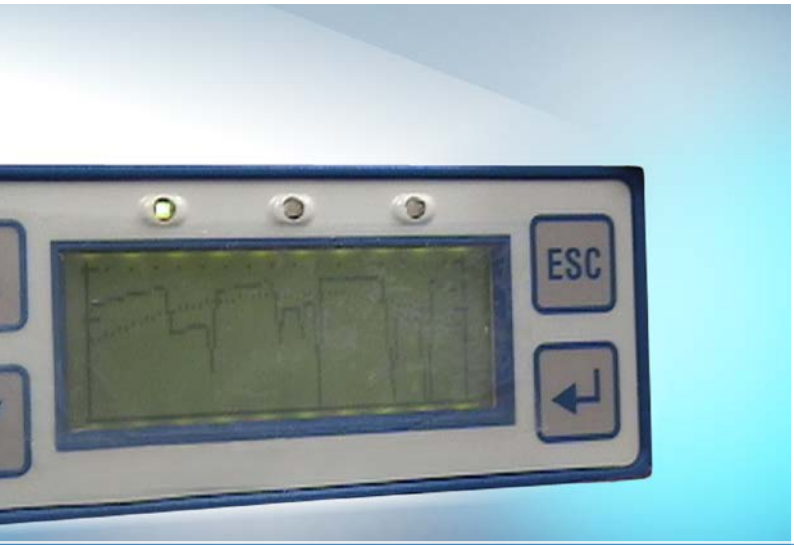
A167

Optical micrometers
optoCONTROL



Contact lens measurement

In their quest for better materials, Research and Development teams at contact lens manufacturers have a need to conduct various material tests on clear, flexible polymer samples. The material samples must be submerged during testing in a saline solution for hydration, as they have completely different properties in their dry state as in their hydrated state. The challenge is to find a way to measure dimensional changes in the samples while stretched, heated, etc. while inside small hydration enclosures. Since contact sensors could easily influence the measurements, a non-contact method is preferable. Also, since the plastic is almost invisible when submerged, most optical measurement technologies would fail in this application. Traditional thru-beam sensors cannot adequately distinguish the sample from the surrounding fluid, and vision cameras are too dependent on external lighting conditions to be reliable.

The highly sophisticated ThruBeam model ODC2600-40 is uniquely capable of making these dimensional measurements with high accuracy and speed. A curtain of LED light is transmitted across the sample through the walls of the enclosure. The sensor is used in segment mode, easily distinguishing between the enclosure walls, saline bath, and test sample edges. The unique dynamic threshold feature allows the user to fine tune the sensor such that it sees the polymer sample's edges with optimum clarity. Also, as the threshold setting is adjusted, it functions as a calibration of the sensor to the material being tested (the threshold can be adjusted until the known width value is displayed).

Sensor accuracies of 1 micron are achieved using high quality silicon optics and a proprietary, high resolution CCD receiving array. This technology also allows for measurement at a far higher rate (2300 per second) than traditional scanning micrometers, allowing for plenty of horizontal resolution in potentially high-speed tests.

Advantages

- Dynamic adjustable threshold
- Intelligent multi segment mode
- Measures through glass enclosure and clear liquid
- High speed helpful in material test applications

Requirements for the measurement system

- Accuracy: 1 micron target
- Resolution: 0,2 microns or better
- Target: Must measure dimensions of a clear polymer strip submerged in saline bath, measured through a glass enclosure

Reasons for choosing the system

- Multi segment mode and programmable threshold allow for accurate measurement of such a challenging target