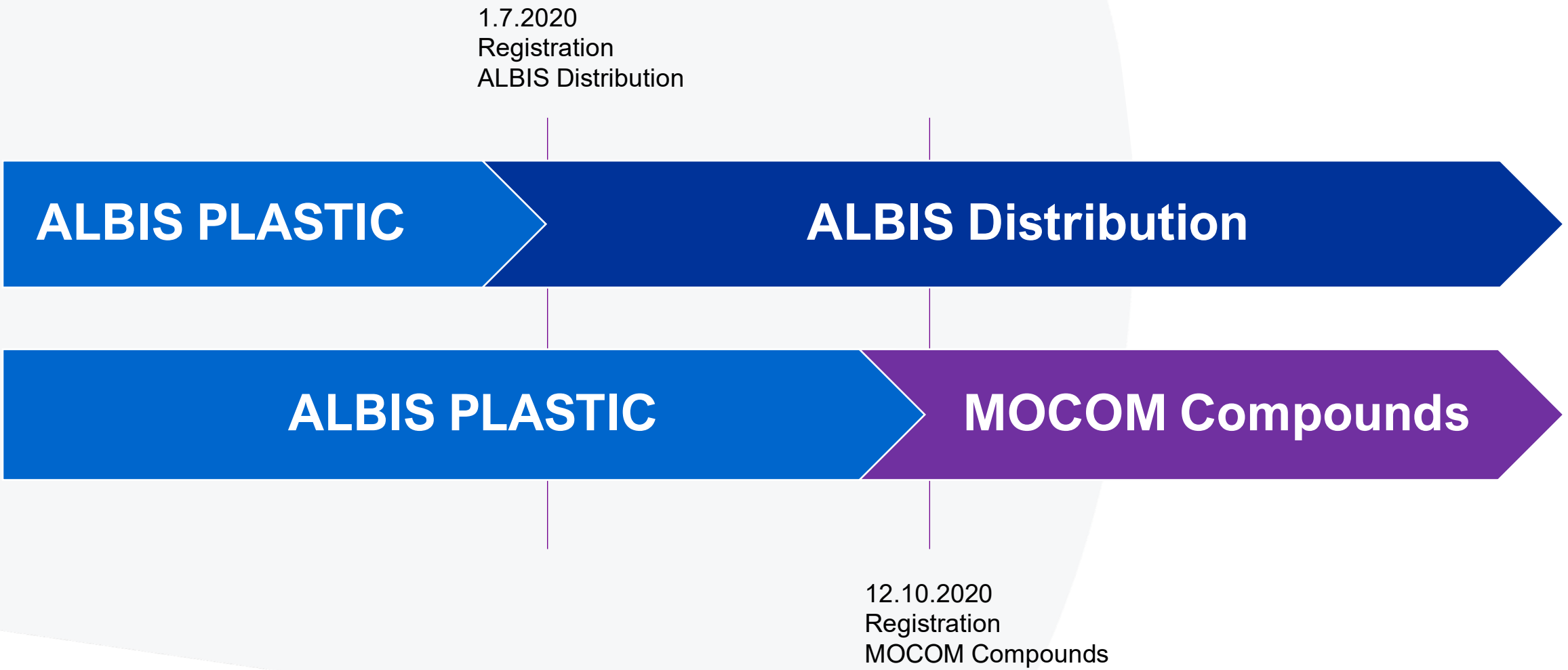
MOCOM

Functional Compounds for Innovative Lighting

M:COM

The ALBIS PLASTIC Compounding Unit

Our Founding



Production Sites

Americas

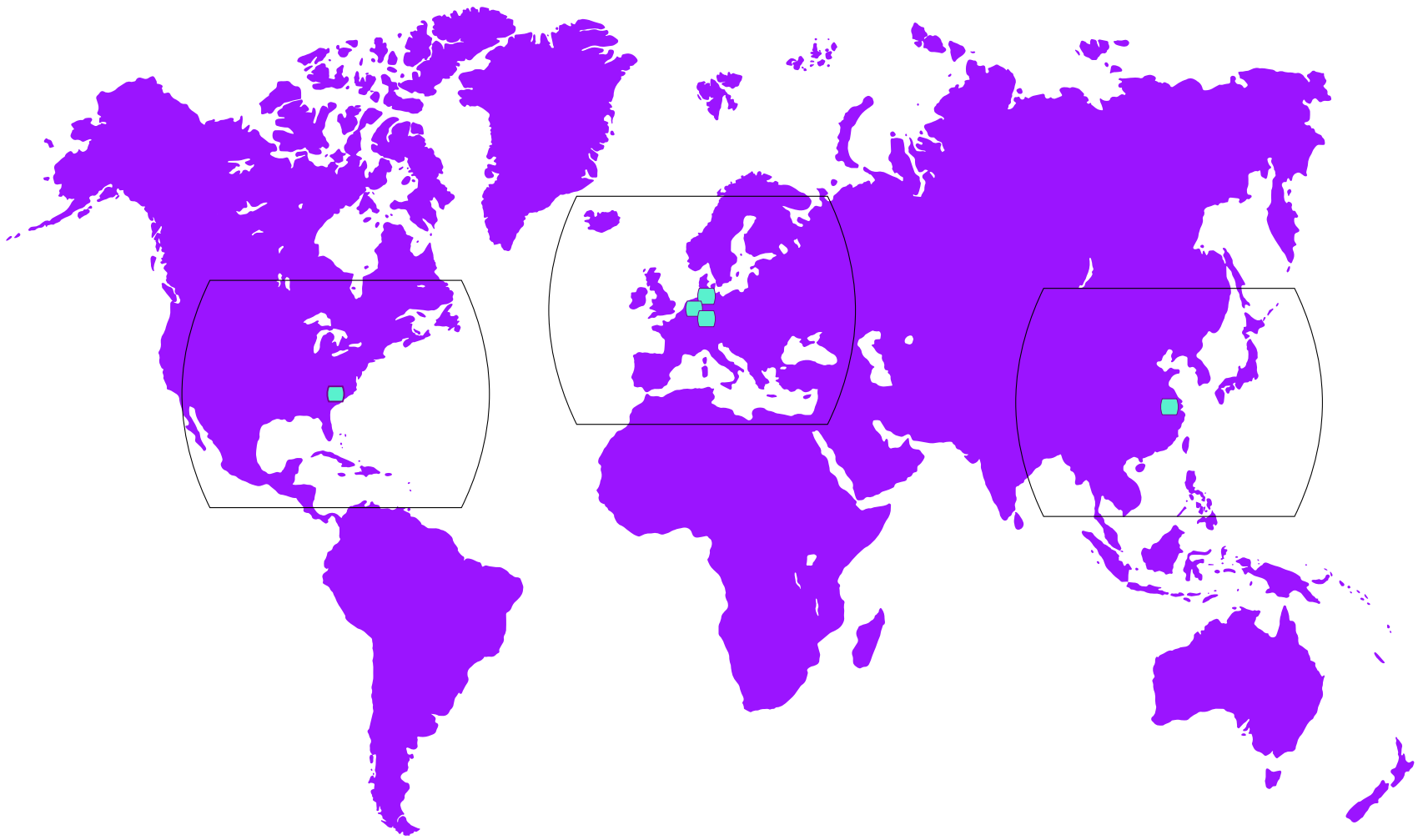
- Duncan, SC, USA

Europe & Africa

- Hamburg, DE
- Zülpich, DE
- Obernburg, DE

Asia-Pacific

- Changshu, CN



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Sales Offices & Regions

Europe, Middle East & Africa

- MOCOM, Hamburg, DE
- MOCOM Direct Sales Region
- ALBIS Sales Region

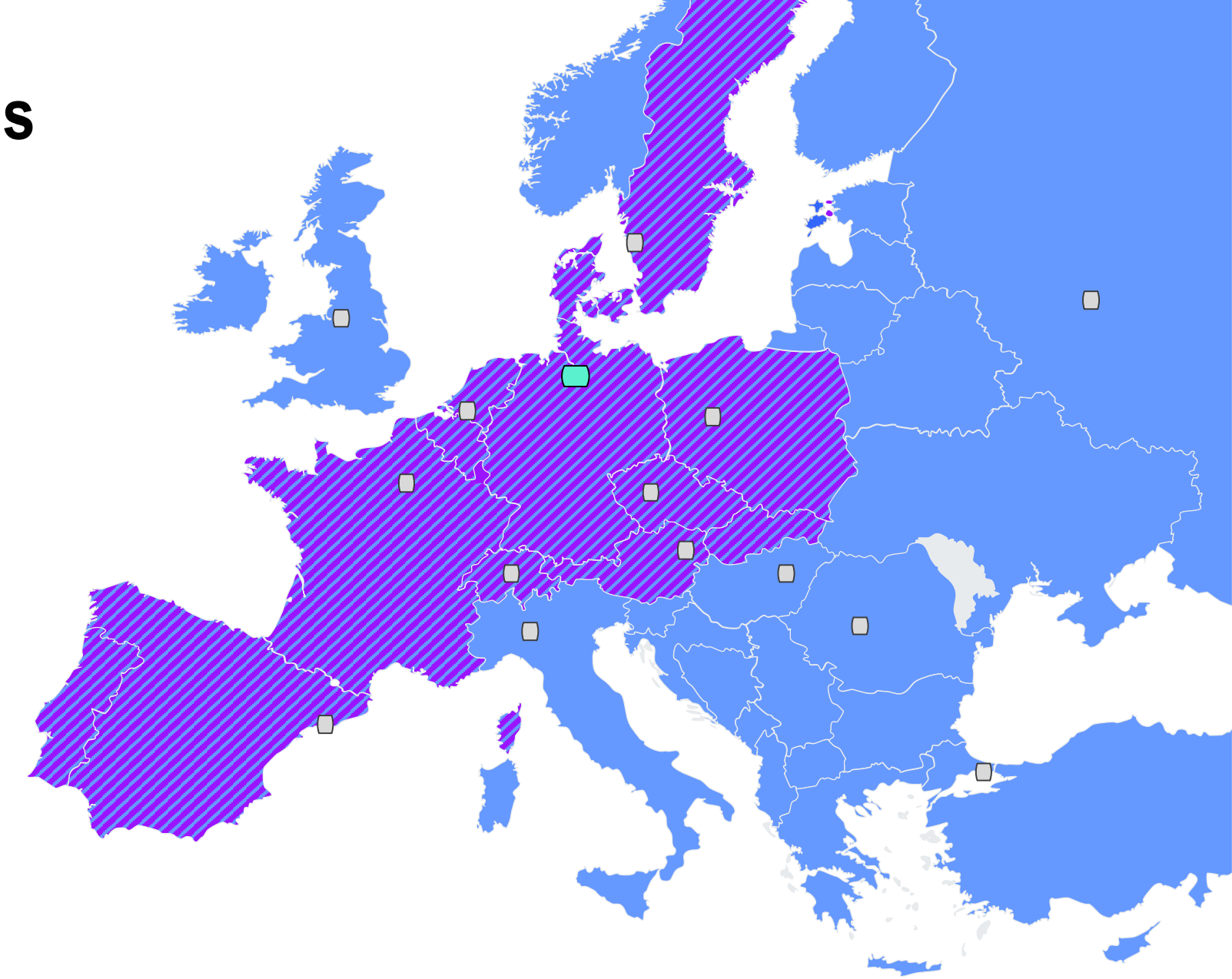
- ALBIS Offices
- ALBIS Sales Region

Asia-Pacific

- MOCOM, Changshu, CN

Americas

- MOCOM, Duncan, SC, USA



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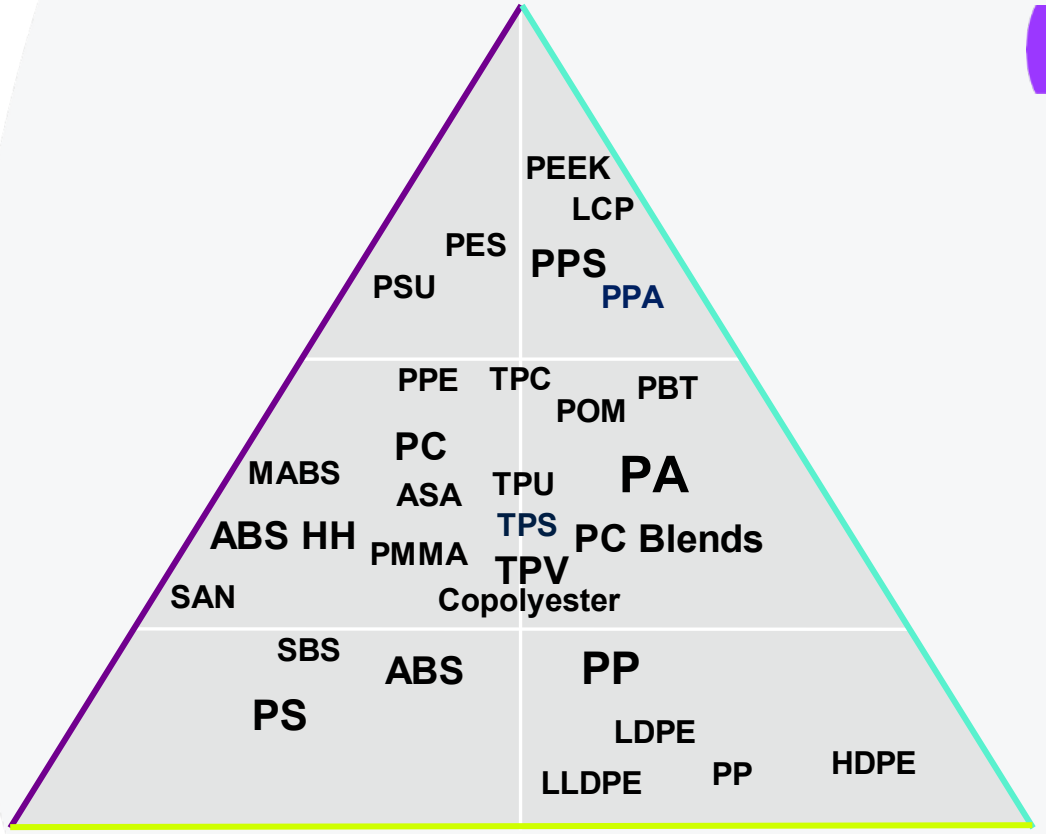
Product Portfolio



SPECIALTIES

- Alcom®
- Alcom® MED
- Alcom® 3D
- Tedur®
- Cellidor®
- Alcolor®
- Alperform®

ADVANCED PRODUCTS

- Altech®
- Altech NXT PP®
- Alfater XL®
- Shelfplus® O_2

RECYCLING

- Altech® ECO
- Altech® IQ
- Alfater XL® ECO

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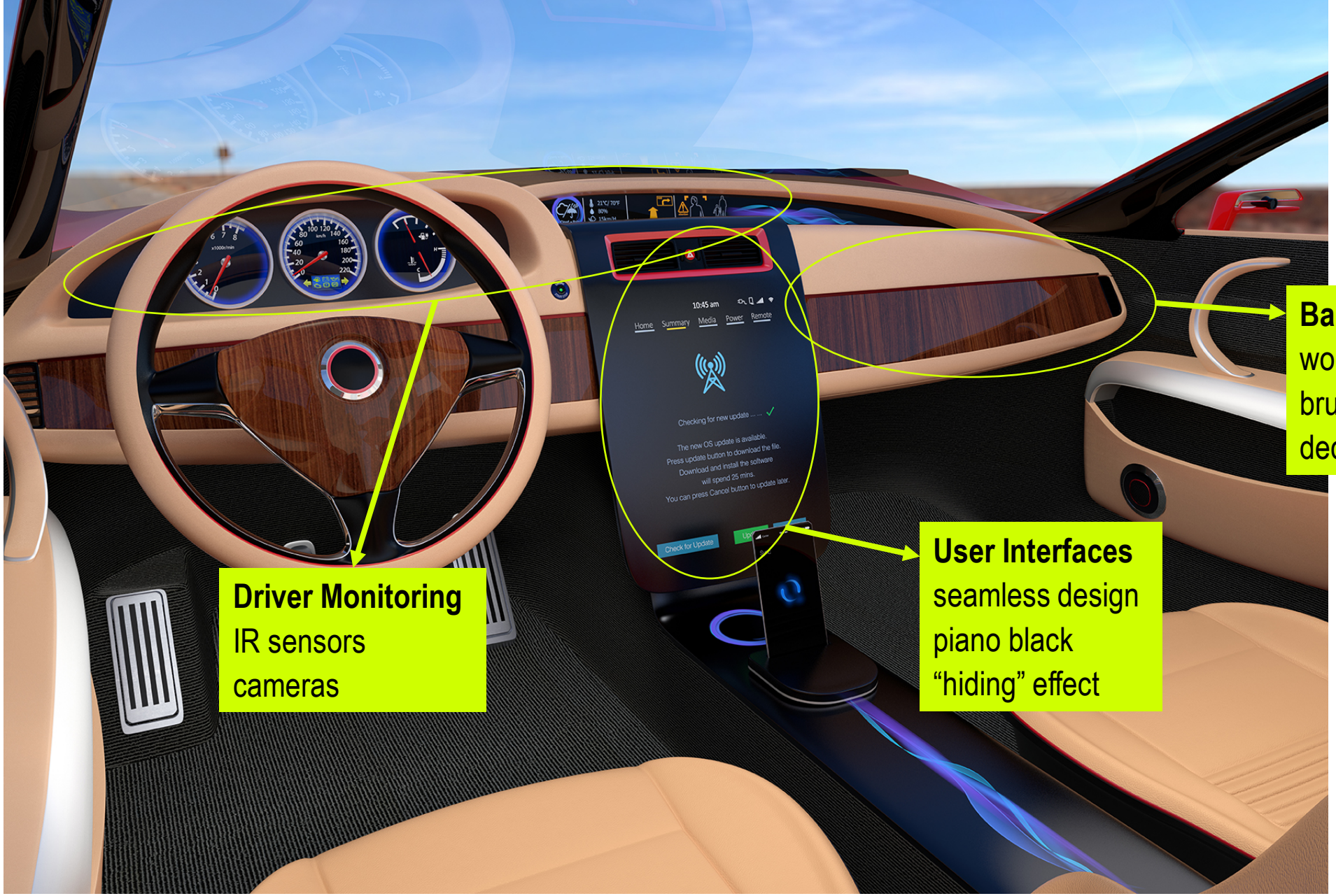
Interior Design Study


Backlit Deco Trim
wood veneers
brushed metal
decorative films
Driver Monitoring
IR sensors
cameras
User Interfaces
seamless design
piano black
“hiding” effect

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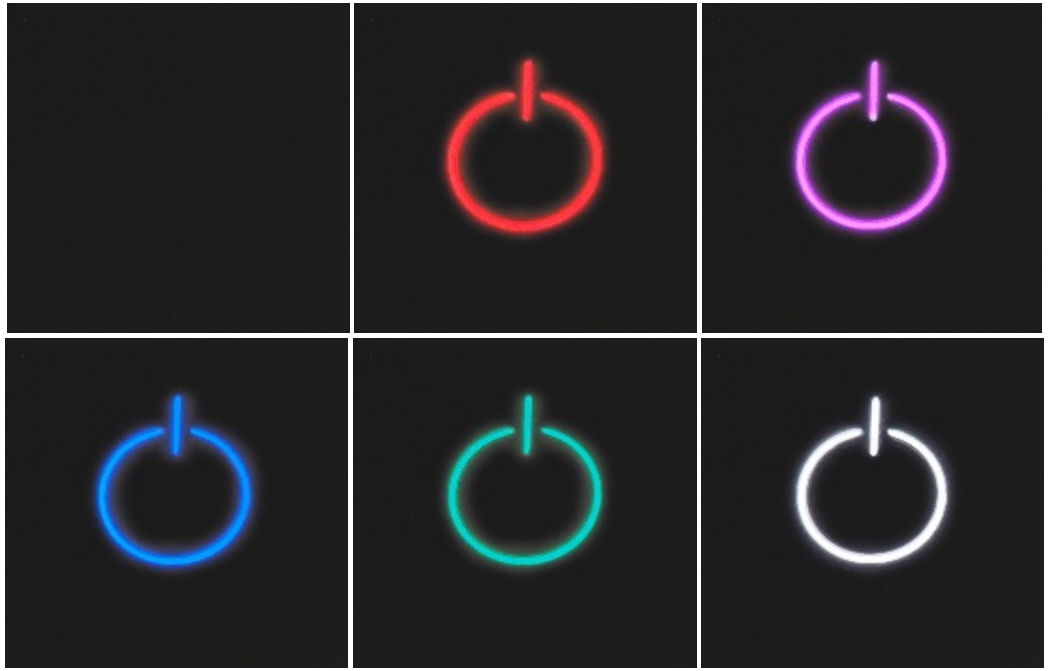
Black Panel User Interfaces

Alcom® LDDC – Deep Color

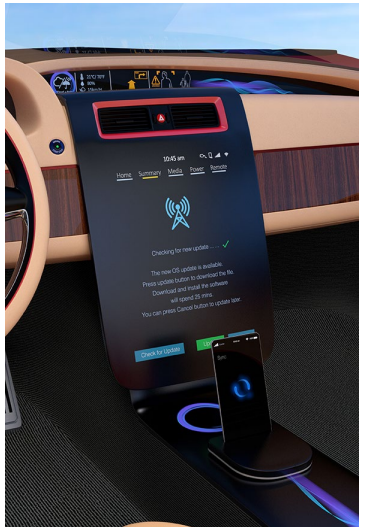
- **Deep Color** for illuminated parts
  - Optical appearance in deep colors (e.g. “Piano Black”) when backlight LEDs switched off
- **Optimized transmission** of (colored) LED light
  - Symbols or displays visible, when LEDs are switched on
  - No visual color shift of transmitted light
- Transmission with/without **homogeneous scattering**
  - **Tailor made**: Color, transmission, haze, half power angle
- Suited for illuminated applications
  - Seamless user interfaces
  - Decorative elements, consoles
  - Displays, touch sensitive surfaces

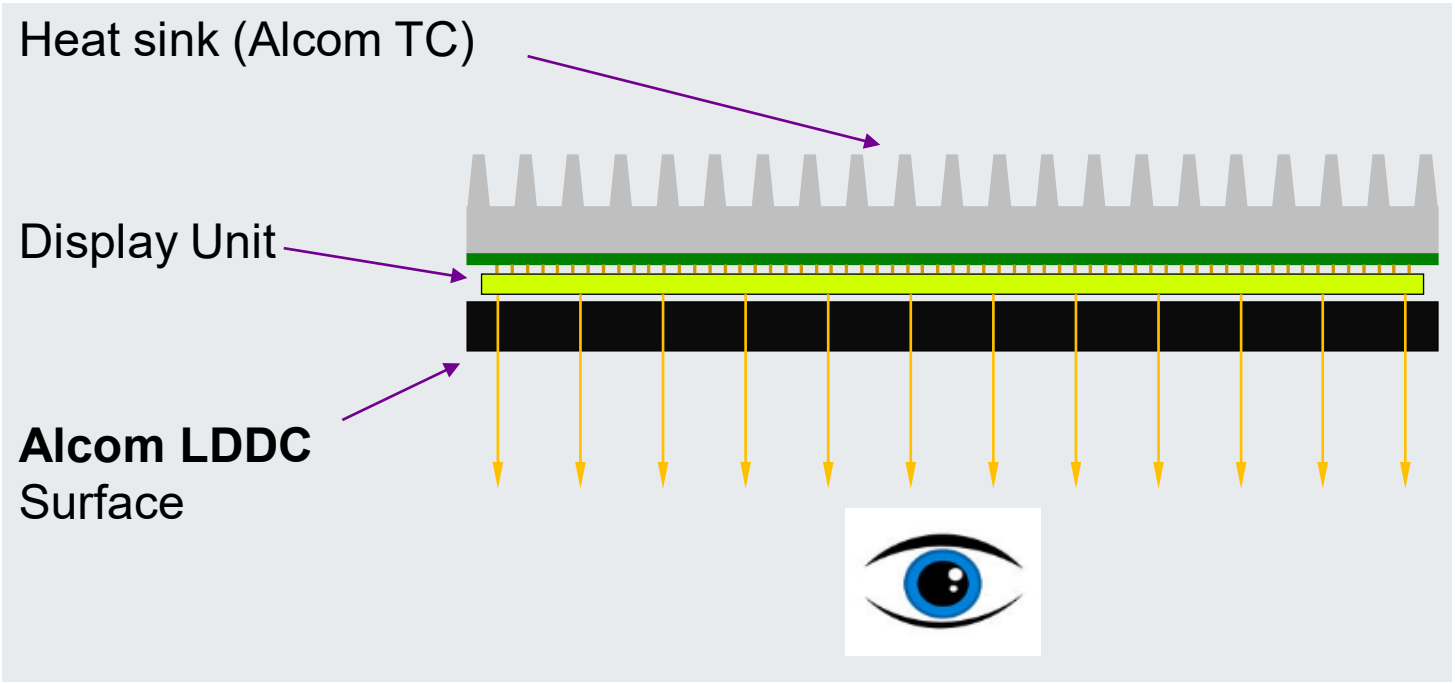


Pictures: Alcom LDDC backlit with symbol template on the Alcom Lighting Demonstrator
Top left: Light switched off; other pictures: illuminated with RGB LEDs

Example: Cover Lens for Displays

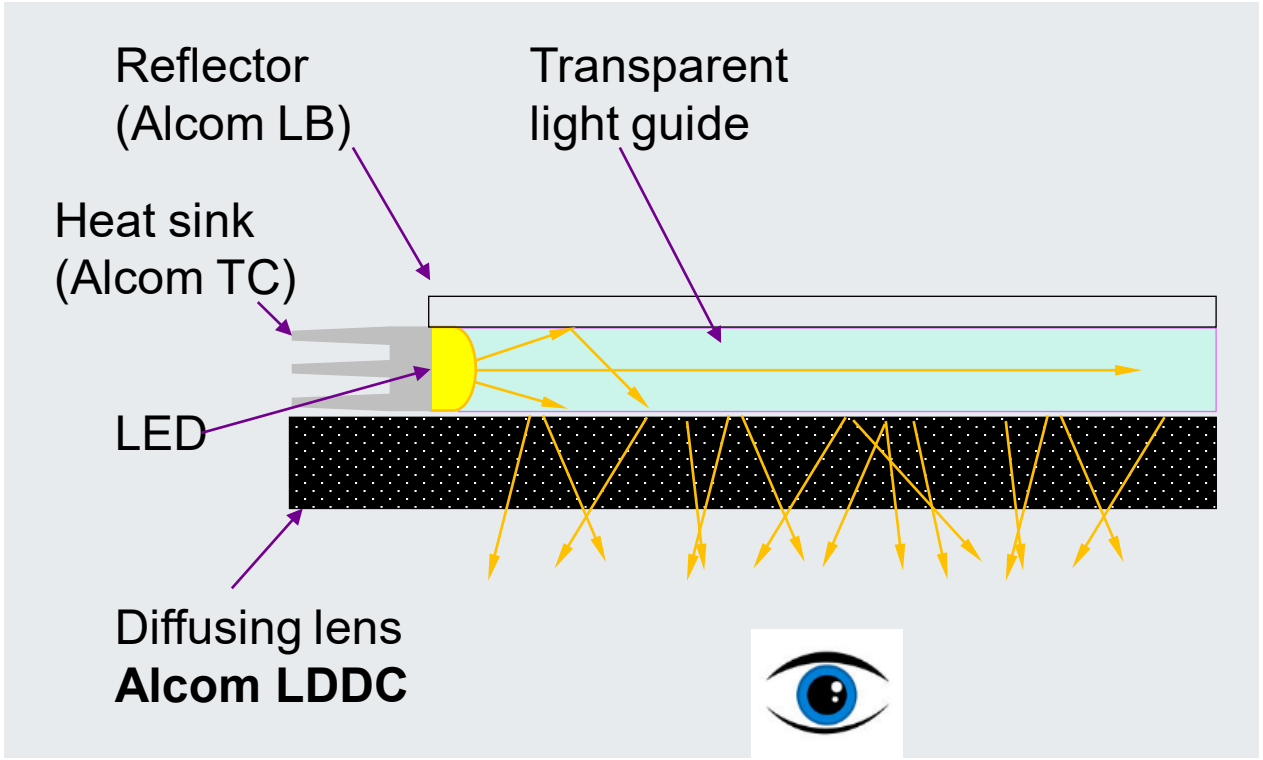
- Transparent black material covers display unit
  - Mold-in-Color user surface
- Display on: clear transmission
- Display off: deep gloss black panel
  - Electronics not visible





Example: Classic Ambient Lighting

- Piano black diffusing lens
  - Homogeneous light output
- Established assembly concepts
- Can be implemented into seamless designs
- Also, for ambient lighting of larger areas, e.g.
  - Illuminated door trim
  - Illumination of center console



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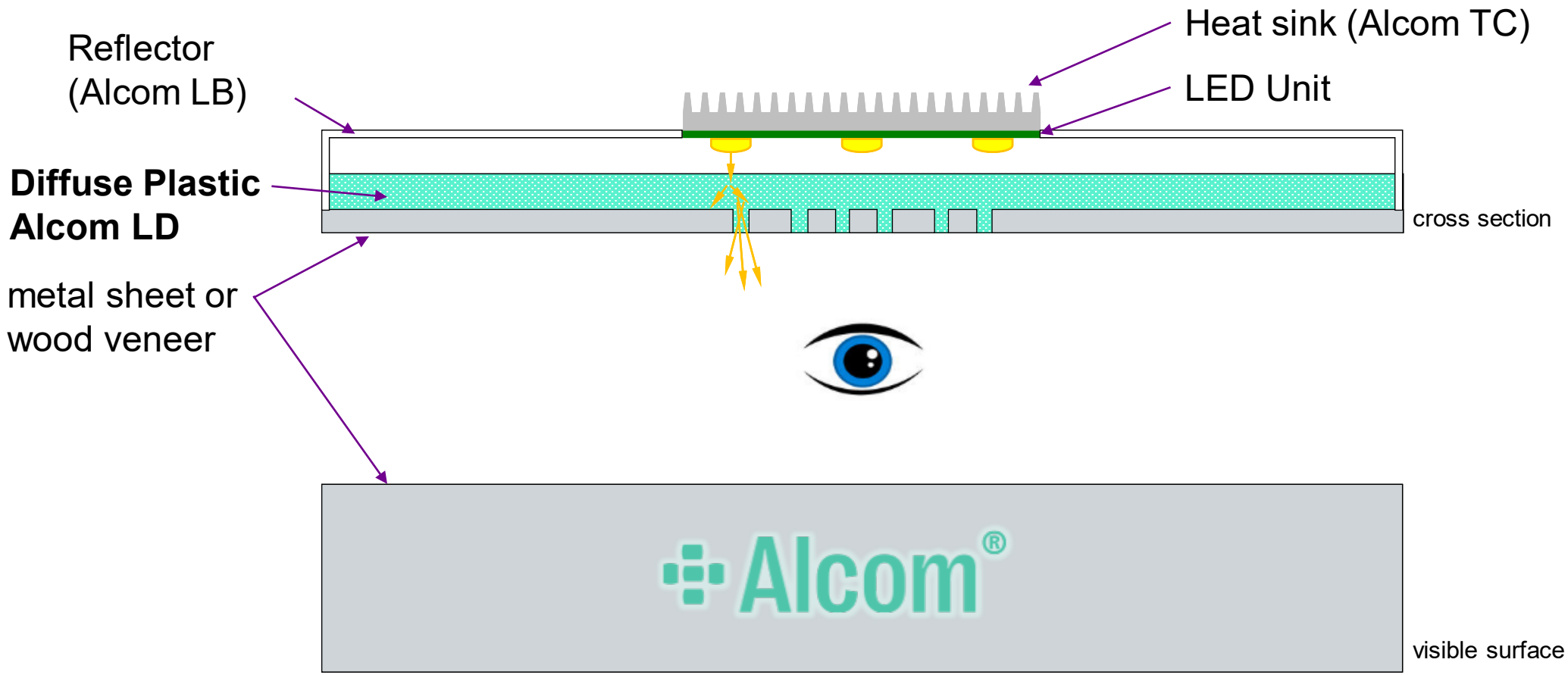
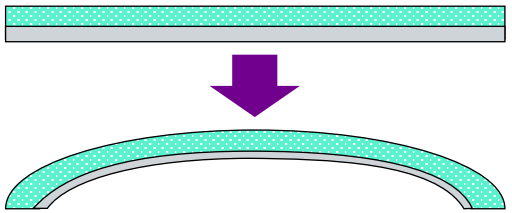
Backlit Rigid Deco Trim

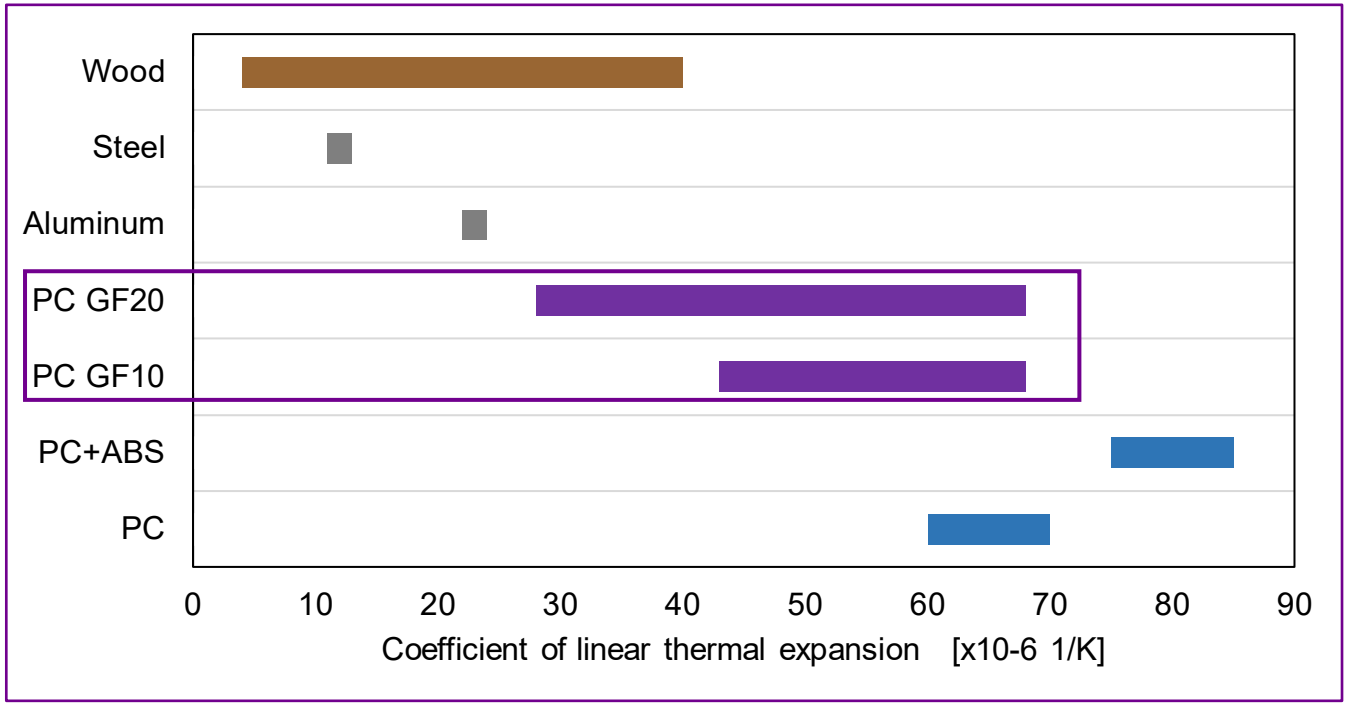
General Assembly & Design



Multi-Material Composite Plastic Modification

- Different thermal behavior of decorative material and back-injected plastic
- Coefficient of linear thermal expansion (CLTE) must be considered
  - CLTE of metal, wood < CLTE unfilled plastic
- Risk: warpage at elevated temperatures!





- **Material solution:**
  Glass fiber filled diffuse compounds

Tailored Material Solutions

- Alcom LD + Glass Fiber
  - Light Diffusion
  - 10% or 20% glass fiber to adjust CLTE
- Different / tailored colors
  - High or low optical diffusion
  - Specified color & optical properties

Material	Color	Transmission (1mm)
PC	natural	89%
Alcom LD PC GF10 / GF20	Crystal Clear	up to 86 %
	Grey	depends on color
	White	
	Other colors	

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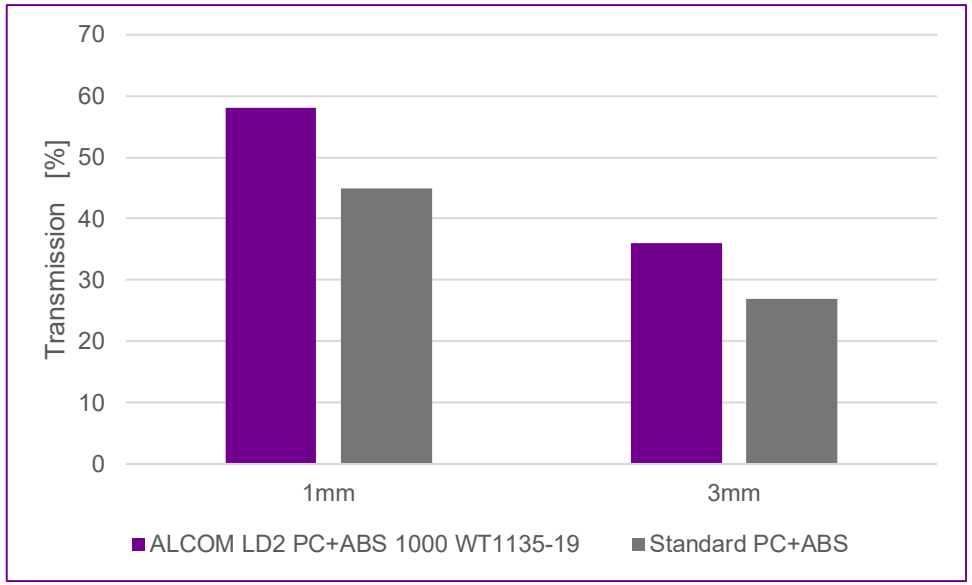
…other concepts…

Back Injection of Films

- **Alcom LD based on PC+ABS**
- Lower processing temperatures and less shear stress compared to Polycarbonate resins
  - More gentle processing for (printed) films
- **Improved transmission and color** compared to standard PC+ABS
  - Good light scattering for homogeneous decor illumination



→ **+30% optical efficiency and improved processing stability**

Electroplating of Illuminated Surfaces

- **Alcom LD ABS+PC**
- Improved color, less yellow tinge
- Suitability for electroplating and good layer adhesion confirmed by OEMs
- High transmission for illumination designs with selective electroplating or laser etching

Material	Wall thickness	Transmission
ALCOM LD2 PC+ABS 1000 WT1107-19	1mm	54,6 %

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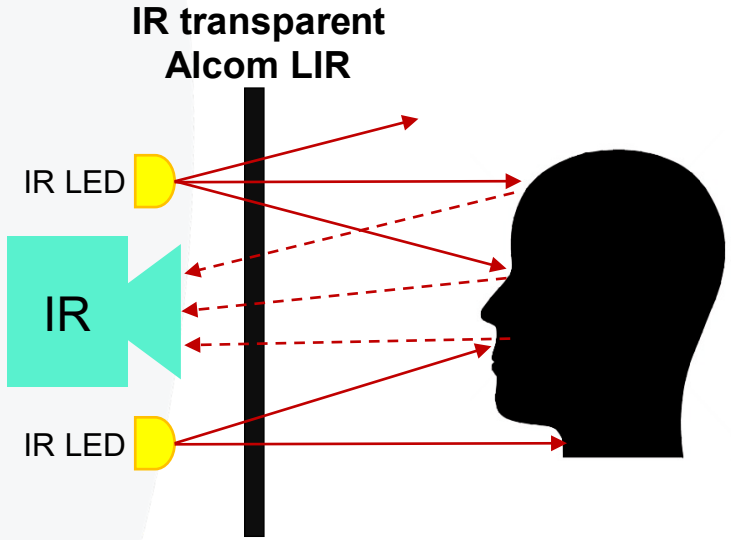
Alcom LIR Infrared Transparent

Example: Driver Monitoring System

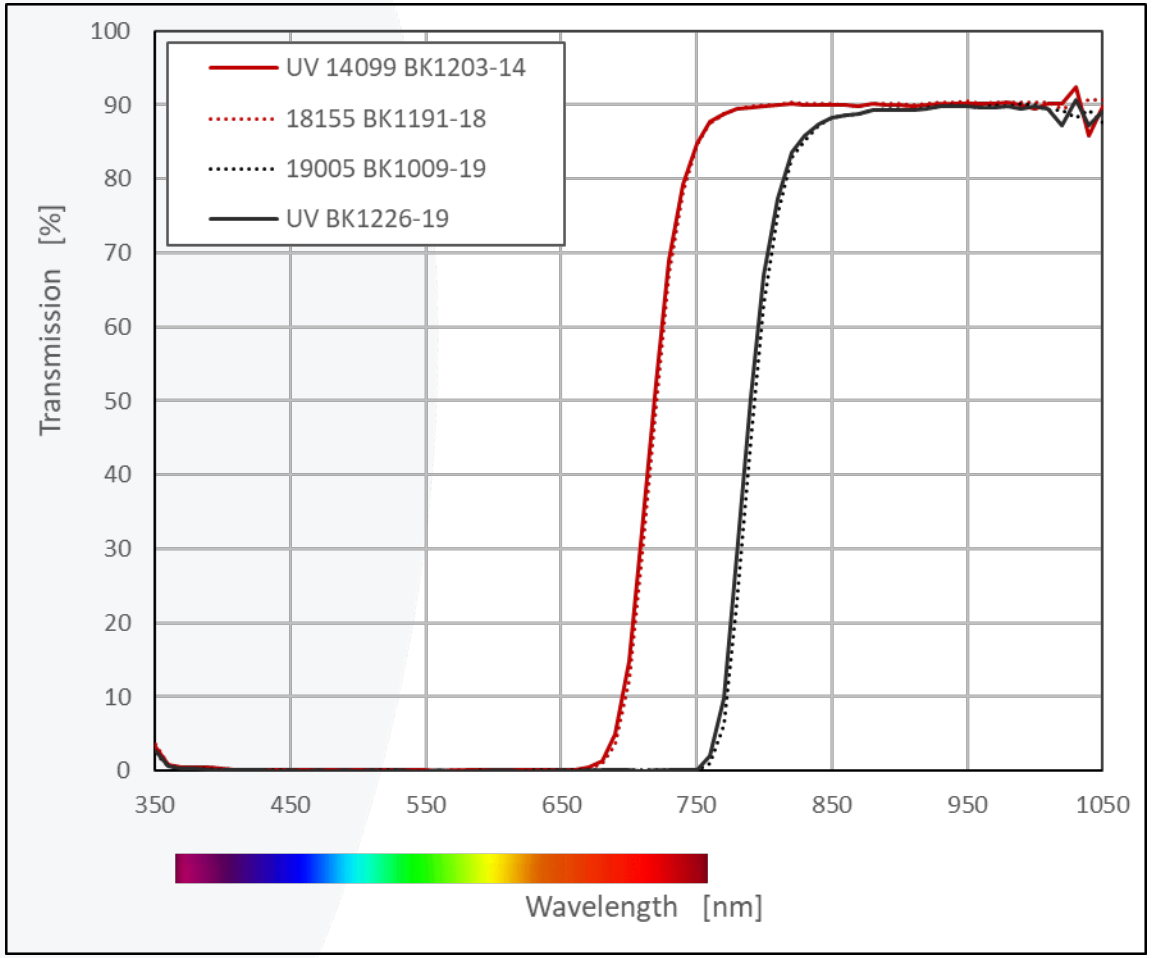
- IR camera observes driver behavior
- Visible light could jam the camera performance
  - Must be filtered while maintaining high transparency in IR-spectrum
- Mostly cameras / sensors are hidden behind black panel lenses or covers
  - Placed for example in the instrument panel



IR-Transparent Materials

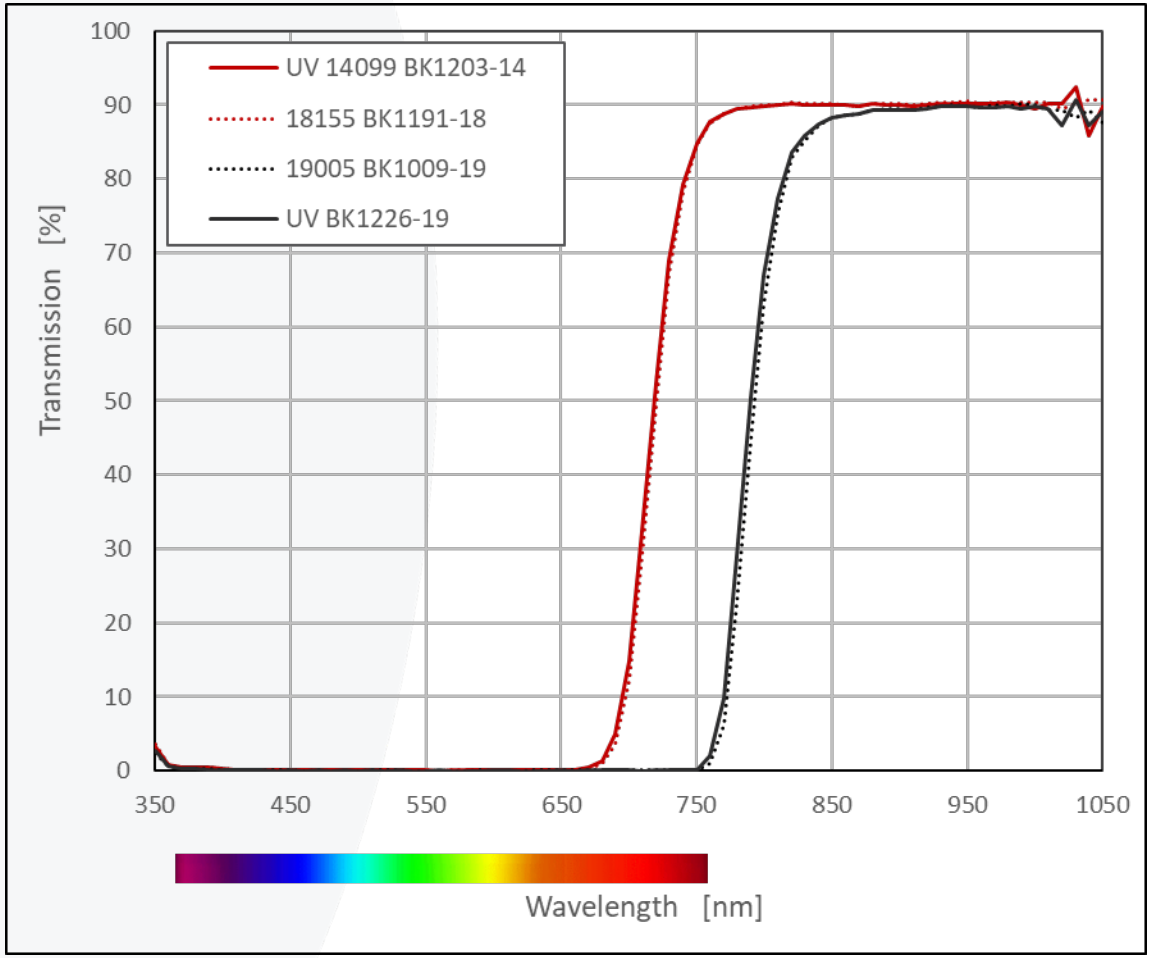
- **Alcom LIR**
- No transmission of visible light spectrum
  → **Black Panel effect**
- Transparent for IR light – **no scattering**
  - Sensors
  - Cameras
  - IR-LEDs
  - Heat radiation

Material	Transmission from	UV
ALCOM LIR PC 1000 19005 **BK1009-19**	850nm	No
ALCOM LIR PC 1000 UV **BK1226-19**	850nm	Yes
ALCOM LIR PC 1000 18155 **BK1191-18**	780nm	No
ALCOM LIR PC 1000 UV 14099 **BK1203-14**	780nm	Yes



IR-Transparent Materials

- Information about lighting properties:
  - Technical Datasheet
    - Total transmission (visible)
    - Spectral transmission
    - Spectral haze
  - CoA/Specification
    - CIE-Lab (dL, da, db)
    - Total transmission (visible)
    - Spectral transmission
    - Spectral haze



Thanks!

MOCOM Compounds GmbH & Co. KG
Mühlenhagen 35
20539 Hamburg
T +49 40 78 105 0
info@mocom.eu
www.mocom.eu

Disclaimer

Note:

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