

HDT-III: HDT/VICAT Tester



BENEFITS

- ✓ User Friendly
- ✓ Superior Thermal Uniformity
- ✓ Accurate and Repeatable Results
- ✓ Low Thermal Linear Expansion

PRODUCT DESCRIPTION

The CSI model HDT-III provides a means of quickly and accurately determining the thermal softening properties of plastic materials with precision and reproducibility. This test system offers sophisticated control and simple operation to guarantee accurate testing to global test specification such as Heat Deflection Temperature (HDT) and VICAT Softening Point Temperature (VST)

The HDT-III has high temperature testing capability and is available with up to 6 test stations depending upon the individual testing needs. The tester is outfitted with a water cooled heat exchanger to lower the temperature of the oil after a test is completed, the reset button starts the cooling when selected. Featuring a dynamic bath circulation pattern, the HDT-III provides an unprecedented temperature uniformity at each specimen station ensuring precise, reproducible test results. An optional cooling device is offered, provides a means of quickly lowering the temperature of the bath oil at the completion of the test

The state-of-the-art computer driven CSI HDT-III is adaptable and user friendly, yet powerful and sophisticated. Equipped with Windows-based control and analysis software, the HDT-III offers easy setup, operation, analysis and frame calibration. Software records data continuously during the test. Powerful graphing tools identify and eliminate test anomalies by plotting deflection vs temperature and temperature rise rate curves. Digital gauges with LVDT transducers and individual specimen thermocouples provide the most advanced, precise measurement of deflection/penetration and temperature.

The rugged system design is used in quality assurance laboratories, production environments and research laboratories worldwide. The CSI HDT-III Test System complies with ISO and ASTM test methods as well as facilitate ISO 9001 compliance. This instrument features a computerized data acquisition and data handling system. The test software is written specific to meet and exceed standard test methods used worldwide for the evaluation of polymer materials.

The test cycle is reset when all stations have failed and the cool down mode takes over until conditions are met for performing another test.

For hard copy files, the user is able to print any of these four reports. The full test report provides station by station specimen information including specimen loading, failure temperatures, rise rates and statistical data.

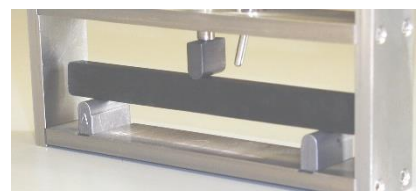
TECHNICAL DATA

STANDARD FEATURES

- All Stainless-Steel construction
- Fully equipped to meet ASTM D648, D1525, D5944, ISO 75 & 306
- Three to Six (universal) test stations
- Invar Specimen Frames for each test station
- Individual temperature monitoring for each station and conditioning bath
- Easily interchangeable specimen holders
- Standard Tool Kit
- Digital Temperature Display
- Microprocessor Based Ramp/Soak Controllers with PID action
- Thermal Distribution $\pm 0.2^{\circ}\text{C}$ @ 300°C
- User Selectable Temperature Rise Rates
- Temperature Rise Rates: $2 \pm 0.2^{\circ}\text{C}/\text{min}$, $50 \pm 5^{\circ}\text{C}/\text{hr}$ or freely selectable
- 300°C Maximum Temperature
- Cooling System to cool bath from 300°C to 30°C in 15 min.
- Linear transducer for deflection/penetration measurement (resolution 0.01mm)
- VICAT Loads: 10N and 50N
- HDT Fiber Stresses 0.455MPa and 1.83MPa
- Universal Test Weights: 1 x 1, 5, 10, 50, 100, 500 and 1100-g, 2 x 2, 20 and 200-g
- Data Acquisition, Windows Based Software. Real-time graphics of test progress. Creates text files for postprocessing using third party software.
- Calibration Menus for Automatic Calibration of test frames thermal expansion, temperature sensors and deflection coefficients.
- Complete Desktop Computer System including monitor, keyboard and mouse.
- Automatic Test Reset
- High Temperature Safety Reset

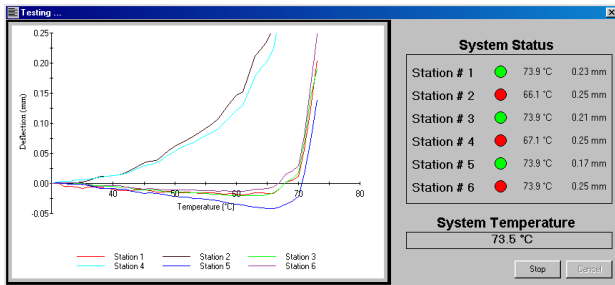
OPTIONAL FEATURES AND ACCESSORIES

- 400°C Maximum Temperature (optional)
 - Allows for testing at temperatures reaching 400°C . this high temperature option package includes the nitrogen blanket safety system and high temperature heaters
- Nitrogen Blanket (optional)
 - This optional safety feature reduces flashover risk at high temperatures and reduces oil oxidation. A built-in safety feature ensures automatic bath cooling reset if nitrogen flow fails, a requirement above approximately 250°C .
- Pure Silicone Fluid, 5 Gal. Pail



Computerized Data Acquisition System

The simple setup page allows the operator to run either industry defined or custom defined test methods. The ASTM D648 and D1525 as well as ISO 75 and 306 test methods are programmed into the software. When using one of more of these tests, the operator only needs to select the test method and all other specifications appear automatically. The software is capable of performing any combination of HDT or VICAT tests provided that temperature rise rates for the bath are identical for the different test. The software also calculates exact specimen loading based on specimen dimensions. Simple and precise, the software provides a fool-proof test setup



Once a test has been setup and initiated, it will process automatically through the start delay, ramping to the test start temperature, initialization of the digital of the digital gauges and display of a bar graph of test progress. In order to identify and eliminate test anomalies the HDT-III system poses powerful graphing capabilities. This feature removes the difficulty of discriminating small differences in material performance that would otherwise get lost in a single numerical end point. The graphing ability provides a quick and precise visual indication of performance to each specimen

Specimen No.	Load (N)	Deflection Temperature (°C)	Width (mm)
1	10	50.1	2.40
2	10	51.1	2.40
3	10	53.1	2.40
Average:	10	51.4	2.40

SPECIFICATIONS

Number of Stations:	3 to 6	
Temperature	±0.2°C @ 300°C	
Temperature Rise	2 ± 0.2°C/min	
Temperature Range:	+20 to +300 °C	
Ramping Rate:	50 K/h, 120 K/h or freely selectable	
Start Temperature:	Freely selectable	
Max Specimen Dimensions	VICAT	10 x 6.5 x 10 mm
	HDT	13 x 15 x 130 mm

Bath	Construction:	Stainless Steel, Double wall insulated
	Bath Type:	Silicone Oil – 20 liters
	Heat Source:	Immersed Heating Element
	Cooling System:	Tap Water Flow Bath Cooling Coil (from 150°C to 23°C in approx. 90 min.)
	Capacity:	20 Liters

Cooling System:	300°C	Tap Water Flow bath cooling coil
	400°C	Cooling system required for high temperature
Warranty:	1 Year Manufacturer's Warranty	
Technical Support:	Lifetime	

WEIGHTS AND DIMENSIONS

Approx. Physical Dimensions:	47 x 19 x 29 in (119 x 48 x 74 cm)
Approx. Physical Weight:	180 lbs (82 kg)
Approx. Ship Weight:	350 lbs (159 kg)
Approx. Ship Dimensions:	58 x 32 x 36 in (147 x 81 x 91 cm)

INSTALLATION REQUIREMENTS

Electrical:	300°C	208/240, 50/60Hz, 1Ph, 15A
	400°C	208/240, 50/60Hz, 1Ph, 20A

APPLICABLE STANDARDS

- ISO 75
- ISO 306
- ASTM D1525
- ASTM D648
- BS 2782
- UNE 53075
- UNE 53118
- DIN 53460
- DIN 53461
- UNI 5641
- UNI 5642
- AFNOR NT T51-005
- AFNOR NT T51-021

Innovative Bath Design

The HDT-III bath design minimizes temperature gradients and provides tight test temperature tolerances (bath temperature gradient of $\pm 0.2^{\circ}\text{C}$ @ 300°C). Optional high temperature system and nitrogen blanket are available for testing up to 400°C . Over temperature reset is also available optionally

Superior Thermal Uniformity

Large 20 liter insulated stainless steel bath with powerful impeller stirrer system offers superior thermal distribution within $\pm 0.2^{\circ}\text{C}$



Exact Temperature Control

Programmable PID temperature control for selected rise rate (50°C per hour or 2°C per minute) ensures accurate rise rates and bath temperatures throughout your test

Present & Future testing flexibility

The HDT-III Systems are designed to be easily expandable from three to six (universal) test stations.

Precise Temperature Measurement

Adjustable thermocouples provide precise individual specimen deflection/penetration temperature

Low Thermal Linear Expansion

Invar test specimen frames guarantees extremely low thermal linear expansion and accurate test data. HDT-III includes PC controlled frame calibration to maintain test integrity

Optional Oil Cooling System

Upon test completion, a high-performance tap water cooled heat exchanger lowers bath temperature from 400°C to 30°C in approximately 15 minutes. Multiple hook-up choices make placement flexible and convenient