible. Weight reduction can be enabled by decreased glass density or decreased wafer thickness. However, it comes at a price in terms of image quality penalties.

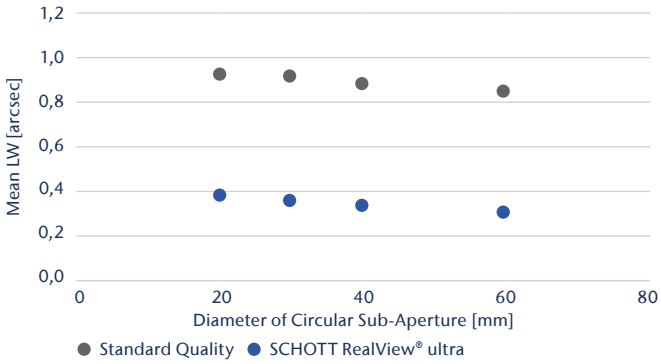
We developed the remedy: SCHOTT RealView® ultra with improved wafer flatness by up to 60 %. With the corresponding boost for image quality, AR device makers can minimize variation of image quality between individual eye pieces and hence maximize production yields. In addition, they can remove up to 30 % weight from the scale. The new ultra grade is applicable to the whole SCHOTT RealView® portfolio. Combined with SCHOTT's latest low-density glass innovation, SCHOTT RealView® 1.9 lightweight ultra even enables a waveguide weight reduction of up to 50 %.

What are challenges for thinner wafers?

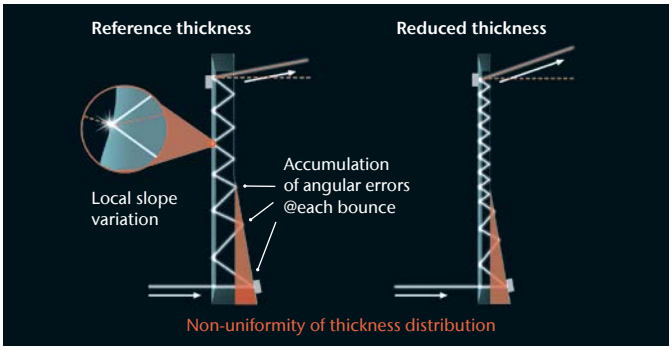
- More bounces of the propagating light beam with the glass surface
- Increased number of bounces give rise to the risk of accumulation of angular error affecting the image quality

How to maximize the image quality?

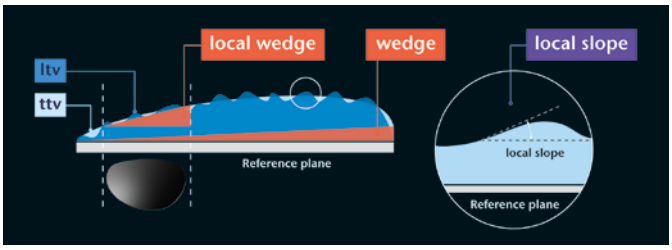
- Tight control of local slope is crucial
- It is equally as important to avoid accumulating deflections on the waveguide level in terms of a local wedge



Mean local wedges for typical eyepiece-sized sub-apertures are cut by more than half for SCHOTT RealView® ultra compared to standard market quality.



Propagation of a light beam through a waveguide. The number of bounces increases with reduced substrate thickness. Wedge causes systematic deviation of the light beam. Local deflections can occur due to local slope.



- Total thickness variation (TTV) 1 µm → 0.4 µm
- Local thickness variation (LTV) on eyepiece level* 0.5 µm → 0.2 µm
- Local wedge on eyepiece level* <1 arcsec → <0.5 arcsec
- Local slope <25 µrad → <15 µrad

* values depending on eye piece size and location

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schott.com

SCHOTT AG, Hattenbergstrasse 10, 55122 Mainz, Germany
Phone +49 (0)6131/66-1695, real.view@schott.com

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