

# TDM-COMPACT

## TOPOGRAPHY AND DEFORMATION MEASUREMENT

The **TDM-Compact** is a versatile instrument for a wide array of applications in the areas of process development, failure analysis, reliability, and quality control.

### ABSOLUTE 3D CARTOGRAPHY

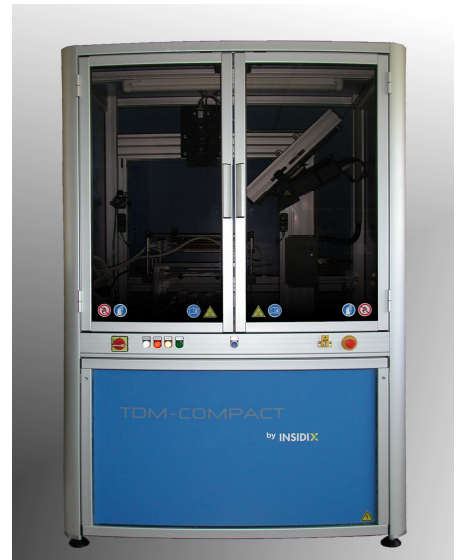
TDM is a patented tool for warpage analysis under a temperature profile. TDM uses the fringe projection technology (also called projection moiré) for non-contact, full-field acquisition of 3D topographies with a resolution as low as 1.5µm. TDM-Compact acquires a full, absolute 3D cartography of devices with dimensions up to 200 mm x 200 mm (field of view up to 150 mm x 150 mm). Simultaneously, its powerful heating and cooling capabilities allow for virtually any temperature profile on the sample under test. The integrated software package provides tools for representation of the results as 3D plots, vectors diagrams, isometrics views, and 2D profiles following user-defined profile lines (e.g., diagonal plots).

### LARGE SAMPLE SIZE CAPABILITY:

- Component qualification for reflow profile compatibility
- Component curing process optimization
- Component characterization following JEDEC 22B112A and IPC/JEDEC J-STD-020D standards
- Fast aging test profiles, ON/OFF cycles, etc.

### ADVANTAGES:

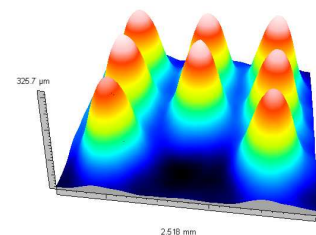
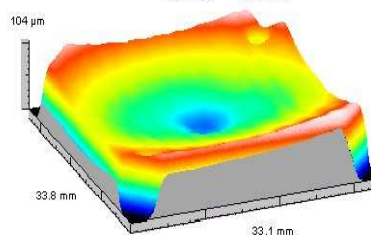
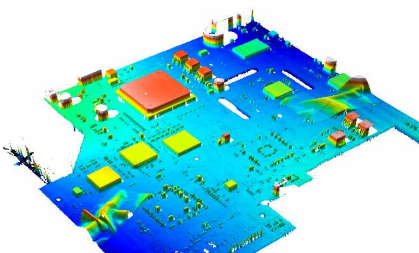
- Independently controlled top/bottom heater banks for superior temperature uniformity
- Ultra high resolution camera for fine feature analysis (e.g., measurement of solder balls/bumps, leads, pins, etc.) and more accurate warpage measurements



TDM-Compact's integrated zoom optics allow the user focus on virtually any sample area of interest. The sub-room temperature package gives access to temperature cycling down to -60° C, allowing for test or reliability inspection by temperature cycling as proposed by the MIL-STD-883G standard.

**DIC (DIGITAL IMAGE CORRELATION) PACKAGE** adds CTE and strain measurement capability and helps the user identify potential CTE mismatches between components and PCBs. This valuable option completes the reliability/failure analysis program, allowing for the analysis of potential in-plane deformation issues.

From left to right: Electronic board, BGA warpage; solder ball characterization



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### TECHNICAL DATA

▶ Imaging	Direct sample illumination, non-contact measurement
▶ Maximum samples size	200 mm x 200 mm
▶ Field of view (x,y)	Zoom 30 x 30 to 150 x 150 mm (10 x10 mm optional)
▶ Depth of view (z)	Up to 25 mm
▶ CCD camera resolution	5 megapixel
▶ Capabilities	Out-of-plane topography analysis: $z(x,y)$ Out-of-plane deformation analysis: $\Delta z(x,y)$ In-plane deformation analysis: $(\Delta x, \Delta y)(x,y)$ (option)
▶ Accuracy	+/-1.5 micron or 3% of measured value, whichever is greater In plane measurement : $5 \times 10^{-5}$ of length of sample

### HEATING AND COOLING

▶ Temperature range	Room temperature to 300° C continuous (-60° C to 300° C optional)
▶ Heating method	IR lamps - top and bottom
▶ Heating rate	Up to +1.5° C/s (sample dependent)
▶ Cooling method	Regulated flow of compressed air
▶ Cooling rate	Up to -3° C/s above 120° C

### SOFTWARE

▶ Acquisition <i>TDM-Control</i>	system control & measurement acquisition
▶ Batch processing <i>TDM-Batch</i>	Automatic warpages calculation of samples during reflow
▶ Advanced 3D analysis <i>TDM-Warpage</i>	Colour cartography, isometric view, 3D surface diagrams Basic surface operator: Levelling, zoom, rotation, thresholding, etc. Filters for advanced analysis: FFT, spatial filtering, Wavelets, etc.
▶ In-plane (x,y) representation <i>TDM-Strain</i>	Strain fields, iso-displacement lines and CTE calculation

### MECHANICAL

▶ Footprint	140 cm x 120 cm x 245 cm
▶ Weight approx.	330 kg
▶ Utilities	Electricity: 230 VAC, 50 Hz, single phase; Compressed air: 6 bar