

## Quality Control for CD & DVD (with special focus on DVD Half-Discs)

*Deviation Analyzer*



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The Deviation Analyzer DA-1 is a stand-alone off-line measurement system for detailed disc deformation analysis of optical data carriers (discs), including CDs, CD-Rs, DVDs, DVD halfdiscs, etc. The entire inspection system basically consists of the DA-1 inspection unit and a customer computer (PC: Operating system Windows, link to DA-1 via Ethernet/TCP/IP). The inspection unit has an optics head for scanning the disc, and an electronics system for data processing, both integrated into one housing. The customer PC is used for inspection data evaluation and for visualization of the inspection results, the software for the PC is supplied with the system.

The flatness of discs is specified for the final product, with partly very tight limits (i.e. for DVD and new formats with high density storage). For the intermediate production steps there are generally no specifications. To achieve the performance at the final stage one has to provide a dedicated quality of flatness from the very beginning of the production process, starting already with the molding.

The DA-1 provides you with the chance to check all kinds of discs (substrates, DVD-halfdiscs as well as finished discs) for their flatness. This analysis is performed with a clamping force close to zero, only on the very edge of the center hole (no distortion of the inherent shape of the disc) and measurement of the disc in vertical position (no influence of gravity on the disc shape).

All these features give you the chance to analyze your discs as if they are "flying in space", no need to worry about the influence of the analyzing system on your measurement results. This is definitely important to optimize the disc shape before bonding and for evaluating the influence of various production steps (i.e. printing + curing of the discs).

## Technical Data

<b>MEASUREMENT CONDITIONS</b>	Measurement of disc deformation with special respect to: <ul style="list-style-type: none"> <li>■ measurement in data area as well as in clamping area</li> <li>■ minimal clamping force, combined with minimal clamping area</li> <li>■ vertical disc position in order to avoid the influence of gravity</li> <li>■ slow disc rotation in order to avoid centrifugal force</li> </ul>
<b>MEASURING METHOD</b>	High precision laser beam triangulation, combined with an interpolation method for evaluating the deviation profiles over the entire radius range
<b>MEASURED VARIABLES</b>	Angular deviation of the reflected beam (according to specification in the DVD-book, Physical Specifications)
<b>SENSORS</b>	2-dimensional position sensitive device
<b>INDICATED VALUES</b>	Radial + tangential deviation Vertical deviation (i.e. axial deflection) Vertical runout
<b>MEASUREMENT RANGE</b>	Radial and tangential deviation: $\pm 1,6^\circ$
<b>RADIAL RANGE</b>	7.5 ... 65 mm
<b>MEASUREMENT TIME</b>	Turning time: 2 s (including evaluation time)
<b>NUMBER OF MEASUREMENTS</b>	2400 values per disc
<b>ACCURACY</b>	radial deviation: $\pm (0.03^\circ + 2\%$ of the actual measured value) tangential deviation: $\pm (0.02^\circ + 2\%$ of the actual measured value)
<b>DISPLAY OF RESULTS</b>	For all measurements (radial + tangential deviation, vertical deviation, vertical runout): <ul style="list-style-type: none"> <li>■ Radial display</li> <li>■ Angular display</li> <li>■ 3D-display of vertical deviation distribution</li> </ul>
<b>POWER SUPPLY</b>	100...240 V AC, 50...60 Hz, max. 60 VA
<b>DIMENSIONS</b>	240 x 310 x 330 mm (W x H x D)
<b>WEIGHT</b>	10 kg
<b>REMARKS, NOTES</b>	GOOD / BAD - evaluation of the disc, based on thresholds for the measured values.  Angular display: The user can determine 3 freely programmable radii to display the angular distribution.  Automatic user-friendly procedure for checking the calibration of the system within a few seconds (test discs are supplied with the system).