Panasonic INDUSTRY

Applications
Automotive
Head up Display Units

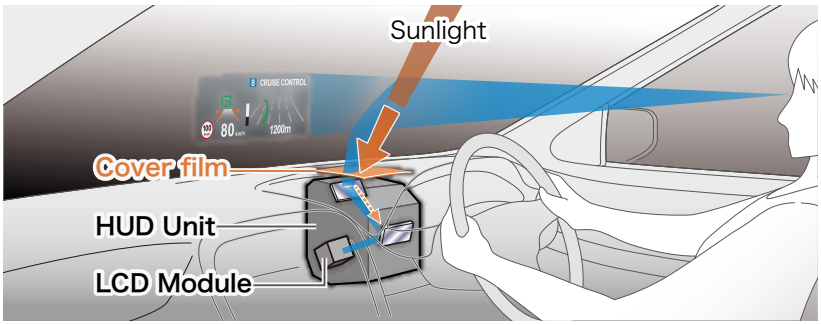
Thermal barrier film
MUAH6
IRC102 (Under development)
Reducing double images film
GSP Series (Under development)

Functional films for HUD cover

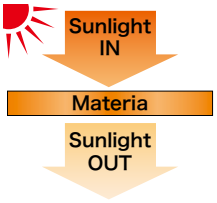
Reduces temperature rising of the display due to direct sunlight entering the HUD unit. Reduces visibility deterioration caused by double images.

Thermal barrier film

Protect HUD units from direct sunlight. To apply, simply replace with the current cover.



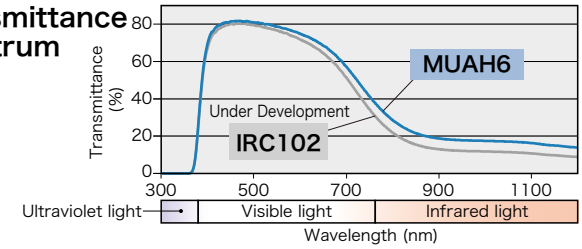
Sunlight shielding performance



Material	Sunlight IN	Sunlight OUT	Sunlight shielding performance
MUAH6 (Thermal barrier films)	100	48	52
Absorption type polarizer		61	39
Cold mirror		51	49

The above data are typical values and not guaranteed values.

Transmittance Spectrum



General properties

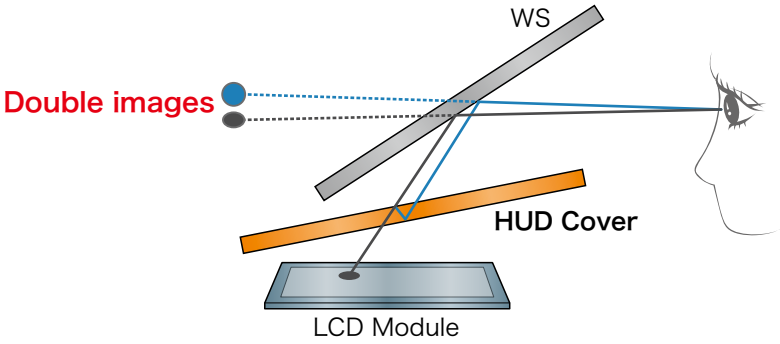
Item	Unit	Thermal barrier films	
		MUAH6	IRC102 (Under development)
Layer structure	–	Thermal barrier HC layer / Substrate PMMA/PC 375μm	Thermal barrier HC layer / Substrate PMMA/PC 375μm
Total light transmittance	%	79.0	77.2
NIR light transmittance (at 1000 nm)	%	22.5	9.9
Haze	%	2.0	2.2
Pencil hardness (750g load)	–	3-4H	3-4H
Flammability (FMVSS No.302)	–	Pass	Pass

The above data are typical values and not guaranteed values.
Specifications are subject to change without notice.

Please refer to the reverse side for the product introduction of the Reducing double images film GSP Series.

■Reducing double images film

Reduces double images caused by HUD dust covers.



Double images

Double images reduction !

General properties

Item	Unit	Reducing double images film GSP Series (Under development)
Layer structure	–	Reducing double images layer Substrate
Total light transmittance	%	**93.0**
Haze	%	**0.2**
Flammability (FMVSS No.302)	–	**Pass**

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Under development Thermal barrier & Reducing double images film

Combined functionality of both thermal barrier and reducing double images

- Prevents temperature rise of the display unit due to direct sunlight.
- Reduces double images in projected images.

Please see our website for Notes before you use.

Panasonic Industry Co., Ltd. Electronic Materials Business Division

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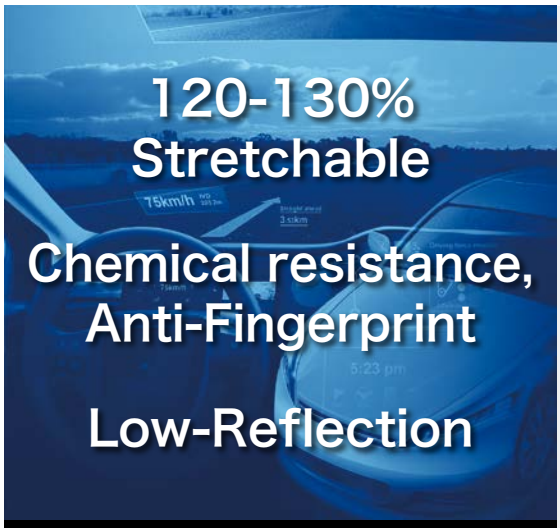


Applications
Automotive
Decorative Cover Lens and Other Insert Molding Parts

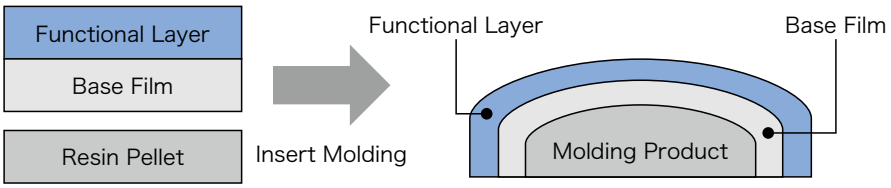
GSP109A (Under development)

Moldable Low-Reflection Films

120-130% stretchable while having Low-Reflection and Anti-Fingerprint functions. Printable on the back side and suitable for curved design molding parts.

Features

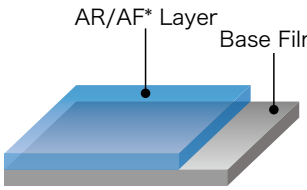
High stretchability fits to the curved surface. Low-reflection provides better visibility. Printable on the back side.



Application Image

Layer Structure

● GSP109A



Base Film: PMMA/PC
Film Thickness: 200, 250, 300μm

*AF: Anti-Fingerprint

General properties

Item	Unit	GSP109A (Under Development)
Base Film	–	**PMMA/PC**
Base Film Thickness	μm	**200, 250, 300**
Total Light Transmittance	%	**93.1**
Haze	%	**0.1**
Photopic Reflectance	%	**1.8**
Pencil Hardness	–	**2H-3H**
Scratch Resistance (500g/cm² Load with Cloth, 200 turns)	–	**No remarkable scratches**
Water Contact Angle	deg	**108**
Anti-Fingerprint	–	**Good**
Chemical Resistance (Sunscreen SPF45)	–	**Passed**
Stretching Rate (Stretching under 150˚C)	–	**120-130% (No Crack)**

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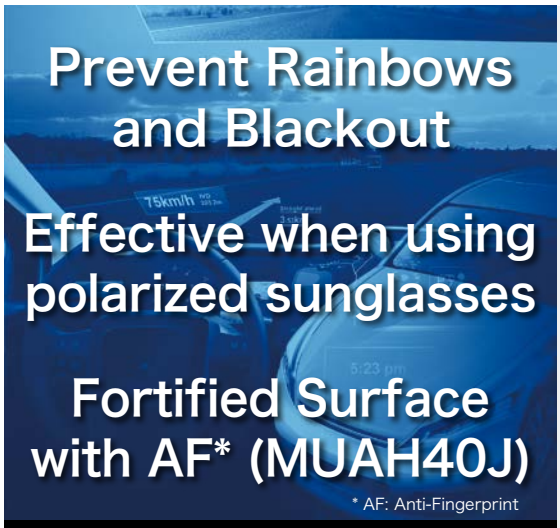


Applications
Automotive
Smart Mirrors, Center Information Displays (CIDs), Side Displays, Instrument Clusters, and other Automotive Displays.

MUAH4029 MUAH40J

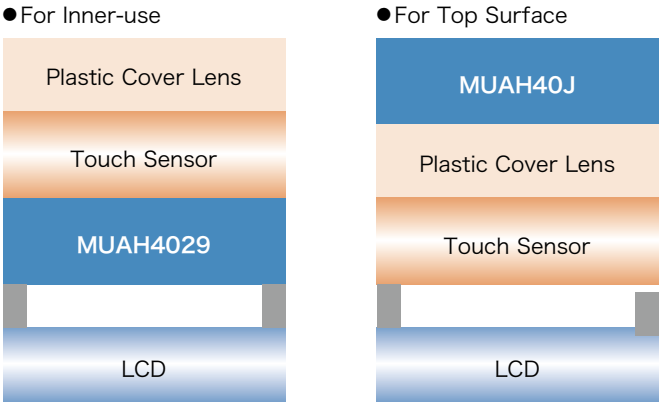
Anti-Rainbow and Anti-Blackout Films

Control birefringence and prevent rainbows and blackout inevitable with polarized sunglasses, and provide clear visibility on the displays.

Features

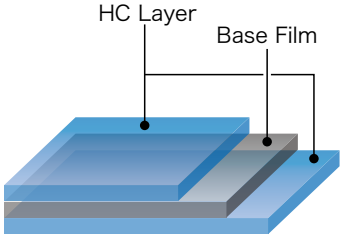
Prevent Rainbows and Blackout

Line-up



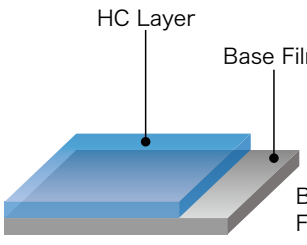
Layer Structure

●MUAH4029



Base Film: Super Retardation Film
Film Thickness: 80μm

●MUAH40J



Base Film: Super Retardation Film
Film Thickness: 80μm

General properties

Item	Unit	MUAH4029	MUAH40J
Base Film	–	Super Retardation Film (SRF)	Super Retardation Film (SRF)
Base Film Thickness	μm	80	80
Total Light Transmittance	%	91.8	92.1
Haze	%	0.2	0.4
Pencil Hardness	–	HB	2H
Water Contact Angle	deg	–	110

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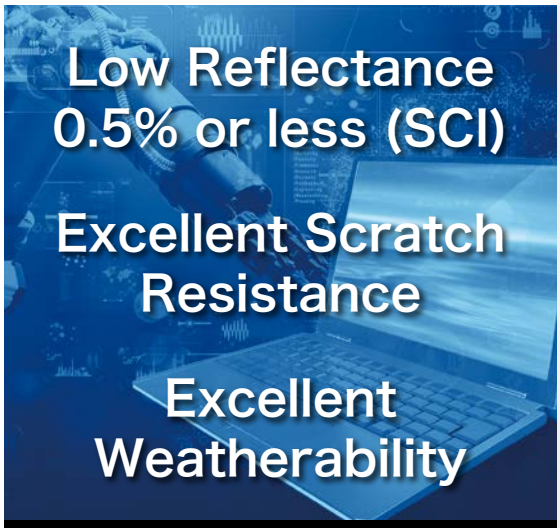


Applications

Laptop PC/Industry

Various displays that require anti-reflection, such as laptop PC, industrial equipment, and amusement machine.

Anti-Glare Type

MUAG8

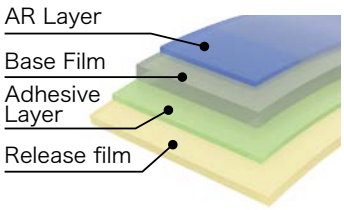
Clear Type

MUAR5

Anti-Reflection Films

Our Anti-Reflection Films Achieve Excellent Properties and Cost Performance by Wet Coating Process.
Low Reflectance : 0.5% or less. Excellent Scratch Resistance. Excellent Weatherability Conforming to the DIN 75220 Standard

Layer structure



Base Film : TAC

Film Thickness : 80μm(MUAG8)
60μm(MUAR5)

Excellent scratch resistance

Scratch resistance test (250g/cm² Load with Steel Wool, 100 turns)

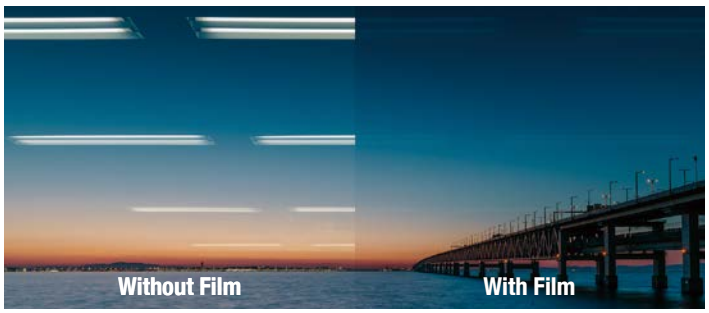
MUAG8	MUAR5
4 points A few minor scratches.	4 points A few minor scratches.

<Scratch resistance criteria>

5 points	4 points	3 points	2 points	1 point
No scratches	A few minor scratches	Less than 10 scratches	Less than 50 scratches	Many scratches Delamination

Property details

Low reflectance : 0.5% or less



Excellent weatherability

No appearance abnormality in DIN standards weatherability test DIN75220 (Z-in1)

General properties

Item	Unit	Anti-Glare Type MUAG8	Clear Type MUAR5
Total light Transmittance	%	95.6	95.2
Haze	%	4.5	0.3
SCI(Y) Photopic Reflectance	%	0.5	0.5
Pencil Hardness (750g load)	–	3H	3H
Scratch Resistance Test*	–	No remarkable scratches	No remarkable scratches
Water Contact Angle	deg	112	110
Times to wipe off fingerprints	times	5-10	10-15
Weatherability (DIN75220 Z-in1)	–	No appearance abnormality	No appearance abnormality
Infrared Transmittance (λ=940nm)	%	>90	>90

* 250g/cm² Load with Steel Wool, 100 turns

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