

Vacuum deposited thin films of several different metals make excellent reflectors. It is difficult to polish metal substrates to the smoothness required for specular reflectance in the visible and ultraviolet, so most metallic reflectors are made by applying a thin metal film to a highly polished glass substrate. We call these coatings metallic reflector coatings to distinguish them from dielectric reflector coatings.

Metallic reflector coatings are inexpensive, cover a broad spectral range, and have good reflectance (there is some loss due to absorption). Some metal coatings, such as aluminum and silver, tarnish rapidly, and reflectance drops significantly. If the optic is to be used as a first surface reflector, a protective overcoat is strongly recommended. Fig. 1 shows a first surface and second surface reflector. Fig. 2 shows the reflectance properties of our metallic reflector coatings.

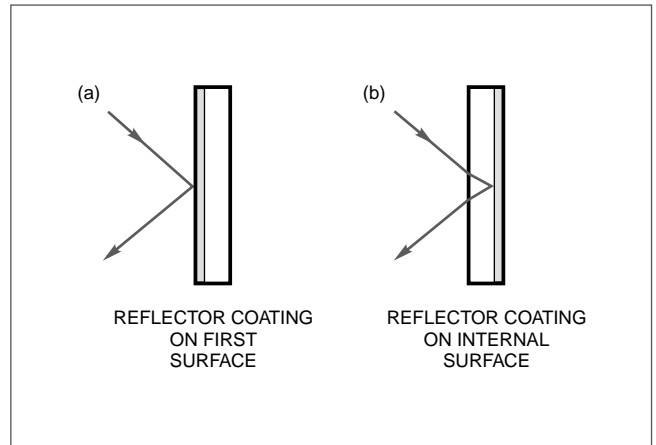


Fig. 1 Front surface (a) and second surface (b) reflector.

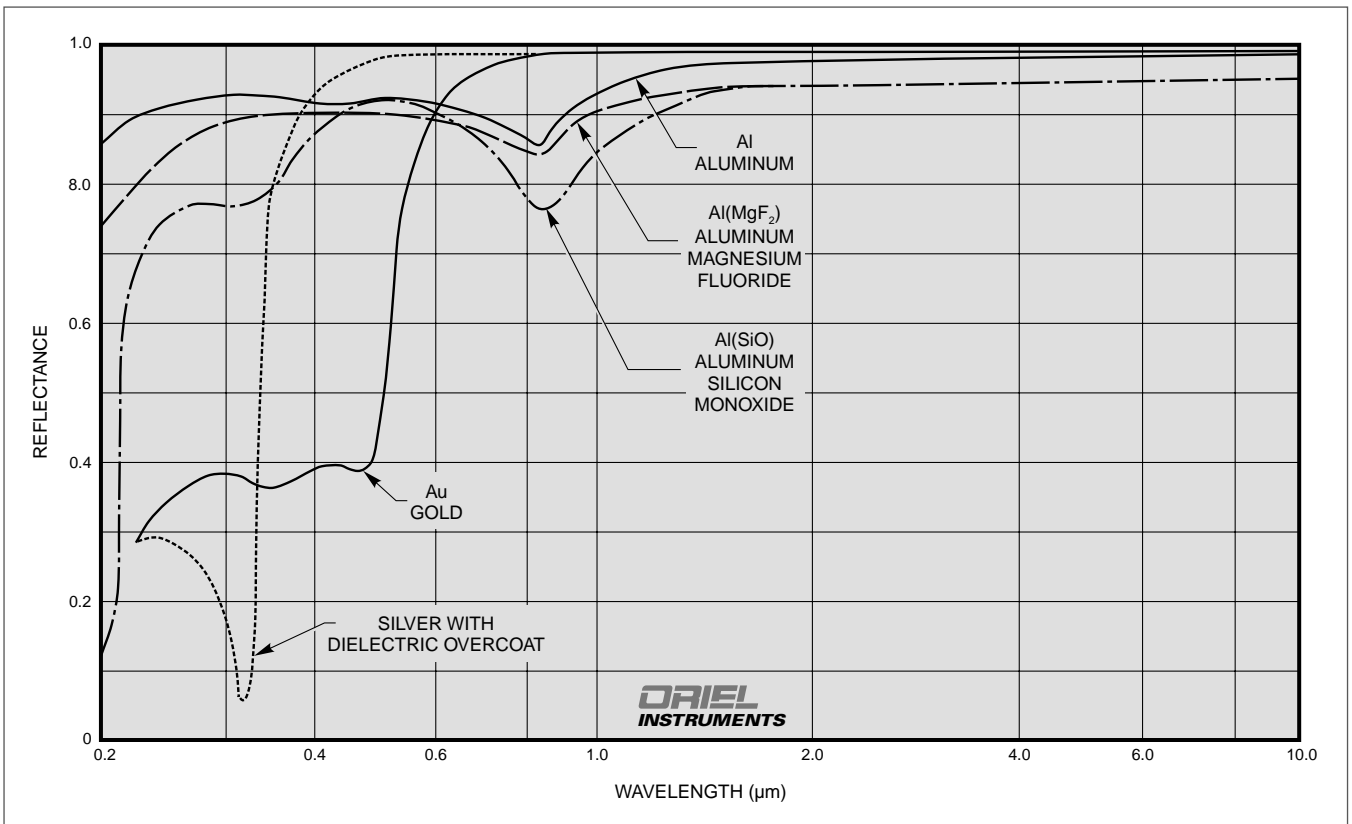


Fig. 2 Typical near normal incidence reflectance of our metallic reflector coatings. The reflectance of the 79950 Bare Aluminum Coating falls rapidly in the ultraviolet, when it's exposed to air.

BARE ALUMINUM COATING

Freshly deposited aluminum has an average of 90% reflectance between 200 and 1000 nm, with an absorption band (85%R) at 820 nm. From 1.0 to 30 µm, reflectivity is 94% to 99%.

A thin oxide coating forms quickly on aluminum exposed to air. UV reflectance falls due to the oxide coating, and deterioration of overall reflectance results from continued exposure to chemicals in the atmosphere. We recommend a bare aluminum coating only for second surface reflectors.

SPECIFICATIONS

Coating material:	Bare aluminum
Reflectance:	See Fig. 2
Incident angle:	0 to 45°
Mil spec compliance:	Meets or exceeds: Abrasion, Mil-C-675A Adhesion, Mil-M-13508C Hardness, Mil-M-13508C

ORDERING INFORMATION

79950 Bare Aluminum Coating	Run Charge* Piece Price**
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* Cost for coating each surface.
 ** Cost for coating each optic.
 These prices are for up to 2.0 inch (50.8 mm) diameter optics; for larger sizes, contact Oriel for a quotation.

ALUMINUM WITH SiO OVERCOAT

Aluminum overcoated with silicon monoxide (SiO) produces a good, general purpose, broadband reflector for the visible and infrared. The reflectivity of this coating is between 85 and 90% from 400 nm to 20 μm with a dip to ~75% at around 825 nm. See Fig. 2.

AlSiO is more durable than bare aluminum, but it can still be easily scratched. Care must be used in handling; always wear gloves or finger cots. To clean metallic coated optics, use the 49122 Cleaning Fluid.

SPECIFICATIONS

Coating material:	Aluminum with SiO overcoat
Reflectance:	See Fig. 2
Incident angle:	0 to 45°
Mil spec compliance:	Meets or exceeds: Abrasion, Mil-C-675A Adhesion, Mil-M-13508C Hardness, Mil-M-13508C

ORDERING INFORMATION

79990 AlSiO Coating	Run Charge* Piece Price**
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* Cost for coating each surface.

** Cost for coating each optic.

These prices are for up to 2.0 inch (50.8 mm) diameter optics; for larger sizes, contact Oriel for a quotation.

GOLD COATING

Gold is an excellent reflector from the near IR (800 nm) to the far IR (30 μm); in this region reflectivity exceeds 98%. Beyond 1.5 μm , reflectance is greater than 99%. Unlike aluminum, gold is resistant to surface oxidation, but it is extremely soft and care should be used in handling and cleaning. Clean a gold coated optic using a non-contact flow of water, organic solvent and clean dry air.

The 79930 is bare gold, with a thin layer of chromium underneath, for adherence. We can also supply an overcoated Gold Coating. Contact an Applications Engineer for details.

SPECIFICATIONS

Coating material:	Bare Gold
Reflectance:	See Fig. 2
Incident angle:	0 to 45°
Mil spec compliance (Overcoated Gold, only):	Meets or exceeds: Abrasion, Mil-C-675A Adhesion, Mil-M-13508C Hardness, Mil-M-13508C

ORDERING INFORMATION

79930 Bare Gold Coating	Run Charge* Piece Price**
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* Cost for coating each surface.

** Cost for coating each optic.

These prices are for up to 2.0 inch (50.8 mm) diameter optics; for larger sizes, contact Oriel for a quotation.

ALUMINUM WITH MgF₂ OVERCOAT

For UV reflectance down to 200 nm, choose AlMgF₂ over AlSiO. AlMgF₂ also has higher overall reflectance in the visible and near infrared; see Fig. 2.

Like AlSiO, AlMgF₂ coated optics require special handling. Never touch the surface of a mirror; handle it by the edges while wearing gloves or finger cots.

We offer AlMgF₂ coated flat and concave.

SPECIFICATIONS

Coating material:	Aluminum with MgF ₂ overcoat
Reflectance:	See Fig. 2
Incident angle:	0 to 45°
Mil spec compliance:	Meets or exceeds: Abrasion, Mil-C-675A Adhesion, Mil-M-13508C Hardness, Mil-M-13508C

ORDERING INFORMATION

79920 AlMgF ₂ Coating	Run Charge* Piece Charge**
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* Cost for coating each surface.

** Cost for coating each optic.

These prices are for up to 2.0 inch (50.8 mm) diameter optics; for larger sizes, contact Oriel for a quotation.

SILVER WITH MgF₂ OVERCOAT

As bare silver tarnishes rapidly in air, and the reflectance falls quickly, we only recommend bare silver for internal or second surface reflectors. We offer an efficient Magnesium Fluoride protected silver coating as a first surface reflector. A layer of magnesium fluoride protects the silver from degradation.

The 79938 has high visible and infrared reflectance and is durable. You can clean it with our 49122 Metallic Reflector Cleaning Fluid.

SPECIFICATIONS

Coating material:	AgMgF ₂
Reflectance:	See Fig. 2
Incident angle:	0 to 45°
Mil spec compliance:	Meets or exceeds: Abrasion, Mil-C-675A Adhesion, Mil-M-13508C Hardness, Mil-M-13508C

ORDERING INFORMATION

79938 Silver with MgF ₂ Overcoat	Run Charge* Piece Price**
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* Cost for coating each surface.

** Cost for coating each optic.

These prices are for up to 2.0 inch (50.8 mm) diameter optics; for larger sizes, contact Oriel for a quotation.