

Laser Line Mirrors

LLM/LLM2

RoHS

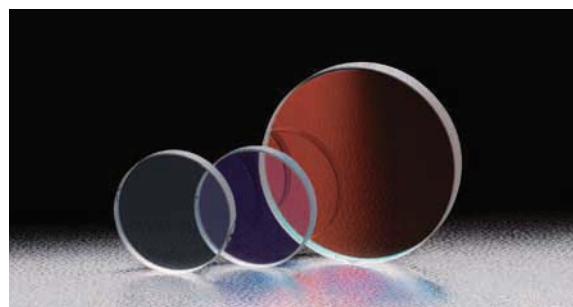
Laser Line Mirrors are total reflection mirrors, multi-layer-coated with dielectrics of different refractive index by turns on. Three types of laser line mirrors are offered.

[Narrowband] Laser line mirrors that are focused on specific wavelengths. Incident angle is 45°.

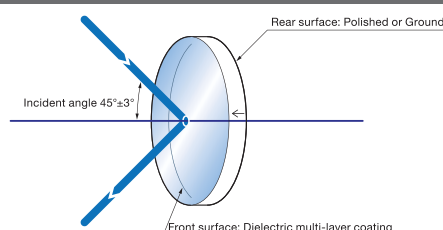
[Middleband] Multi line mirrors with middle reflection bands. Incident angle is 45°.

[Broadband] Multi line mirrors with broad reflection bands. Incident angle is 45°.

- Dielectric multi-layer coating does not have absorption like AL and the reflectance can be more than 99% except some mirrors for UV wavelength.
- These coatings are much stronger than Al+MgF₂ coating against high-power lasers.

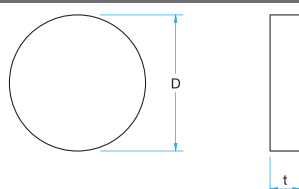


Schematic



Outline Drawing

(in mm)



- Tolerance
Diameter D: ± 0.1
Thickness t: ± 0.1

Specifications

Material	BK7 (CaF ₂ crystal for TFM-157 only)
Coating	Dielectric multi-layer coating
Incident angle	45°±3°
Surface Flatness	$\lambda/10$, Polished (LLM-157)
Parallelism	<3'
Surface Quality (Scratch-Dig)	10-5 (LLM-157: 40-20)
Clear aperture	90% of Actual Aperture

Guide

- ▶ Please contact our International Sales Division for customized products. (customized on outer diameter, wavelength characteristic, etc.) Please use the inquiry sheet. [Reference](#) C036
- ▶ Also available are our surface flatness guarantee (SAGM) mirrors with accuracy guarantee after surface coating. [Reference](#) C012

Attention

- ▶ The un-coated rear surface of the mirror is polished and is indicated with an arrow on the side of the substrate.
- ▶ Reflectance of laser line mirrors are different according to the polarization of input beams. S-Polarization has high reflectance with a wide reflective bandwidth compared with P-Polarization. The reflectance in the specification list is at random polarization or (P-Polarization reflectance + S-Polarization reflectance) / 2.
- ▶ The reflectance curves are based on actual measurements and may be different with production lots.
- ▶ Be sure to wear laser safety goggles when checking optical path and adjusting optical axis.
- ▶ The surface flatness is the reflected surface wavefront distortion before coating.

Laser Line Mirrors Narrowband

157 – 337.1nm

Part Number	Wavelength Range [nm]	Laser Type	Diameter D [mm]	Thickness t [mm]	Reflectance [%]	Laser Damage Threshold* [J/cm²]	Rear Surface
LLM-30C03-157	157	F ₂	φ30	3	>95.0	0.5	Polished
LLM-50C05-157	157	F ₂	φ50	5	>95.0	0.5	Polished
LLM-25.4C05-193	193	Ar*F	φ25.4	5	>95.0	1	Polished
LLM-30C05-193	193	Ar*F	φ30	5	>95.0	1	Polished
LLM-50C08-193	193	Ar*F	φ50	8	>95.0	1	Polished
LLM-25.4C05-248	248.4	Kr*F	φ25.4	5	>99.0	2	Polished
LLM-30C05-248	248.4	Kr*F	φ30	5	>99.0	2	Polished
LLM-50C08-248	248.4	Kr*F	φ50	8	>99.0	2	Polished
LLM-25.4C05-266	266	YAG4ω	φ25.4	5	>99.2	2	Polished
LLM-30C05-266	266	YAG4ω	φ30	5	>99.2	2	Polished
LLM-50C08-266	266	YAG4ω	φ50	8	>99.2	2	Polished
LLM-25.4C05-282	281.8	Xe*Br	φ25.4	5	>99.3	2	Polished
LLM-30C05-282	281.8	Xe*Br	φ30	5	>99.3	2	Polished
LLM-50C08-282	281.8	Xe*Br	φ50	8	>99.3	2	Polished
LLM-25.4C05-308	308	Xe*Cl	φ25.4	5	>99.5	3	Polished
LLM-30C05-308	308	Xe*Cl	φ30	5	>99.5	3	Polished
LLM-50C08-308	308	Xe*Cl	φ50	8	>99.5	3	Polished
LLM-25.4C05-325	325	He-Cd	φ25.4	5	>99.5	3	Polished
LLM-30C05-325	325	He-Cd	φ30	5	>99.5	3	Polished
LLM-50C08-325	325	He-Cd	φ50	8	>99.5	3	Polished
LLM-25.4C05-337	337.1	N ₂	φ25.4	5	>99.5	3	Polished
LLM-30C05-337	337.1	N ₂	φ30	5	>99.5	3	Polished
LLM-50C08-337	337.1	N ₂	φ50	8	>99.5	3	Polished

* Laser pulse width 10ns (TFM-157: 20ns), repetition frequency 20Hz

Application Systems

Machine Vision

Manual Positions

Motion Control Products

Optical & Mirror Holder

F A Parts

Measurement & Control

FA Electrical Parts

Tool & Measure

Cleanroom & AntiStatic

Index

Mirrors

Beamsplitters

Filters

Polarizers

Lenses

Multi-Element Optics

Prisms

Substrates & Windows

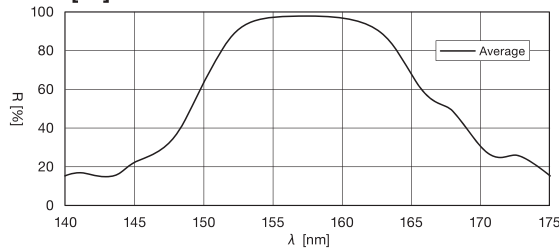
Holder & Vibration isolator

Laser Line Mirrors | LLM/LLM2

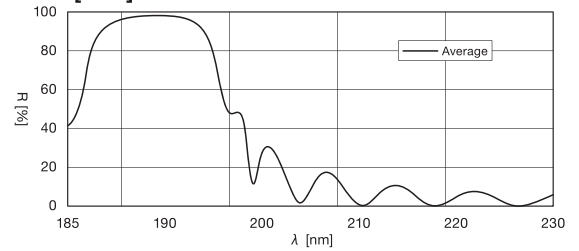
Typical Reflectance Data ... Laser Line Mirrors Narrowband

R: Reflectance

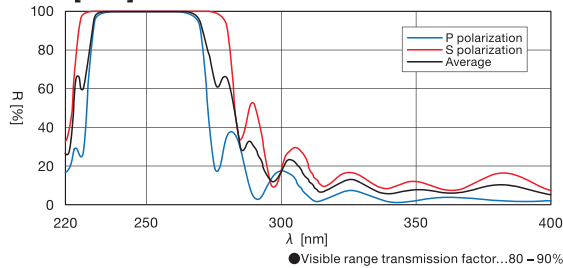
LLM-157 [F2]



LLM-193 [Ar*F]

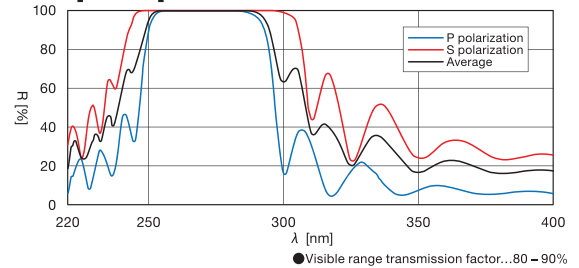


LLM-248 [Kr*F]



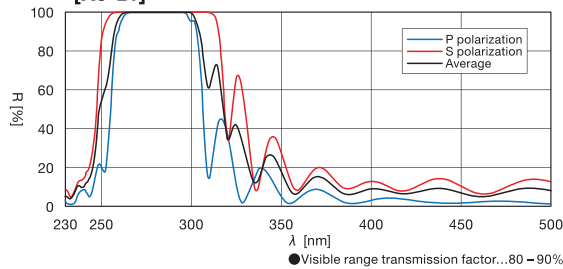
● Visible range transmission factor...80 – 90%

LLM-266 [YAG4 ω]



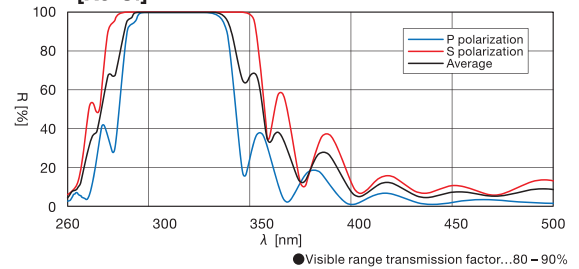
● Visible range transmission factor...80 – 90%

LLM-282 [Xe*Br]



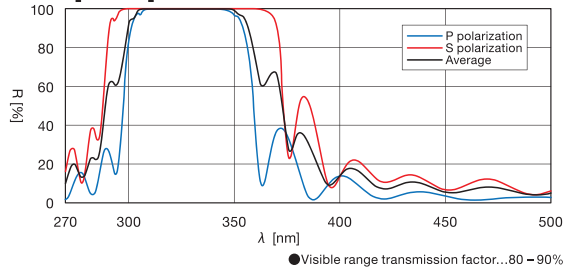
● Visible range transmission factor...80 – 90%

LLM-308 [Xe*Cl]



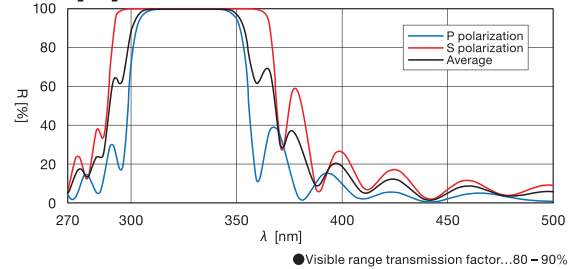
● Visible range transmission factor...80 – 90%

LLM-325 [He-Cd]



● Visible range transmission factor...80 – 90%

LLM-337 [N2]



● Visible range transmission factor...80 – 90%

Application Systems

Machine Vision

Manual Positions

Motion Control Products

Optical & Mirror Holder

FA Parts

Measurement & Control

FA Electrical Parts

Tool & Measure

Cleanroom & AntiStatic

Index

Mirrors

Beamsplitters

Filters

Polarizers

Lenses

Multi-Element Optics

Prisms

Substrates & Windows

Holder & Vibration isolator

Compatible Optic Mounts

KMH-HS25-NL, -HS30-NL / KMH-MP50-NL / GMB-40S

Laser Line Mirrors Narrowband

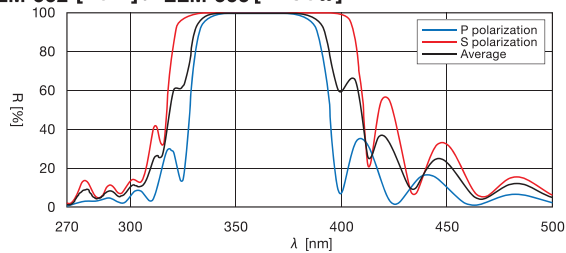
352 – 1064nm							
Part Number	Wavelength Range [nm]	Laser Type	Diameter D [mm]	Thickness t [mm]	Reflectance [%]	Laser Damage Threshold* [J/cm ²]	Rear Surface
LLM-25.4C05-352	352	Xe*F	φ25.4	5	>99.5	5	Polished
LLM-30C05-352	352	Xe*F	φ30	5	>99.5	5	Polished
LLM-50C05-352	352	Xe*F	φ50	8	>99.5	5	Polished
LLM-25.4C05-355	355	YAG3ω	φ25.4	5	>99.5	5	Polished
LLM-30C05-355	355	YAG3ω	φ30	5	>99.5	5	Polished
LLM-50C08-355	355	YAG3ω	φ50	8	>99.5	5	Polished
LLM-25C05-532	532	YAG2ω	φ25	5	>99.5	8	Polished
LLM-25.4C05-532	532	YAG2ω	φ25.4	5	>99.5	8	Polished
LLM-30C05-532	532	YAG2ω	φ30	5	>99.5	8	Polished
LLM-40C06-532	532	YAG2ω	φ40	6	>99.5	8	Polished
LLM-50C08-532	532	YAG2ω	φ50	8	>99.5	8	Polished
LLM-25.4C05-1064	1064	YAG	φ25.4	5	>99.5	20	Polished
LLM-30C05-1064	1064	YAG	φ30	5	>99.5	20	Polished
LLM-40C06-1064	1064	YAG	φ40	6	>99.5	20	Polished
LLM-50C08-1064	1064	YAG	φ50	8	>99.5	20	Polished

* Laser pulse width 10ns, repetition frequency 20Hz

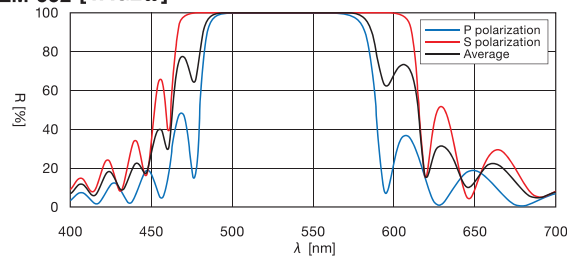
Typical Reflectance Data ... Laser Line Mirrors Narrowband

R: Reflectance

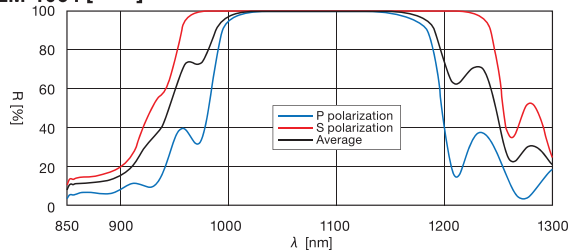
LLM-352 [Xe*F] / LLM-355 [YAG3ω]



LLM-532 [YAG2ω]



LLM-1064 [YAG]



Application Systems

Machine Vision

Manual Positions

Motion Control Products

Optical & Mirror Holder

FA Parts

Measurement & Control

FA Electrical Parts

Tool & Measure

Cleanroom & AntiStatic

Index

Mirrors

Beamsplitters

Filters

Polarizers

Lenses

Multi-Element Optics

Prisms

Substrates & Windows

Holder & Vibration isolator

Laser Line Mirrors

LLM/LLM2

Application Systems

Machine Vision

Manual Positions

Motion Control Products

Optical & Mirror Holder

F A Parts

Measurement &Control

FA Electrical Parts

Tool & Measure

Cleanroom & AntiStatic

Index

Mirrors

Beamsplitters

Filters

Polarizers

Lenses

Multi-Element Optics

Prisms

Substrates & Windows

Holder & Vibration isolator

Laser Line Mirrors Middleband

390 – 840nm						
Part Number	Wavelength Range [nm]	Diameter D [mm]	Thickness t [mm]	Reflectance [%]	Laser Damage Threshold* [J/cm²]	Rear Surface
LLM-25.4C05-405	390 – 410	φ25.4	5	>99.5	0.5	Polished
LLM-30C05-405	390 – 410	φ30	5	>99.5	0.5	Polished
LLM-50C08-405	390 – 410	φ50	8	>99.5	0.5	Polished
LLM-25.4C05-450	420 – 480	φ25.4	5	>99.5	0.5	Polished
LLM-25.4C05-450	420 – 480	φ30	5	>99.5	0.5	Polished
LLM-10C03-500	480 – 540	φ10	3	>99.5	0.5	Ground
LLM-15C03-500	480 – 540	φ15	3	>99.5	0.5	Ground
LLM-15C05-500	480 – 540	φ15	5	>99.5	0.5	Ground
LLM-20C03-500	480 – 540	φ20	3	>99.5	0.5	Ground
LLM-20C05-500	480 – 540	φ20	5	>99.5	0.5	Ground
LLM-25C05-500	480 – 540	φ25	5	>99.5	0.5	Polished
LLM-25.4C05-500	480 – 540	φ25.4	5	>99.5	0.5	Polished
LLM-30C05-500	480 – 540	φ30	5	>99.5	0.5	Polished
LLM-50C08-500	480 – 540	φ50	8	>99.5	0.5	Polished
LLM-10C03-600	570 – 640	φ10	3	>99.5	0.5	Ground
LLM-15C03-600	570 – 640	φ15	3	>99.5	0.5	Ground
LLM-15C05-600	570 – 640	φ15	5	>99.5	0.5	Ground
LLM-20C05-600	570 – 640	φ20	5	>99.5	0.5	Ground
LLM-25C05-600	570 – 640	φ25	5	>99.5	0.5	Polished
LLM-25.4C05-600	570 – 640	φ25.4	5	>99.5	0.5	Polished
LLM-30C05-600	570 – 640	φ30	5	>99.5	0.5	Polished
LLM-40C06-600	570 – 640	φ40	6	>99.5	0.5	Polished
LLM-50C08-600	570 – 640	φ50	8	>99.5	0.5	Polished
LLM-25.4C05-670	630 – 700	φ25.4	5	>99.5	0.5	Polished
LLM-30C05-670	630 – 700	φ30	5	>99.5	0.5	Polished
LLM-10C03-800	770 – 840	φ10	3	>99.5	0.5	Ground
LLM-15C03-800	770 – 840	φ15	3	>99.5	0.5	Ground
LLM-15C05-800	770 – 840	φ15	5	>99.5	0.5	Ground
LLM-20C03-800	770 – 840	φ20	3	>99.5	0.5	Ground
LLM-20C05-800	770 – 840	φ20	5	>99.5	0.5	Ground
LLM-25C05-800	770 – 840	φ25	5	>99.5	0.5	Polished
LLM-25.4C05-800	770 – 840	φ25.4	5	>99.5	0.5	Polished
LLM-30C05-800	770 – 840	φ30	5	>99.5	0.5	Polished
LLM-40C05-800	770 – 840	φ40	6	>99.5	0.5	Polished
LLM-50C05-800	770 – 840	φ50	8	>99.5	0.5	Polished

* Laser pulse width 10ns, repetition frequency 20Hz

Laser Line Mirrors Broadband

420 – 900nm						
Part Number	Wavelength Range [nm]	Diameter D [mm]	Thickness t [mm]	Reflectance [%]	Laser Damage Threshold* [J/cm²]	Rear Surface
LLM2-25.4C05-500	420 – 540	φ25.4	5	>99	0.5	Polished
LLM2-30C05-500	420 – 540	φ30	5	>99	0.5	Polished
LLM2-50C08-500	420 – 540	φ50	8	>99	0.5	Polished
LLM2-25.4C05-600	540 – 660	φ25.4	5	>99	0.5	Polished
LLM2-30C05-600	540 – 660	φ30	5	>99	0.5	Polished
LLM2-50C05-600	540 – 660	φ50	8	>99	0.5	Polished
LLM2-25.4C05-800	730 – 900	φ25.4	5	>99	0.5	Polished
LLM2-30C05-800	730 – 900	φ30	5	>99	0.5	Polished
LLM2-50C08-800	730 – 900	φ50	8	>99	0.5	Polished

* Laser pulse width 10ns, repetition frequency 20Hz

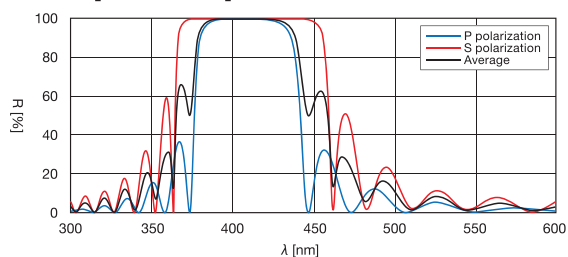
Compatible Optic Mounts

KMH-HS25-NL, -HS30-NL /KMH-MP50 /MAD-30-10 + MHB30M / VBH-15-2 / MHF-20 / GMB-40S

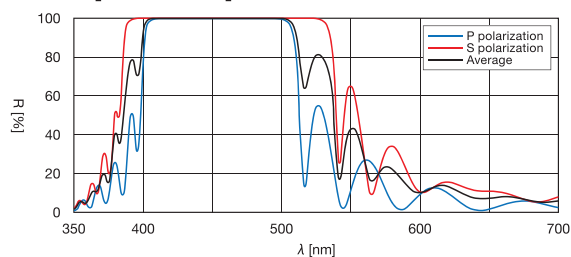
Typical Reflectance Data ... Line Mirrors Middleband

R: Reflectance

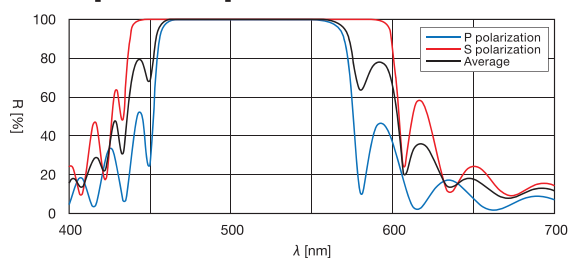
LLM-405 [390 – 410nm]



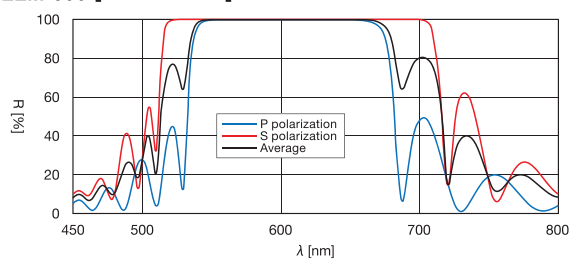
LLM-450 [420 – 480nm]



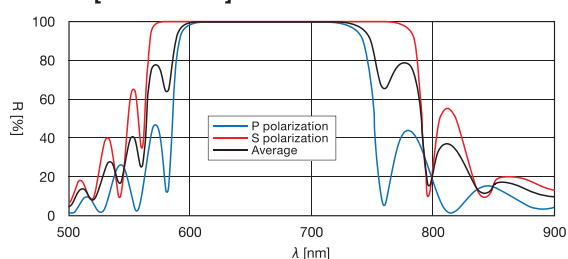
LLM-500 [480 – 540nm]



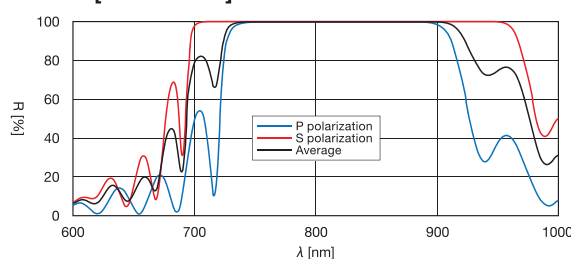
LLM-600 [570 – 640nm]



LLM-670 [630 – 700nm]



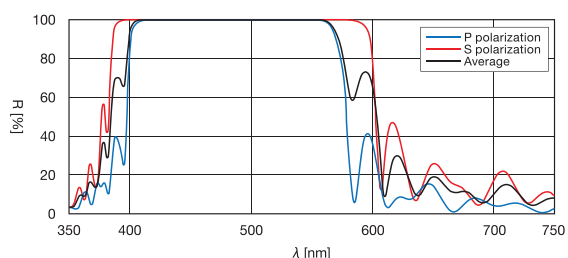
LLM-800 [770 – 840nm]



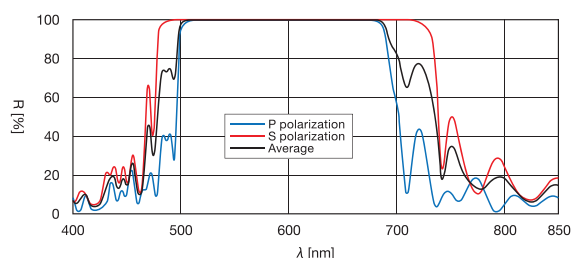
Typical Reflectance Data ... Laser Line Mirrors Broadband

R: Reflectance

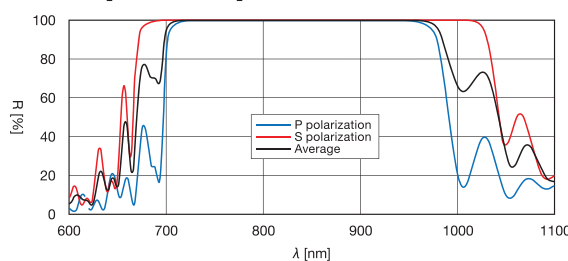
LLM2-500 [420 – 540nm]



LLM2-500 [540 – 660nm]



LLM2-800 [730 – 900nm]



Application Systems

Machine Vision

Manual Positions

Motion Control Products

Optical & Mirror Holder

F A Parts

Measurement & Control

FA Electrical Parts

Tool & Measure

Cleanroom & AntiStatic

Index

Mirrors

Beamsplitters

Filters

Polarizers

Lenses

Multi-Element Optics

Prisms

Substrates & Windows

Holder & Vibration isolator