



# HDT VICAT 500 ALOXIDE



**CEAST** 

DESIGN AND PRODUCTION OF  
INSTRUMENTS AND APPARATUS  
FOR QUALITY CONTROL  
ON MATERIALS

These instruments are made in  
compliance with CE health and  
safety requirements



**Test Station****“HDT” test means: determination of temperature of deflection under load****Field of application**

The test determines the temperature at which a specified deflection occurs when a standard test specimen is subjected to a bending stress, to produce one of the nominal surface stresses according to international standards. This test is very important for both quality control and research on plastics because it determines the heat resistance characteristics of materials, and is fundamental to define precisely the thermal behaviour of the polymers. Results can be widely used for design purposes.

**Method**

The specimen, in the form of a rectangular bar of dimensions complying with the chosen standard, is tested as a simple beam with a load applied at midspan to produce a maximum, nominal surface stress according to the chosen standard. The test assembly, with the loaded specimen, is then immersed in a heat-transfer medium, equipped with a system capable of increasing the temperature linearly at a uniform rate (generally 2 °C/min). Temperature and deflection data for each station are monitored, and when the specimen reaches a specified deflection the temperature is recorded.

This value is indicated as the Temperature of Deflection Under Load,  $T_f$ , in degrees Celsius of the material under test.

**“VICAT” test means: determination of the VICAT softening temperature****Field of application**

The test determines the temperature at which a standard indenter penetrates 1 mm under the surface of a test specimen under load. It is used to establish the differences between many types of thermoplastic materials and compounds with regard to their softening properties.

**Method**

An indenting tip of 1 mm<sup>2</sup> circular cross sectional area is placed on the specimen and is loaded with a constant force (10 N or 50 N depending on the standard method used).

The test assembly, with the loaded specimen, is immersed in a heat-transfer medium equipped with a system capable of increasing the temperature linearly at a uniform rate (generally, 50° C/hour or 120° C/hour).

The temperature, when the needle has penetrated 1 mm into the specimen, is recorded.

This temperature, expressed in °C, is indicated as the VICAT Softening Temperature of the material under load.

**Standards**

Designed and built to meet the following standards:

**“HDT” TEST**

ASTM D 648 - ISO 75 - DIN 53461 - BSI 2782 - Met 121 C - NT T 51-005 - UNE 53075

**“VICAT” TEST**

ASTM D 1525 - ISO 306 - DIN 53460 - BSI 2782 - Met. 120 C - NT T 51-021 - UNE 53118 and others equivalent.

**HDT VICAT 500 AlOxide Features**

The new generation of technopolymers (such as Polyamide-imide, PEEK family and others) is characterized by its excellent properties at high temperature. The automatic HDT VICAT 500 AlOxide is the latest Ceast instrument design to perform HDT and VICAT tests at high temperatures (up to 500°C) on three independent test stations. Based upon an innovative system for specimen heating (fluidised bed technique), it can be considered as a very revolutionary instrument for its field of application. It is very simple to use and, at the same time, eliminates all of the environmental concerns associated with silicone oil usage, such as oil vapour emissions from the bath and all the oil recycle problems.

**The innovative heating system**

An Aluminum Oxide micrometer-size powder, which is “fluidised” by compressed air, is the heat transfer medium; The new Auto-Air System allows an automatic regulation of the air flow in function of the bath temperature in order to obtain the optimum level of fluidisation and the best temperature uniformity.

**Automation**

All three stations are automatically raised and lowered by a pneumatic system at the beginning and end of test. An independent pneumatic system applies the selected weights on the specimens and then removes them at test end.

It is possible to perform HDT and VICAT test simultaneously at the same temperature ramp conditions.

The instrument can be managed either through the alphanumeric keyboard or a separate PC; it is equipped with both a parallel port for direct test report print-outs and with a serial port for PC connection.

### Versatility

The new HDT VICAT 500 AlOxide has been designed in order to set the test parameters within a wide range:

- Heating rates: selectable according to the standards (120°C/h, 50°C/h) or in accordance with the customer's needs
- Possibility to select the applied stress according to the standards or in accordance with the customer's choice
- Possibility to test any specimens cross section, according to the standards or customer's needs
- Automatic calculation, and its visualization on the LC display, of the load weight needed to apply the required stress on the specimens
- Visualization of the test results (including deflection or penetration curves against time/temperature) on the LC display
- Statistical analysis of the results
- Light weight load rods allow minimum load stress according to the standards

### Auto compensation for thermal expansion

The advanced firmware is able to run an automatic compensation of thermal expansion for each test station in order to avoid the influence of this error on the measurement.

### Safety

- Maximum temperature control: via firmware and via separated dedicated safety thermostat.
- The new safety system doesn't permit to open the new Plexiglas cover till the bath temperature has reached the threshold temperature
- A safety pressure switch is able to switch-off the heating resistances when an insufficient air flow could cause a local temperature peak

Technical Data	
Number of Stations	3
Test Capabilities	HDT, VICAT, HDT and VICAT tests at the same time, CREEP, THERMAL DILATATION, ELASTIC MODULUS with dedicated software (optional)
Temperature Range	+20 ÷ +500°C
Temperature homogeneity of the bath	± 2°C at 500°C
Thermal Stability at constant T	± 1°C at 300°C
Temperature Resolution	0.1°C
Heating Rates selectable via Keyboard	120 ± 10 °C/h (12 ± 1 °C/6 min verified at each station) 50 ± 5 °C/h (5 ± 0.5 °C/6 min verified at each station) Operator may select any other rate between 50 and 120 °C/h
Temperature Measurement	Thermo-resistance Type PT100 (One for each station plus one for the thermal regulation of the bath)
Deflection/Penetration Measurement	LVDT with ± 0.001 mm resolution for each station
Compensation for Thermal Expansion	Automatic for each test station
Test management with PID heating control	By built-in microprocessor
Electronic Control with alphanumeric polyfunctional keyboard	Liquid Crystal Display 128 x 240 points, CPU board and amplifier system included
Graphic Display	Graphs, parameters
Deflection/Penetration transducer zeroing	Automatic
Autocheck during test execution	Yes
Heat transfer medium	Aluminum Oxide Fluidised Bed
Safety Pressure Switch	Yes
Customizable test load	Optional Binary Mass System (one set for each station) consisting of a set of 13 masses to cover any HDT and Vicat test mass from 67 to 5140 g in steps of 1 g
Cooling System at test end	Automatic
Cooling time from 300 to 50 °C	60 min
Separate Water Chiller	Optional

<b>HDT test</b>	
HDT capability to test sample in flatwise or edgewise position with 64 or 100 mm fixed span according to international standards	Yes
Automatic calculation and list of masses to apply to reach defined stress according to standards	Pre-defined for 0.450, 0.455, 1.80, 1.82, 8.00 MPa
HDT testing heads complete with traceable certificates	Optional
HDT positioning tool for HDT head positioning	Optional
<b>VICAT test</b>	
10 N and 50 N masses (one set for each station) for VICAT test only	Optional (alternatively for VICAT and HDT tests see Binary Mass System)
VICAT testing heads complete with traceable certificate	Optional
<b>Data Acquisition</b>	
Parallel port for test print-out	Yes
RS 232 serial port for connection with PC	Yes

### Technical Data

Overall dimensions (LxDxH) [mm]	1000 x 860 x 1260
Weight [kg]	150 approx.
Supply	230 V - 50 Hz - Singlephase (110 V - 60 Hz on request)
Power [W]	4500
Paint	fuchsia RAL 4006 - gray RAL 7035
Compressed Air	Required (5 bar)

### CEAST Software Available for HDT VICAT Auto Configuration of HDT VICAT Auto in CeastVIEW platform

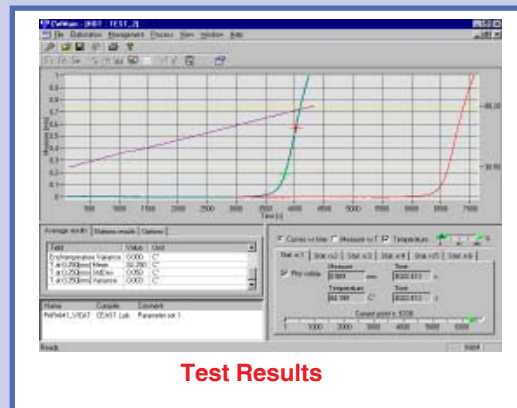
#### "VisualTHERM" software - code 0710.500.

VisualTHERM is the software developed by Ceast for the complete management of both HDT and VICAT test. This software is based upon the CeastVIEW platform. As for all CeastVIEW based software, the extraordinary information organization, which the software is based upon, makes the management of HDT and Vicat Softening Temperature tests very simple and functional. The software accessibility, together with the availability to run the program in demo version, make the whole system perfectly suitable to the most advanced organization of laboratories.

#### Options:

- Operator Module to control and manage via password three operator access levels to the programme
- Transfer Module to transfer data from internal data base to an Excel work sheet or text file
- Multi Module to connect more instruments (up to 8) to one PC.

For further details please revert to the software leaflet.



Test Results

"Due to the continuous development policy of CEAST's Research and Development Department, changes may be introduced without notice"



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