

2024 New Effect material

# FRIEND COLOR<sup>®</sup> AUTONAL

**Perylene black coated aluminium pigment**



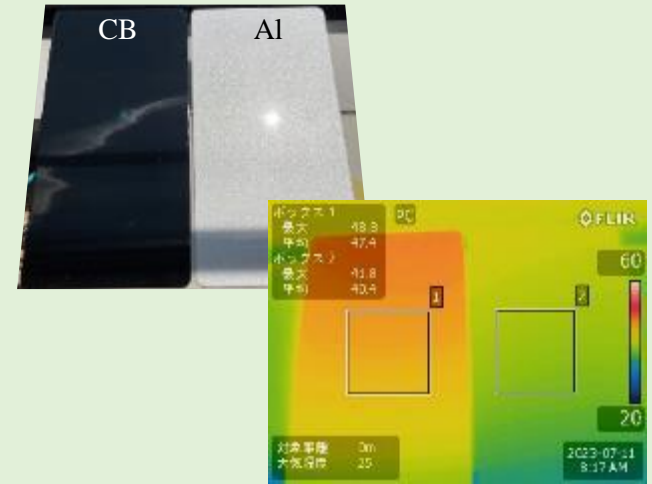
Development Team  
Technology Development Unit  
TOYO ALUMINIUM K.K.



Why Perylene black??

If using carbon black;

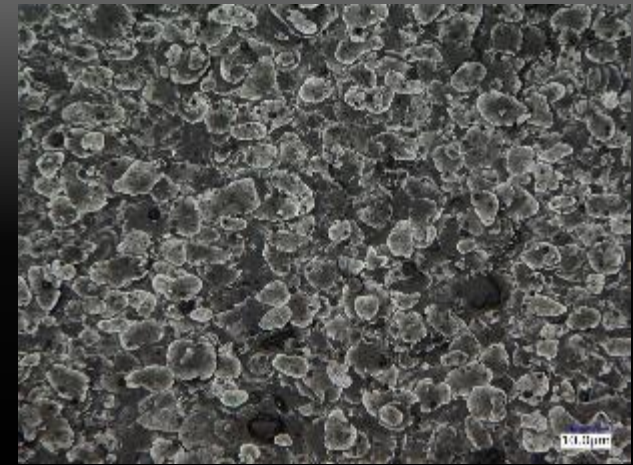
- ✓ Reddish / yellowish black color
- ✓ Absorb IR
  - Easy to heat
  - Invisible for LiDAR system



Perylene black colored Al pigment (2024's new color)

Using perylene black;

- ✓ Neutral black color
- ✓ IR reflectance
  - Heat dissipation
  - Possibility of visible for LiDAR system



## Features

New Effect material to bring aesthetic & functional value  
Neutral Jetness, IR reflectance and Heat dissipation

## Line-UP

	D463 PBK for solvent borne	EMR-D46PBK for water borne
Grade		
Form	Paste with Mineral Spirit	Paste with PM <sup>*1</sup>
Non volatile content	52–58%	48-52%
Particle size (D <sub>50</sub> ) <sup>*2</sup>	17 μm	
Pigment	Perylene Black	
Density <sup>*3</sup>	1.2 g / cm <sup>3</sup>	
Packaging size	12 kgs	

\*Patent applied for

\*1 PM : 2-Methoxy-1-propanol

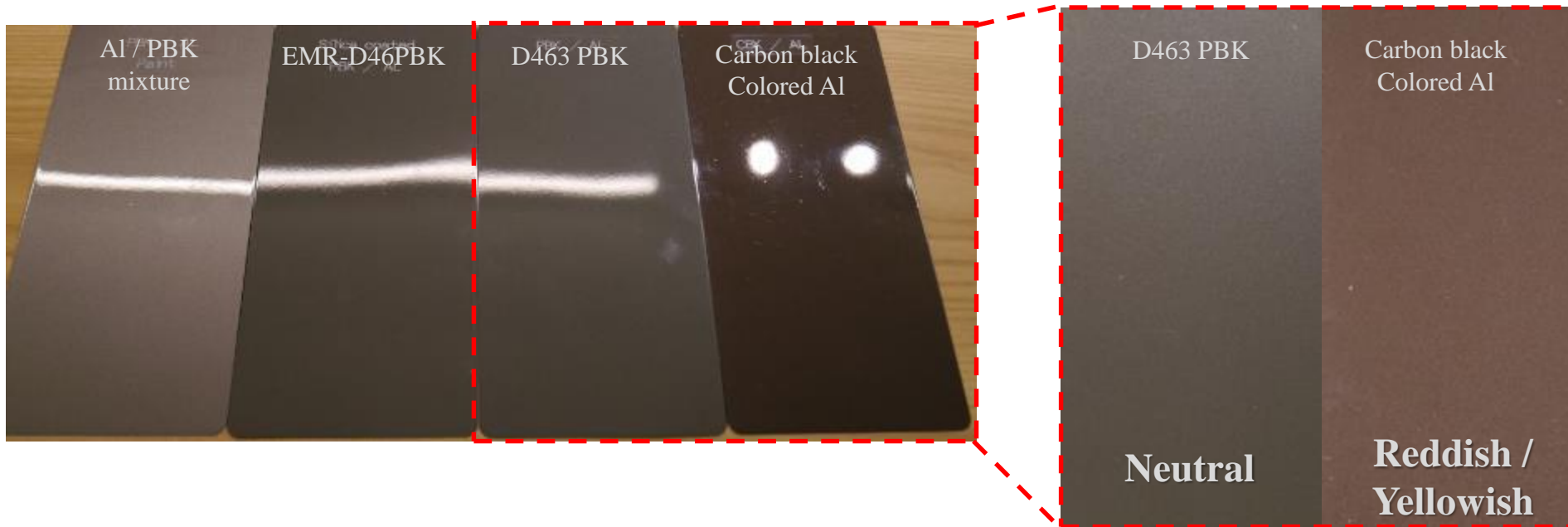
\*2 Measured by laser diffraction. Not specification.

\*3 By calculation

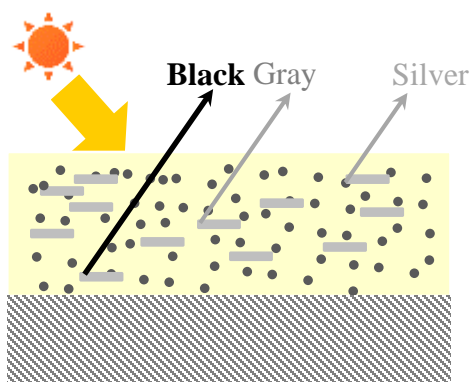
# Neutral Black Color : Carbon black vs. Perylene black



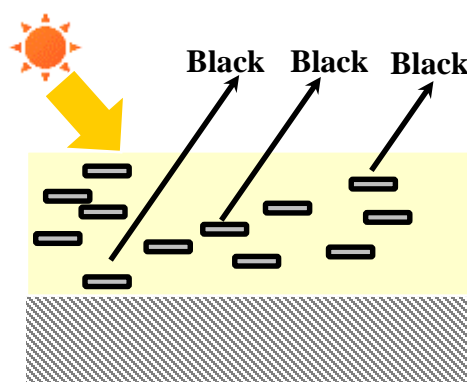
- Neutral black color (NOT reddish / yellowish )
- Strong tinting (vs. mixture of Al flake / Perylene black)
- Silica coated type is available for W/B system



# Why perylene black with FRIEND COLOR? : Strong tint



Al / Perylene black mixture



FRIEND COLOR



# Hiding power benefit



## Paint formulation

Paint : Solvent-borne paint  
Pigment : D463 PBK  
Concentration : 15PWC

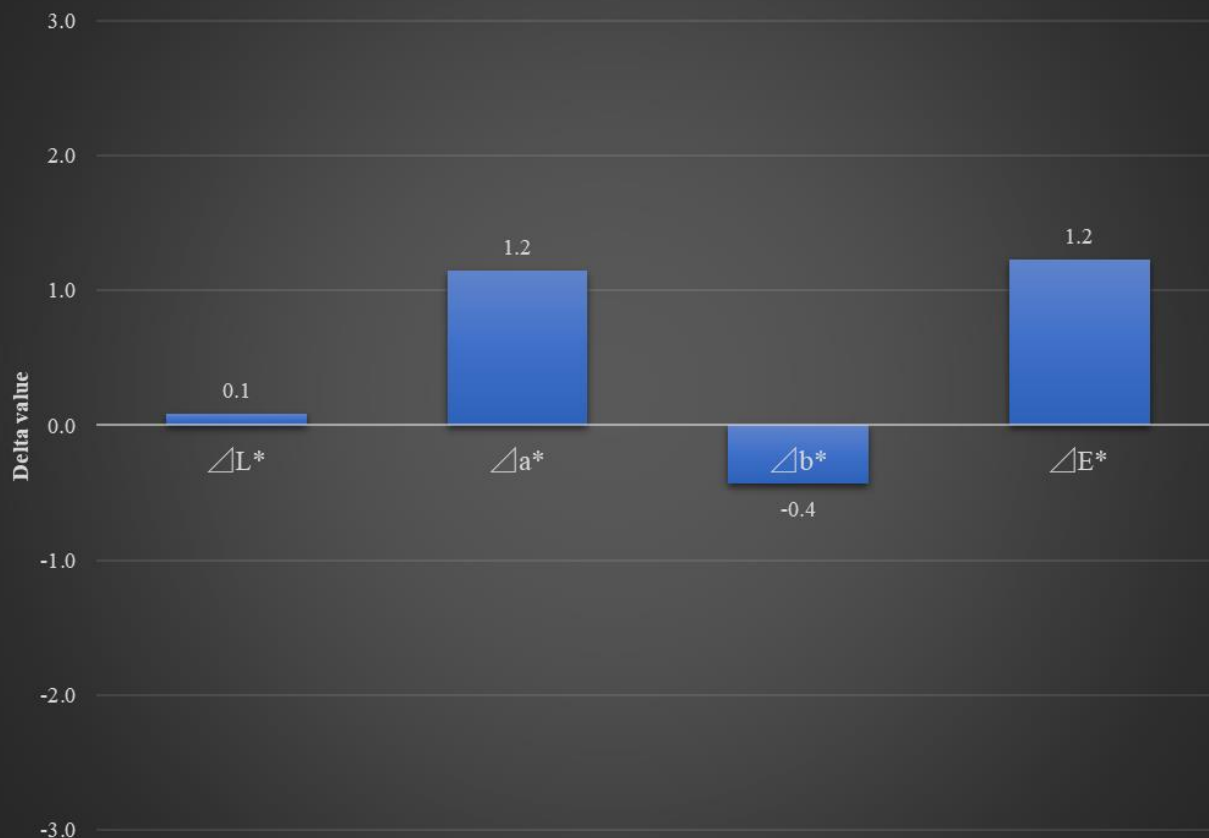
Hiding thickness : 18µm

D463 PBK has same hiding power as other FRIEND COLOR

# Weathering Data (Xenon WOM)



Delta value after 3500 hrs



## Paint panel preparation

Solvent-borne paint for OEM

Base coat: 14um

Top coat: 35um

Test condition	Water spray OFF	Water spray ON
Equipment	Atlas Ci4400 Weather-Ometer	
Irradiance (300-400 nm)	100 W / m <sup>2</sup>	
Black panel temperature	63°C	-
Air temperature	37°C	
Humidity	50%RH	95%RH
Duration	102min	18min
Cycle number	1750	

FRIEND COLOR AUTONAL has high durability

# For LiDAR system



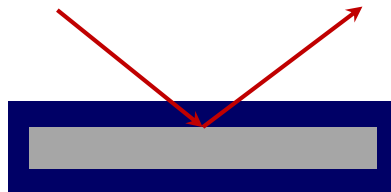
IR absorbed

IR laser

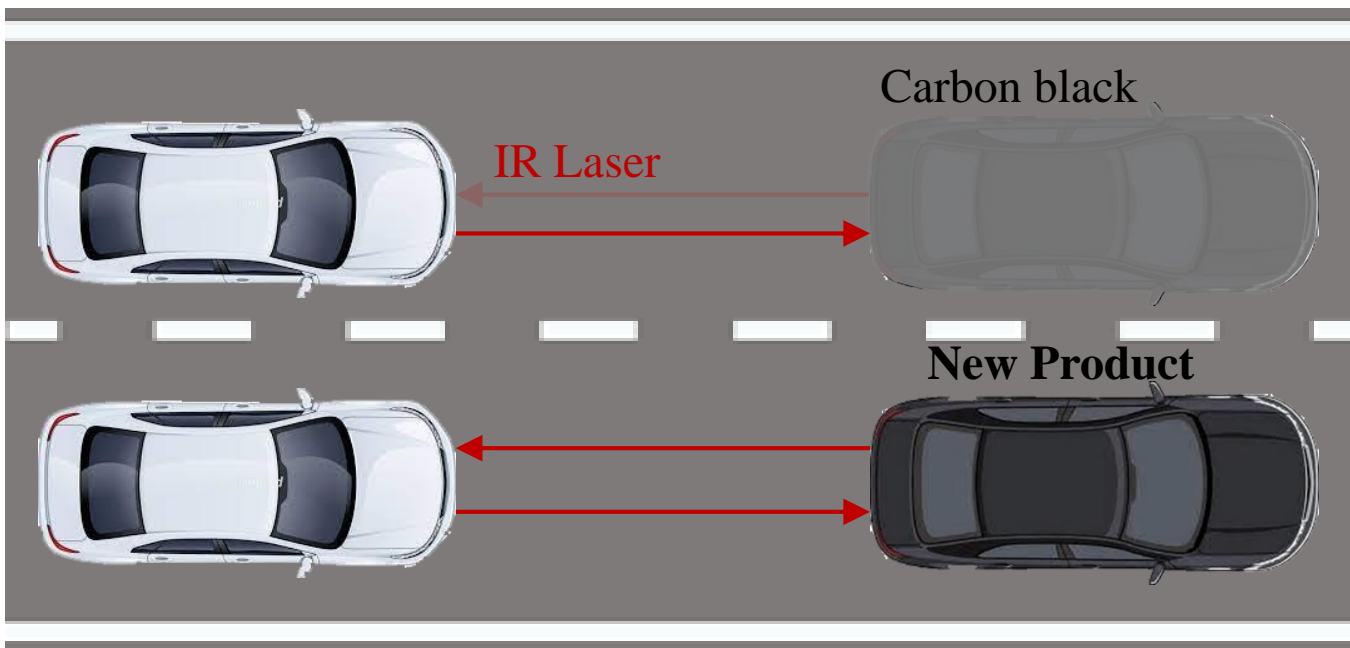


Carbon black

Transparent for IR (Wavelength = 905nm)  
(Reflect on Al flake)



Perylene black

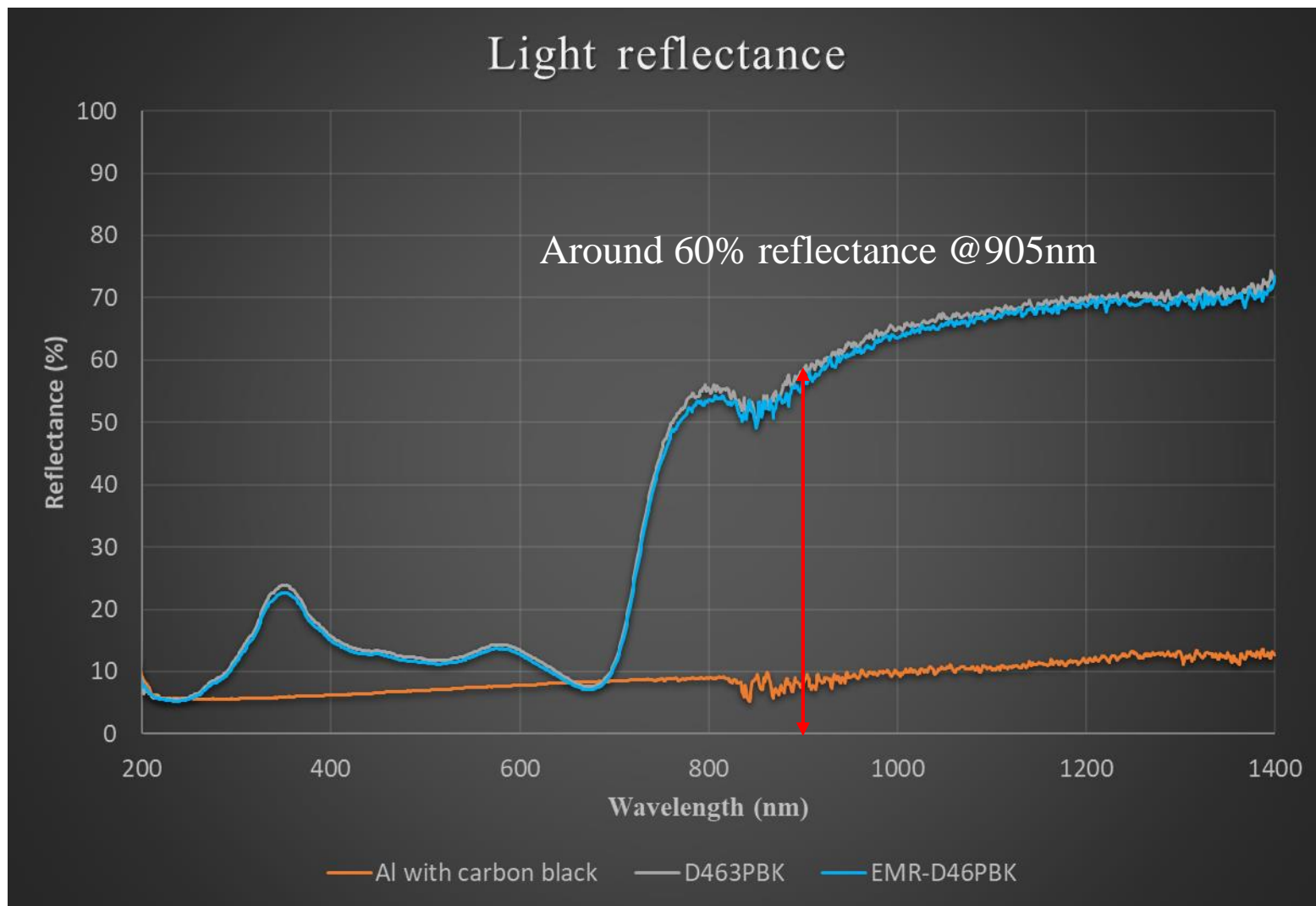


Conventional technology  
Can not reflect IR

New product  
Visible for LiDAR system



# IR reflectance : Carbon black vs. Perylen black

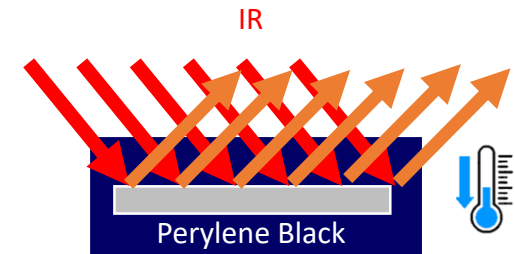
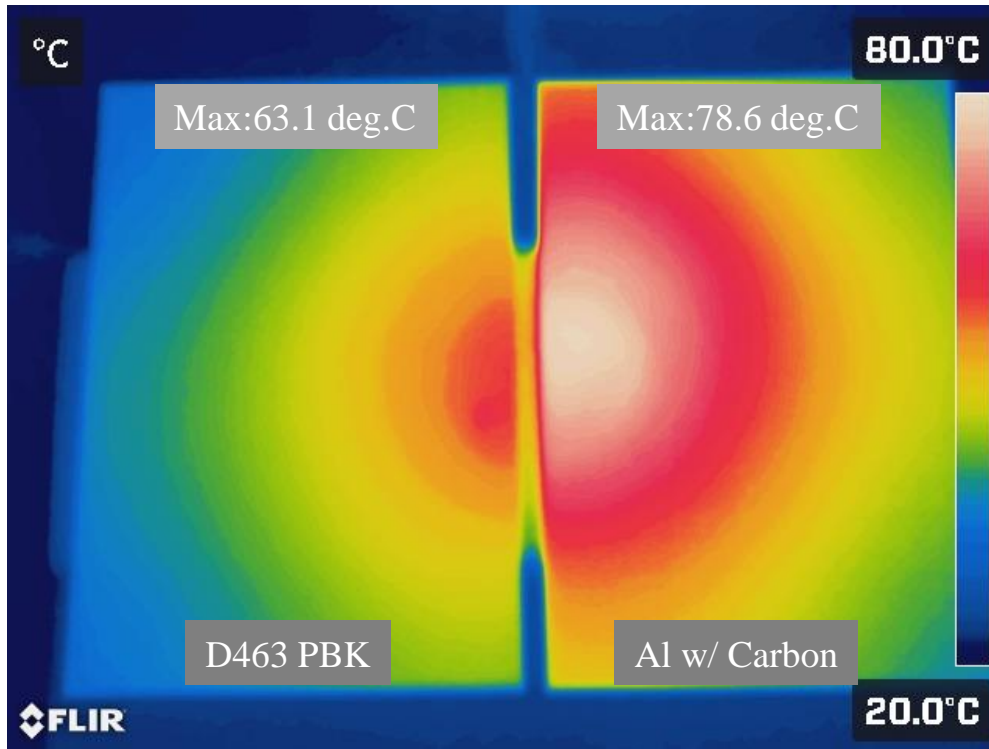


FRIEND COLOR AUTONAL has higher IR reflectance compared to Al with carbon black.

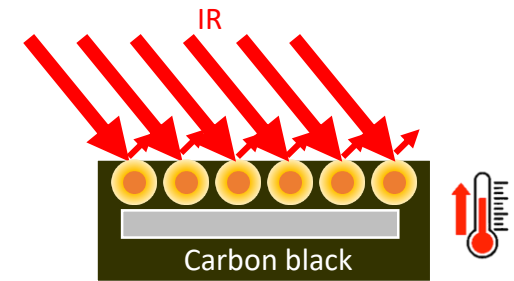
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## Feature : Black 'n' Cool

- Contribution to fuel / electricity efficiency for mobility (Lower energy consumption.)



D463 PBK  
Transparent for IR



Carbon black  
IR absorption and heated

- Test method  
Expose under filament lamp (270W) for 30 min.
- Result  
D463 PBK temperature is around 15 deg.C lower at max temperature.

*Thank you for your kind attention!*