

Accessory Newsletter – No. 5

Reflector Accuracy

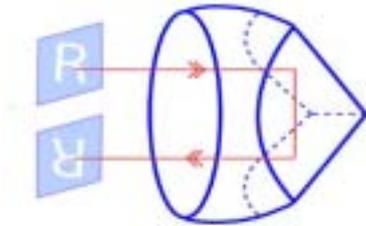
HATACCURACY OF THE REFLECTOR

A circular prism is manufactured by cutting the corner from a solid glass cube. This creates three mutually orthogonal reflecting surfaces that reflect any light rays back towards their source.

The accuracy of a reflector is defined by various aspects that are detailed in this newsletter.

ANGULAR BEAM DEVIATION

The angular difference between the entering and exiting beam is known as Angular Beam Deviation. A high deviation significantly reduces the returned signal strength and hence the measurement range.



The GPR1/GPR121 Professional reflectors have the highest possible manufacturing accuracy with a beam deviation of less than 2 arc seconds. After manufacture, each prism is measured by interferometer to determine its beam deviation. Those prisms with a higher deviation, but still less than 8 arc seconds, are assembled as a GPR111 Basic reflector.

REFLECTIVE COATING

Leica prisms have a copper coating on the reflecting surfaces. Copper offers a very high reflectance of infrared beams. Being robust and resistant to corrosion it has a long useable life.

Many other prisms in the market do not have a coating on the reflective surface. This dramatically reduces the distance measuring, ATR and PowerSearch range by over 30%. In addition, incorrect measurements can result when moisture forms droplets on the reflecting surface. An exception is the GPR112 monitoring reflector. Although this prism has no reflective coating, a patented gas-exchange valve prevents droplets from forming.

ANTIREFLEX COATING

The front surface of Leica prisms has an anti-reflection coating. This coating is remarkably hard and has the added feature of protecting the surface from scratches. Without this, the front face of a prism will reflect part of the EDM signal. At close ranges, this causes incorrect distance measurements.

The coating is optimised for the Leica EDM signal. Therefore other brands of coated prisms will still partially reflect and can cause incorrect measurements.

An exception is the GPH1P precision reflector. Although this prism has no antireflex coating, the prism is mounted at a slight tilt to prevent any direct reflection back to the EDM.

CENTRING ACCURACY

The centring accuracy is the precision with which the optical centre of the prism coincides with the mechanical axes of the holder. In combination with the carrier, force-centred in a tribrach, 3D centring accuracy over a measurement point can be defined.

LEICA REFLECTOR OVERVIEW

The table below gives an overview of the minimum specifications of Leica reflectors. The suitable reflector should be chosen depending on the required measurement range and accuracy. The centring accuracy is based on a combination with a SNLL121 Professional Carrier.

Prism Type	Beam Dev. Arc Sec.	Centring mm
PROFESSIONAL		
GPH1P	2	0.3
GPR1/GPR121	2	1.0
GMP101	6	1.0
GRZ4	6	2.0
GMP104	6	n/a
BASIC		
GPR111	8	2.0
GMP111	6	2.0
GRZ101	6	2.0
GPR112	6	n/a