

Measuring Accuracy

Measuring accuracy is specified in accordance with ISO-recommendation ISO/R 1938-1971, with a statistical safety of 95% (2σ , i.e. two-fold standard deviation). Typical measuring accuracy is based on average measuring conditions within the specified measurement range. It is not valid for special application functions and calculations, such as Pythagoras and is not valid in tracking mode (continuous tracking).

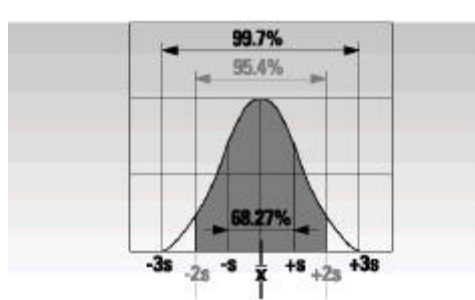
Favorable measuring conditions are:

- Highly reflective materials, which diffuse the reflected laser beam (not mirrored reflections!)
- Laser dot is brighter than the surroundings
- Operating within the ideal temperature range (10° to 30°)

Maximum measuring errors occur under adverse measuring conditions. Adverse measuring conditions are e.g.:

- Highly reflecting surfaces (e.g. reflective foils)
- Very absorbing surfaces, e.g. wet, dark surfaces
- Operating outside of the ideal temperature range
- Bright surroundings
- Intense heat shimmer

- For optical reasons and for reasons of technical safety, no measurements should be done against colorless liquids (water) or glass!



A method to calculate the standard deviation s (= Sigma):

A calculator with statistics functions or Excel is required to calculate the mean \bar{x} and the standard deviation s by directly using the measured values.

The formula for the standard deviation s :

$$s = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2}$$

n ... Number of measurements

x ... Single value in a series of measurements

\bar{x} ... Mean of a series of measurements

Range

The range increases, the better the laser beam is reflected back from the target (diffused not mirrored) and the brighter the laser dot is compared to the surroundings (e.g. indoors or from dusk to dawn). If the signal is too weak (display shows: E255), the brown side of the target plate has to be used as it reflects the laser beam better. Dull green or blue surfaces (e.g. plants and trees) reduce the range, but measurements can still be made with a target plate.

Accuracy

Leica DISTO™ lite⁵

Measuring accuracy typ. ± 3 mm
max. ± 5 mm

The tolerance is not proportional to the measured distance over the whole distance. An additional error with around ± 30 ppm (parts per million) what is ± 3 mm to 100m has to be added by longer distances

Leica DISTO™ classic^{5a} / DISTO™ plus

Measuring accuracy typ. ± 1.5 mm
max. ± 2 mm