

The manufacture of mirror segments for telescopes like the Grantecan calls for close cooperation between production and measuring technology.

Ultramodern Measuring Technology

To comply with the extremely tight dimension and shape tolerances required, Schott used a 3D laser tracker system for the first time. The mobile 3D coordinate measuring system operates by directing a laser beam from the instrument's laser head to a target reflector, which has been placed on the position to be measured. The beam is reflected by the target back to the laser tracker, which records the target angle required as well as the distance between the laser head and the reflector. The reflector's spatial coordinates are calculated. The laser tracker not only provides high measurement accuracy (0.01 mm per meter of distance from the laser head) but also covers a large measurement area (up to 35 meters).

Use in the production area

Since the measuring system is highly mobile and can be used in a variety of climatic conditions, the laser tracker can also be used in the production area in direct proximity to the processing machine. This facilitates the necessary close cooperation with quality assurance during processing. As a consequence, any necessary corrective action can be taken immediately upon evaluation of the measurement results.



The laser tracker provides not only high measuring accuracy, but also mobility and sophisticated inspection and evaluation methods.

Sophisticated inspection and evaluation methods have been developed which enable the laser tracker to carry out measurements which would otherwise be too costly or simply impossible with standard inspection methods.

Challenging duties

With the Grantecan project, the laser tracker is used for a number of applications, including simple angle sum checks during the early machining stages, highly accurate radius and surface shape determination on the concave side of the mirror, and the

measurement of the shape of the whole hexagonal blank. The laser tracker can also check the accuracy of the processing machines. This is very important since the shape tolerances required come down to tenths of a millimeter and even the slightest deviation during machining could result in a whole mirror segment being rejected ■