

English

Trosifol®

# The Wedge

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**kuraray**

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Trosifol® The Wedge

# Excellent HUD image quality

Delivering your window into the world of advanced interlayers for laminated safety glass, Kuraray's Advanced Interlayer Business is underpinned by decades of innovation, application knowledge, domain experience and market success.

Our advanced interlayer portfolio – comprising Trosifol® PVB and SentryGlas® ionoplast interlayers – has continually revolutionized aesthetic, structural and functional design, fabrication and installation in the architectural and automotive/transportation segments.

**THE USE OF HEAD UP DISPLAYS (HUD)** continues to increase in the automotive industry. Not much more than a decade ago, only a small fraction of OEMs (Original Equipment Manufacturers) utilized this technology to reduce driver distraction and increase safety. Now, nearly every major OEM in the world is installing HUD in at least one of their vehicles.

Head up display systems project images onto the windshield. The resulting virtual image appears to be 2-3 meters in front of the driver, minimizing the amount of re-focusing necessary by the driver which reduces eye fatigue. The driver is also able to keep their eyes on the road, increasing safety.

The tapered profile of windshields laminated with Trosifol® The Wedge PVB interlayer allows the glazing to act as a combiner, overlapping the two reflections that occur – one from the inside surface of the windshield and one from the outside surface.

Kuraray has been producing high-quality Trosifol® PVB for head up display windshields for over 25 years.

# Trosifol® The Wedge

Kuraray offers both traditional Trosifol® The Wedge Monolayer, along with Trosifol® The Wedge Acoustic for instances where excellent HUD image quality is necessary with superior acoustic performance. The acoustic version of Trosifol® The Wedge is based on the same formulation as our standard acoustic automotive Trosifol®. In both formulations, clear and shadeband versions are available, in both melt fracture and embossed surface patterns.



Photo: © www.aayme

## TROSIFOL® THE WEDGE ENABLES A CLEAR FUTURE FOR HEAD UP DISPLAYS

- Keep your eyes on the road for information that is critical to avoiding a collision, along with turn by turn navigation and important vehicle functions
- Trosifol® The Wedge provides the critical difference for crisp head-up display images with greater clarity and high quality and high yield windshield manufacturing
- The technology has been developed in close partnership with HUD system developers and the world's leading automotive glass companies
- Kuraray has been supplying Trosifol® The Wedge for HUD applications for over 25 years
- As a result, Trosifol® The Wedge is the leading inter-layer solution for HUD-equipped vehicles

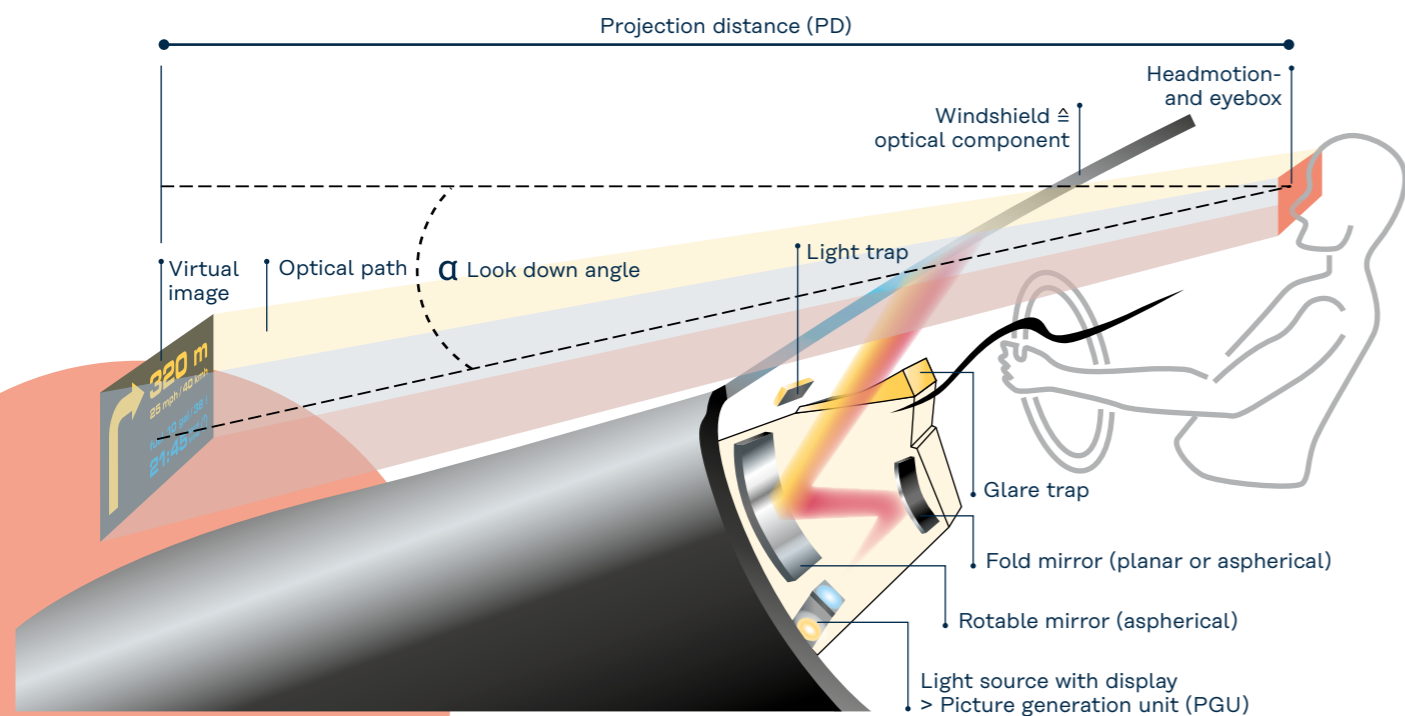
## VOICE OF THE CUSTOMER

- Visibility - Easy to read & interpret
  - Projection of information (minimizes re-focusing time)
  - Eyes stay on the road (road/situational awareness enhanced)
  - No obscuration by steering wheel (easy to find information)
- Information content & management
  - Provides useful information
  - Provides timely and specific warnings
- Resulting attributes
  - Improved information access time (allows reduced response time)
  - Offers convenience, comfort and safety (an aid to driving)
  - Brings the information to the driver (visual accommodation)

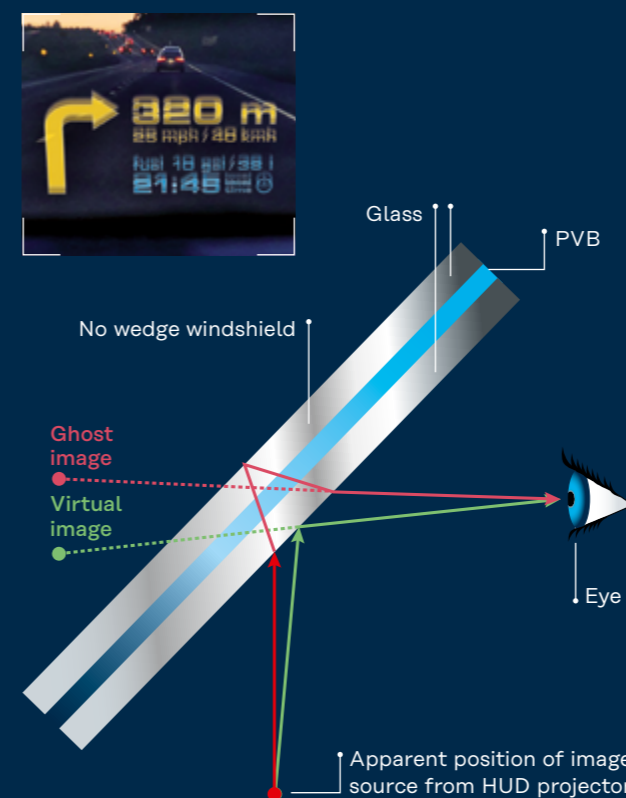
## THE OPTICAL DIFFERENCE WITH TROSIFOL® THE WEDGE TECHNOLOGY

- Image combiner optics are critical to the success of HUD systems. Safety windshields are now high-quality optical devices made possible by the proprietary engineering of a partial wedge profile interlayer for laminated safety glass windshields.
- The wedge angle of Trosifol® The Wedge is precisely tuned to the image area, which is just below the driver's line of sight of the road ahead and above the steering wheel. The resulting image is at a perceived distance of 2-3 meters, appearing to be over the front bumper of the vehicle.
- Windshields produced with Trosifol® The Wedge combine the reflected image from the inner and outer surfaces of the glass to create a single image. Together with improved projection units and properly produced glass, Trosifol® The Wedge reduces image ghosting or other distortions that could distract the driver or cause eyesight weariness on long trips.

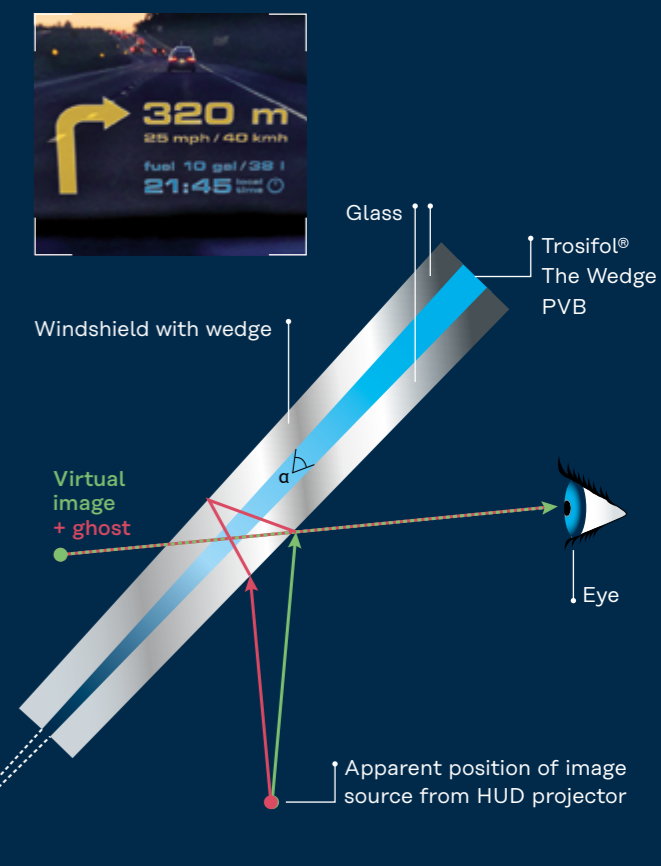
## Principle function of a head up display (HUD)



## Windshield without wedge



## Windshield with Trosifol® The Wedge



## BENEFITS OF THE PARTIAL WEDGE PROFILE OF TROSIFOL® THE WEDGE

### Better roll formation

- Less wrinkling (can result in improved windshield optics)
- Better tracking through shaping line (improved yields)

### Better packaging & handling

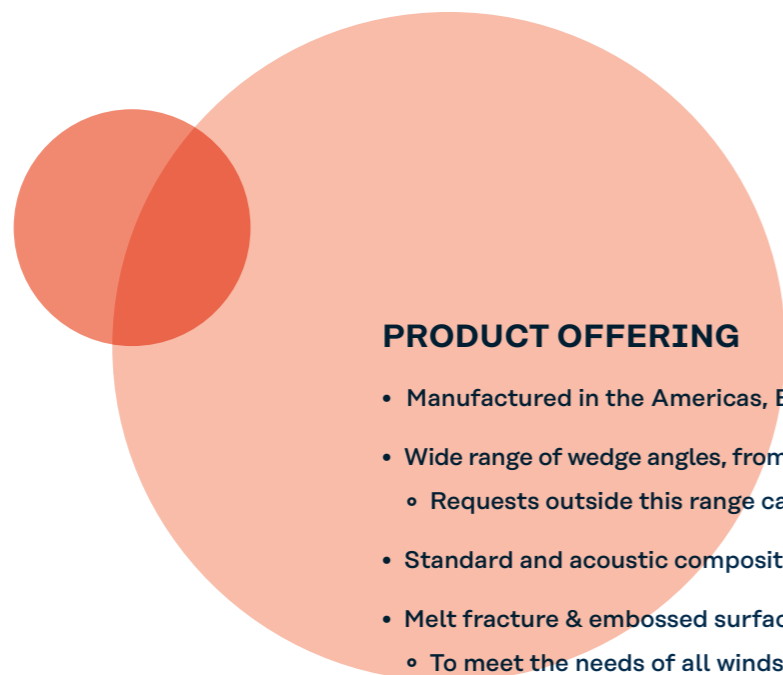
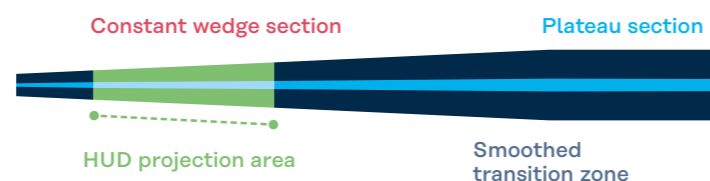
- Longer roll lengths
  - More windshields per roll
  - Fewer pallets to store
  - Less roll handling during lamination campaigns
  - Depending on the sheeting design (wedge angle, roll width, plateau width), rolls with the partial wedge design can be 15% longer than a full-wedge design while maintaining the same roll diameter/ packaging
- The ability to lift rolls vertically, if desired
- Packaged vertically with the thick-end-up or thick-end-down
  - Thick-end-up is only available for “small” rolls (with the diameter of a standard 250 m (820 ft) roll of 0.76 mm (30 mil) sheeting)

### Lamination

- Reduced thickness at the top of the windshield
- More cut blanks per stack, reducing tray changes at windshield assembly
- Easier to trim at windshield assembly
- Lighter windshields

### Cross section of Trosifol® The Wedge

- Smoothed transition minimizes interference with advanced driver assistance systems



### PRODUCT OFFERING

- Manufactured in the Americas, Europe, and Asia
- Wide range of wedge angles, from 0.15 mrad to 0.70 mrad
  - Requests outside this range can be discussed
- Standard and acoustic compositions
- Melt fracture & embossed surface patterns
  - To meet the needs of all windshield manufacturing processes: nip roll, vacuum ring and vacuum bag prepressing
- Clear and shadeband
- Roll widths up to 122 cm (48 in) can be produced easily
  - Wider sheeting can be discussed. Widths up to 183 cm (72 in) have been produced for specific applications.

# Contact



### FOR FURTHER INFORMATION

on products from Kuraray, please visit [www.kuraray.com](http://www.kuraray.com).  
You can find further information on our Trosifol® and SentryGlas® products at [www.trosifol.com](http://www.trosifol.com).

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7/2021



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