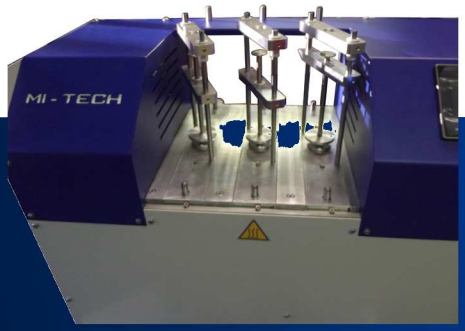
MI-TECH™

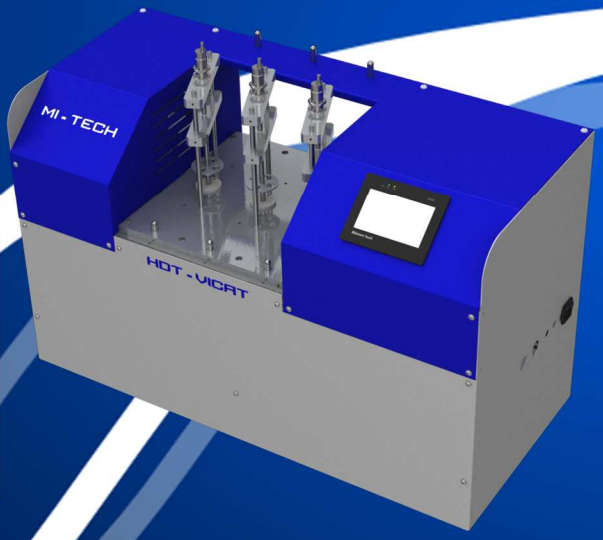
A brand of MATÉRIAU INGÉNIERIE

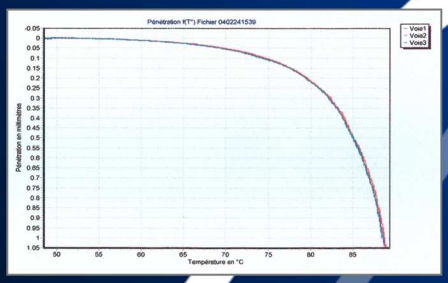
MADE IN FRANCE

HDT - VICAT



Commercial reference(s): M037-00, M038-00, M034-00





Type of tests:
Thermique et thermomécanique

Type of materials:
Thermoplastics
Thermosets
Composites

Standards:
ISO 75
ISO 306

INTRODUCTION

The **HDT-Vicat**, developed and manufactured by Matériau Ingénierie, has been designed as a tool for simple and autonomous control of plastics, according to the reference standards. Its use requires little care and training.

It allows the measurement of changes in the stiffness of a material (polymer, composite...) depending on the temperature and the performance comparison of different materials on the criterion of the mechanical behavior in temperature.

This measurement tool which is primarily a monitoring tool, enables the testing of HDT or Vicat by simply changing some accessories ■

Applications

This essay is adapted to all polymer materials (thermoplastics, thermosets and composites) which is desired to know and control the temperature limit of use ■

Principle

The measurement principle is simple: it is to determine the temperature at which a sample under a given load is softened to allow a decrease in 3-point bending (HDT) or sinking (Vicat) a needle.

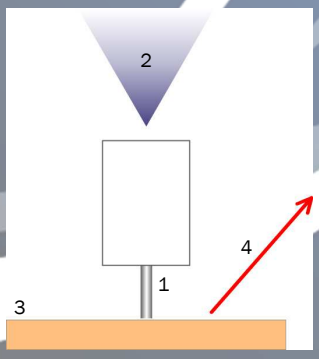
For this, the sample was placed in a fitted manner to impose a thermostated bath temperature ramp. An electronic system continuously measures the lowering of the load placed on the test piece, and stores the temperature corresponding to the criterion used.

Thus, during the measurement, we can meet at regular time intervals (or bending), the values of temperature and bending.

Vicat test

The sample is immersed in an oil bath, is laid flat, and receives a constant load through a rod of 1 mm² of section (1). The bath temperature is ramped 50°C.h^{-1} (4). The Vicat temperature is reached when the rod has penetrated 1 mm into the sample.

The charges applicable (2) on the sample (3) via the tip are: 1.8 MPa or 0.45 MPa.



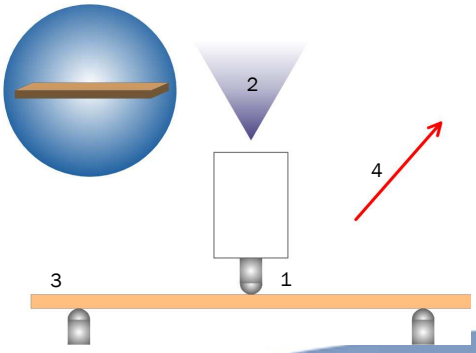
Vicat test

HDT test (Heat Deflection Temperature)

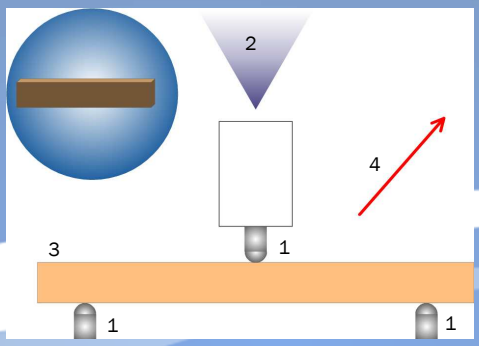
Also called "deflection temperature under load" of placing the sample (3) 3-point bending (1) immersed in an oil bath. This sample receives a constant load (2) while applying a temperature gradient of 120°C.h^{-1} (4). HDT is the temperature achieved when the sample has reached a standard boom.

Applicable charges on the sample via the tip are: 1.8 MPa, 0.45 MPa and 8 MPa.

➲ Test on specimen flat

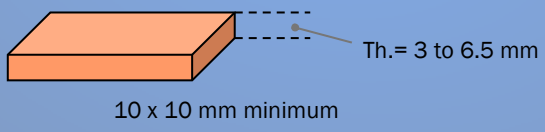


➲ Test on specimen edge



Sample dimension

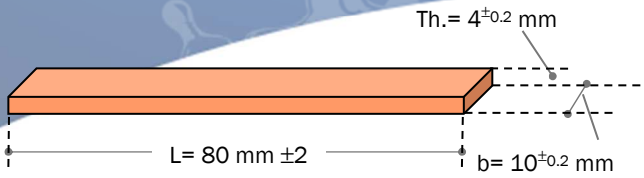
➲ Vicat (ISO 306)



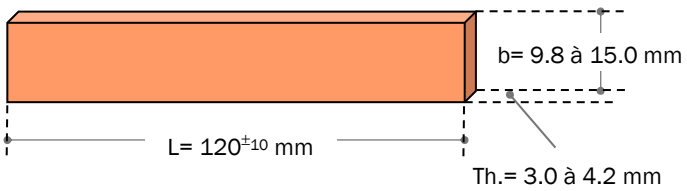
➲ HDT (ISO 75)

Dimensions are recommended by the ISO 75 standard for testing:

<u>On flat</u>



<u>On edge</u> (annex A)



Description

Matériau Ingénierie provides a modular **HDT-Vicat**, easy to use and reliable.

Technical description

➲ It all starts with the bath

An **HDT-Vicat** is primarily a bath intended to impose a temperature ramp to or samples. The tank of our instrument is stainless for the inner wall and coated with the powder paint to outer wall. Between the two walls, insulation limit the maximum heat loss and protects the user from burns.

2 heaters provide the heating of the bath.

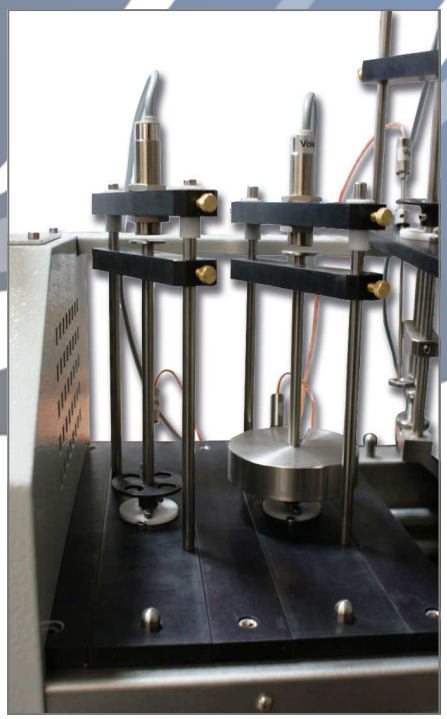
Cooling is provided by a coil located within the bath with circulating water after the test. Standard, its action is initiated manually, an option to **automatically** start cooling after the test.

A valve allows easy emptying of the bath (oil change).

➲ La régulation thermique

Having a bath is nothing without an effective system of temperature regulation. We equip our **HDT-Vicat** a PID regulation coupled to a temperature sensor Pt 100. The assembly is associated with a stirrer to homogenize the temperature of the bath.

➲ Measuring stations



Version 3 postes

A good thermostated bath is ensuring the proper control of heat stress. Measuring stations as suggested by their name, allow displacement measurements (accuracy of 10 µm) and temperature (accurate to 0.1°C).

Each post consists of two guide rods for greater rigidity between which slides freely on a shaft which is attached to the bottom of the latter is the punch (Vicat) or the pane (HDT). At the top of this rod-sensitive element coupled to a transducer enables contactless measurement of the depression of the stem.

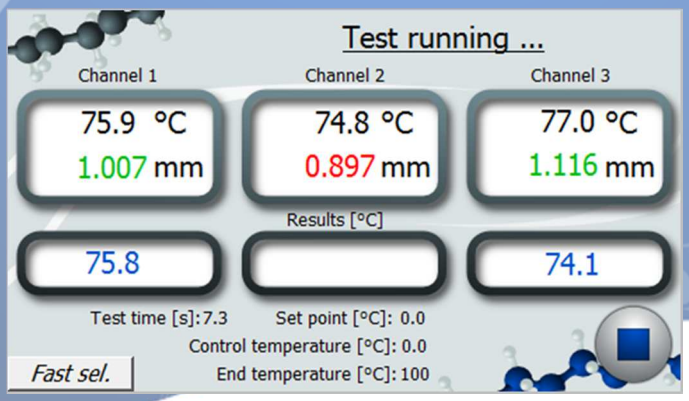
The assembly is placed on a removable base which, established on the bath provides a sufficient closure for limiting heat loss from the bath and protects the user from possible splashes.

All parts to be subjected to variations in temperature are Invar (an alloy of iron and nickel, whose main property a very low coefficient of thermal expansion).

The height adjustment of the measuring system with respect to the specimen is adjustable manually and easily.

Finally, each measuring station is equipped with a temperature sensor Pt 100 high accuracy (0.1 ° C) while being very robust (stainless steel sheath of protection).

➲ Control panel



All commands and actions are grouped together on one screen, touch type.

User is accompanied on the configuration of the test. ISO methods are already implemented, to perform a test without difficulty.

Changing values and results are easily visible.

The displacement setpoint for each channel is freely adjustable: 0.01 mm to 30 mm ■

➲ Weights

Slotted masses are supplied with each measuring station. The first is that the masses of the central shaft which will be exerted by the pressure.

Additional weights are provided for each measuring station.

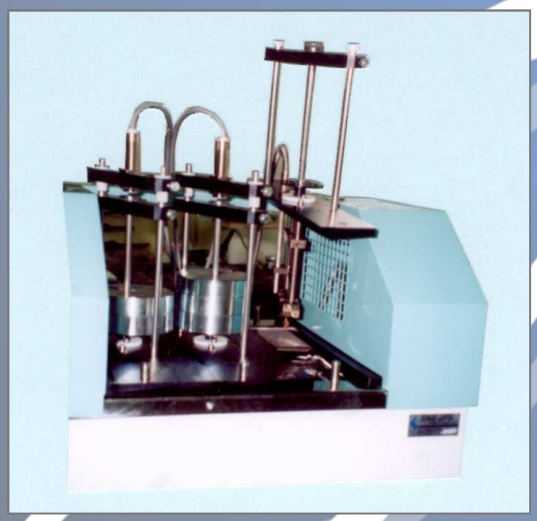
HDT masses: 1x1 g, 1x2 g, 1x3 g, 1x4 g, 1x10 g, 1x20 g, 1x30 g, 1x40 g, 1x100 g, 1x200 g, 1x300 g, 1x400 g, 1x1000 g.

Vicat masses: 1x900 g, 4x1000 g.

These masses are either stainless steel for larger (from 100 g.) Or anodized aluminum. They can be added together to obtain the desired total mass.

Masses on specifications can be provided.

Available versions



Version 3 posts

3 versions:

- ➲ 1 measuring station
- ➲ 2 measuring stations
- ➲ 3 measuring stations

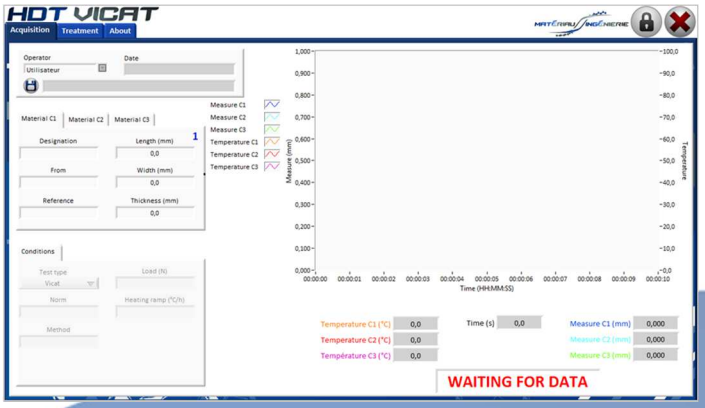
Each version comes equipped with HDT and Vicat posts.

Options

It is possible to combine HDTvpost and Vicat post on the same bath (very interesting for teaching).

We can supply only HDT or Vicat.

➲ Computerization: the control panel is supplemented by a system of visualization and acquisition data via a PC computer. The standard version gives results in temperature, whereas with this option, it is a complete evolution that is displayed



This can simply be added thereafter

Ref.: M034-03

Main characteristics

Common characteristics

Temperature measurement:

Range	20 to 300°C
Accuracy	±0.1°C

Temperature control:

Range	AT+10 to 300°C

Displacement range:

Range	4 mm
Accuracy	10 µm

Power supply:	*Single phase 230 V., 50 hz*
Water supply:	*Urban water*

Version 1 post

Volume:	*13 to 15 l.*
Dimensions(wxdxh):	*45 x 48 x 55 cm*
Weight:	*~ 29 kg*

Version 2 posts

Volume:	*15 to 20 l.*
Dimensions(wxdxh):	*45 x 48 x 70 cm*
Weight:	*~ 37 kg*

Version 3 posts

Volume:	*20 to 25 l.*
Dimensions(wxdxh):	*45 x 48 x 82 cm*
Weight:	*~ 45 kg*

** Features purely illustrative, we reserve the right to change freely in order to improve the performance of our instrument.*

Delivered accessories

- HDT and/or Vicat option, according to the order
- IEC power cable
- Calibration certificate
- User manual
- CE certificate ■

Consumables

- Vicat tip: delivered with control certificate
  Ref.: M034-09
- HDT pane: delivered with control certificate
  Ref.: M034-10
- Silicon oil: coolant - Silicon oil 100 mPa.s - 25 l.
  Ref. : M034-08
- Weights: contact us

Résumé

Performance

Pt 100 temperature probes

A temperature sensor PT100 by post

Thermal PID

Mechanical parts subjected to temperature in Invar

Safety

Double insulated wall

Drain valve

Non-contact displacement sensor

stainless steel tank

The bath is fully covered during the test

Modularity

Controlling the thermal ramp is freely configurable

The tank is the only part fixed

How to choose

Step 1

Select the number of positions depending on the pace of tests scheduled

Step 2

Define the extensions of measures:

- HDT and / or
- Vicat

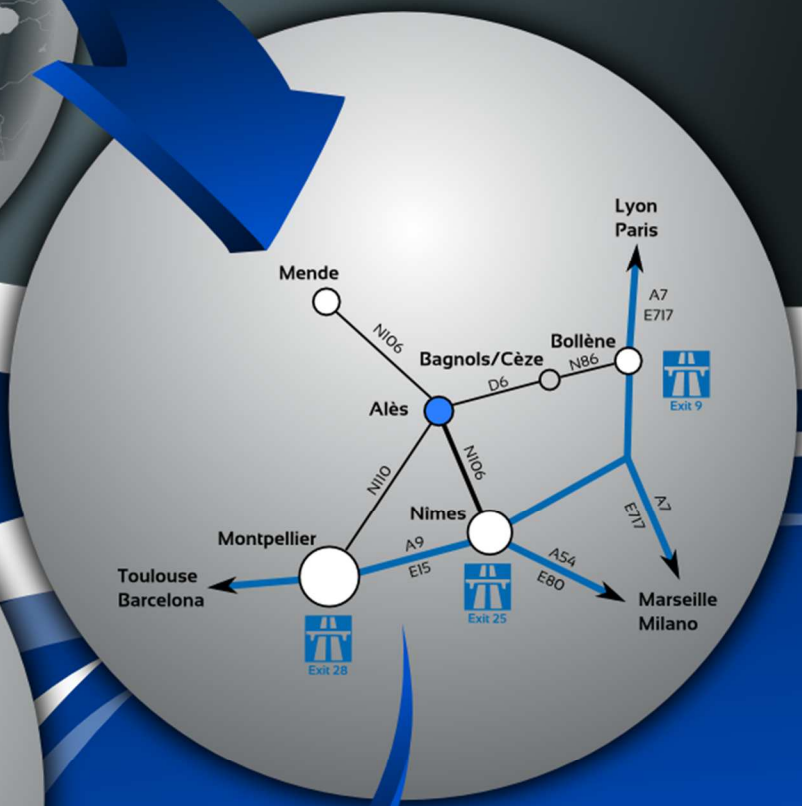
Step 3

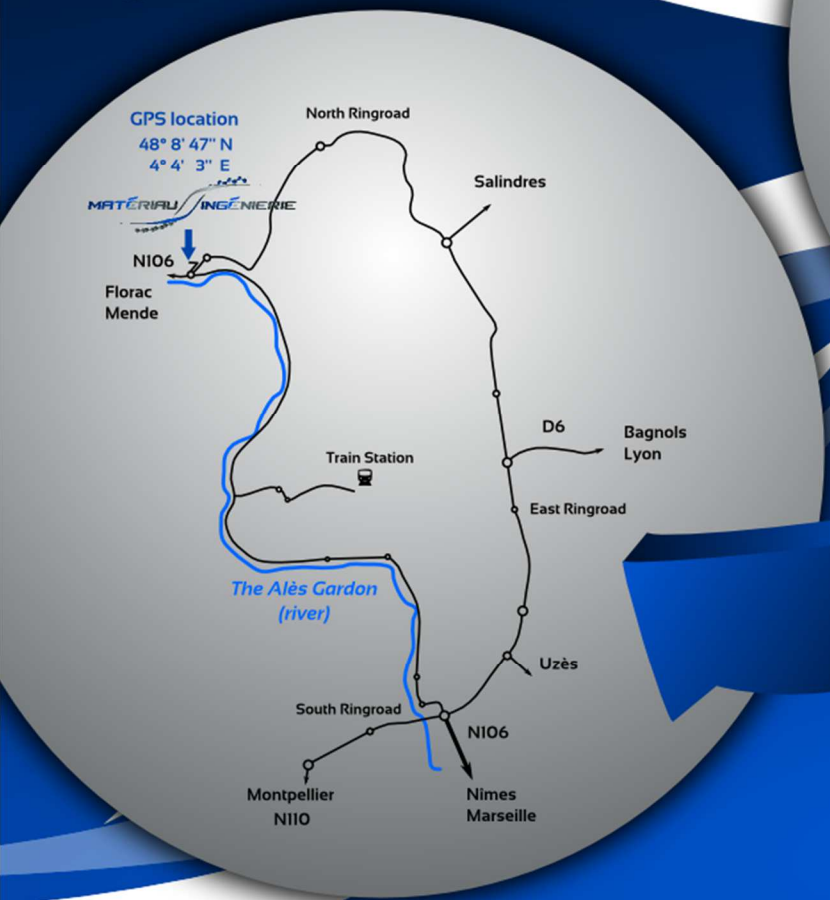
Set options:

- computerization

And if you want more information, contact us!

Our contact





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