



LBP Newsletter October 2015

Stainless Steel Mirrors

In pharmaceutical, food and textile production, metal detectors and magnetic separators have a vital safety role. Our stainless steel mirrors use 430F grade known for its magnetic susceptibility. We can now offer polished 430F grade stainless steel mirrors either uncoated or with a choice of reflective coatings:

- Electroplated gold for infrared use.
- Protected silver or protected aluminium for UV/visible applications.

We also have customers using magnetic mirror mounts to make system assembly much easier and cheaper.

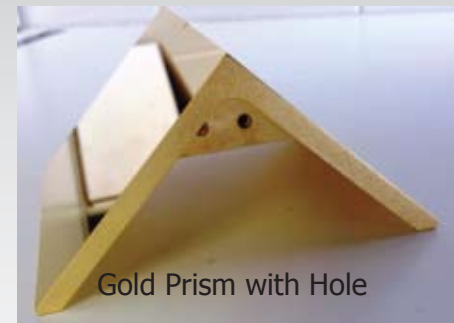
Stainless Steel Mirrors Gold Coated



Reflective Apertures, Stops and Shutters



Sometimes a high power infrared laser needs to have its power attenuated, or have strongly diverging modes removed from the beam. We manufacture mirrors with precision through holes or knife edges that are cost effective, even when made to your design as a "one off" prototype. We advise that the length of the hole is no more than the hole diameter to avoid having a "tunnel" with an aperture at either end. We can make tapered holes to avoid this problem.



Gold Prism with Hole

Diffuse Infrared Reflector

We have developed the gold coating of carefully roughened metal substrates to be used as diffuse reflectors in the infra red. This particular example, based on Aluminium, has a consistent surface roughness of $R_a = 6\mu m$ and would be useful in the near infra red.

The surface roughness needs to be random enough to allow the surface to function as an isotropic diffuse reflector for infrared wavelengths. Additionally the magnitude of the surface roughness needs to be high enough so the reflectance will be perfectly diffuse and have no enhanced reflectance in the specular direction.



Contact us for help,
information and prices:

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AFTR Repair

We were happy to help out a customer who bought a used CO₂ laser system made by a UK OEM, but is now unsupported.

He sent us this assembly containing four unknown mirrors. We identified it as a "back reflection isolator", used when cutting reflective materials such as aluminium. If the beam reflects back off the workpiece it can follow a return path directly back into the resonator where it causes a large spike of two or three fold in resonator power. This will often burn out the expensive resonator optics.

By using the fact that light reflected off the workpiece has a phase shift of 180 degrees, this multi mirror unit can discriminate between the outgoing beam's polarisation and the reflected beam's polarisation and absorb the reflected beam at least for a short time. We replaced all the mirrors in this back reflection stopper and the other six mirrors in the beam delivery train and the reflective collimator.

Compound Parabolic Concentrators (CPCs)

The name compound parabolic concentrator derives from the fact that the CPC is comprised of two parabolic mirror segments with different focal points. We can mechanically polish the inner surface of the CPC and then gold coat it as this example shows.



Gold coated CPCs are useful for collecting and concentrating infra red and long wavelength radiation and have interesting properties. Unlike a simple parabolic mirror the CPC is a non-imaging optic and concentrates light from diverging sources. Light entering the CPC entrance aperture at any angle up to the "acceptance angle" (which depending on the design could be up to 45 degrees to the optical axis) can still be concentrated. Industrial grade CPCs are used as solar cookers and solar concentrators, smaller better quality ones like this have a use in scientific instrumentation.

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