Laser Range Settings

The THoT tool is capable of measuring many features on a polished surface. The laser system is very versatile and capable of measuring defects into the single Angstom range and morphology from hundreds of microns to hundredths of Angstroms.

To support this very wide range of about 100,000,000:1, the laser has several ranges. The lowest vibrometer range, 5mm/s/v, has a limited bandwidth and most testing is performed at 25mm/s/v to take advantage of the increased bandwidth.

The standard programs have a laser range settings that are appropriate for current disk technology. For morphology tests, wavelengths longer than 100um, the 5mm/s/v range is used at a rotational speed of 5500 rpm. For shorter wavelengths and defect testing the 25mm/s/v range is used.

With the increased sensitivity of the Model 42000 tool, some older product, for example LMR (Longitudinal Magnetic Recording) media, circa 2004, may require shifting the range to a less sensitive setting of 125mm/s/v.

In the case of rough substrates, for example at the final grinding process, the use of the 125mm/s/v selection may also be required.. If the system detects a signal beyond the capability of the selected range, it will saturate the laser velocity output. When this occurs it is easily detected on the displays as saturation, a condition where most of the signal is at the maximum display level.

When the Power Spectral Density test is executed, the laser range is automatically selected based on the wavelength, radius and spindle rpm. If a rough sample is to be tested, the user can select a “rough” setting that changes the laser ranges from 5mm/s/v and 25mm/s/v to 25mm/s/v and 125mm/s/v.

All of the ranges are calibrated so that no matter which range is selected, the measurements will be correct. However, the change from 5 to 25 and 25 to 125 also decreases the resolution by a factor of 5 with each change.

It is highly recommended that the standard program values are used. If the readings saturate due to the need to measure rougher surfaces, then the range can be adjusted.