

LOW TEMPERATURE CHECK

AUTOMATIC INSTRUMENT FOR THE DETERMINATION FOR BOTH TR TEST AND
BRITTLENESS POINT



Standards the instrument complies with:

ASTM D746; ASTM D1329; ASTM D1414; ASTM D2137; FIAT 50416; FIAT 50419; ISO 812; ISO 974; ISO 2921;

Overview

Tests at low temperatures permit to evaluate the crystallization effects and to compare viscoelastic properties of rubber and rubber-like materials at low temperatures. Temperature Retraction and Brittleness Point tests are useful for the selection of materials suitable for low-temperature service.

The structure of the Low Temperature Check permits the installation of arrangements for TR and Brittleness point tests.

The structure includes the common parts required for low temperature testing:

- 5 litres stainless steel bath for cooling liquid
- Heat exchangers for bath cooling & thermal resistance for bath heating
- Temperature controller with 0.1 °C resolution
- Stirrer for bath homogenization
- Electronic card for the complete control and usb port for PC connection
- Safety devices: independent bath overheating controller, thermal switch, safety pushbutton.



Key Features

The instrument has been specially developed to automate test execution, minimize operator influence on results and ensure full compliance with safety requirements.

The most important features are:

- **Automatic temperature adjustment based on the selected test procedure**
- **Possibility to configure the instrument for the execution of TEMPERATURE RETRACTION (TR) and / or BRITTLENESS POINT tests**
- **Automatic execution of the entire test cycle in compliance with international standards**
- **Automatic recording of retraction curves**
- **Saving of curves and numerical results in the standard Gibitre SQL database**
- Possibility of configuring the instrument for cooling via liquid nitrogen tank and refrigeration unit
- CE labelling

Cooling system

The bath cooling devices provided by Gibitre can be either:

- **Nitrogen tank**
- **Refrigeration unit.**

The regulation of the cooling is automatically controlled by the instrument according to the temperature set of the test procedure in use.



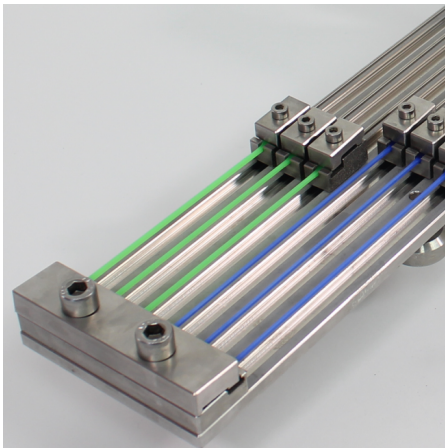
Temperature Retraction (TR) Test: Instrument Setup

The arrangement for TR test includes:

- Sample holder for the simultaneous test of 6 samples
- Pneumatic lifting system for the easy handling of the sample holder
- Windows bases software for TR test performance

The Sample Holder makes it possible to:

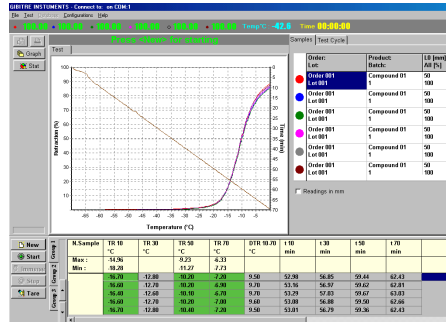
- Carry out simultaneous testing on 6 samples.
- Read automatically the retraction of each sample with 0.02 mm resolution
- Lock sample position in extended position during test preparation
- Automatically release of test samples at the end of the conditioning time.



TR Test Software

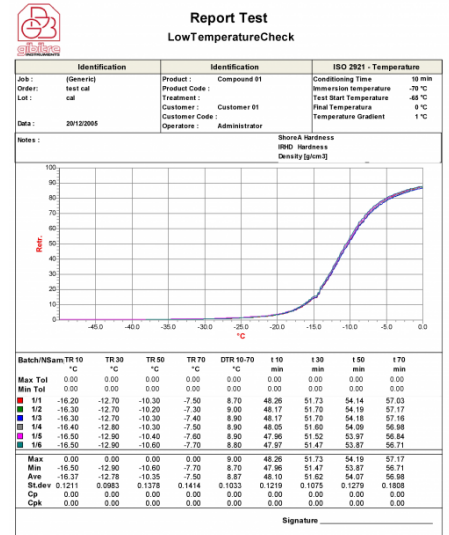
The software permits to:

- Select the Test Procedure, which automatically sets the instruments
- Enter samples identification (up to 3 products)
- Cool and condition the samples
- Start the test
- Plot Retraction Curves for each sample
- Calculate test results and statistics
- Check tolerance limits for each product
- Save results and curves in the standard Gibitre SQL Database



Test report

Can be printed or saved to pdf in one of the available languages. The format of the Test Report can be customized by the user.



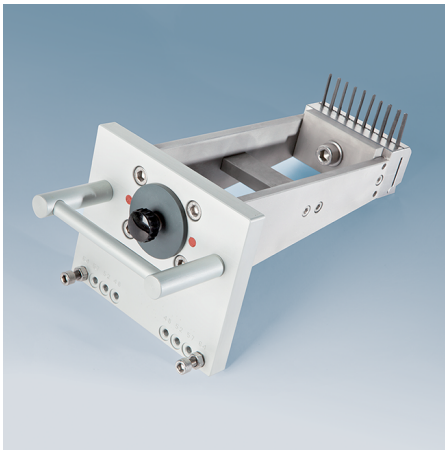
Brittleness point test: Instrument setup

The arrangement for Brittleness Point test includes:

- Pneumatically actuated striker
- Sample holder for the simultaneous test of 10 samples
- Windows bases software for Brittleness Point test performance
- Datagest software for database management.

The striker is in compliance with international standards and the clearance can be set according to the kind of test (4.8, 5.2, 5.7, 6.4 mm).

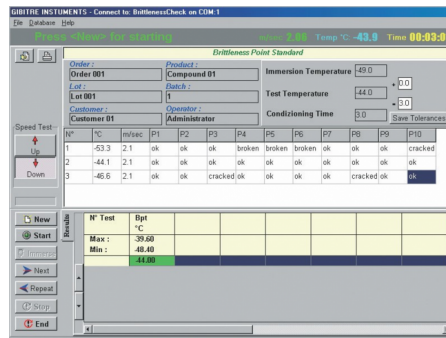
A pneumatic piston drives the striker and permits to perform the tests while the samples are immersed in the cooling liquid. A pressure regulator enables the speed of the striker to be adjusted in compliance with standards depending from the number of samples and the density of the cooling liquid in use. The software permits to prepare and store test procedures with custom test conditions.



Software for Brittleness Point

The Brittleness Point Software permits to:

- Select the Test Procedure, which automatically sets the instrument
- Cool and condition the samples
- Activate the striker at the end of the conditioning time for the samples
- Record the temperature and the speed of the striker
- Allow the user to enter test results after visual inspection
- Prepare the instrument for the next test
- Calculate and save Brittleness Point Temperature



Test report for Brittleness Point Test

Can be printed or saved to pdf in one of the available languages. The format of the Test Report can be customized by the user.

Report Test
Brittleness Point Test

Identification	Identification	Brittleness Point Standard									
Job: (Serial)	Product: Compound 01	Conditioning Time 3 min									
Order: Order 001	Product Code: 001	Type of Sample (1+A, 2+B) 1									
Lot: Lot 001	Treatment: Original State										
Batch: 1	Customer: Customer 01										
Date: 22/09/2005	Customer Code: Cua001										
	Operator: Administrator										
Notes:											
N° Test	Bpt °C										
Max Tol.	0.00										
Min Tol.	0.00										
	44.00										
Test Details											
N°	Degr. m/sec	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
1	-53.3	ok	ok	ok	broken	broken	broken	ok	ok	ok	cracked
2	-44.1	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok
3	-46.6	ok	ok	cracked	ok	ok	ok	ok	cracked	ok	ok

Signature _____

Datagest program: total Traceability

The Datagest program is the **Database Management Tool** always installed in combination with all Gibitre instrument-control programs.

The program permits to:

- **Select, filter, print, export and analyse the test results stored** with all the instruments connected.
- **Prepare test procedures** by defining the test conditions and the results to be produced
- **Set tolerance limits** for each product by manual insertion or using the statistical analysis (mean and standard deviation) of saved results
- **Prepare multi-instrument test reports**

The screenshot shows the Datagest software interface. The main window displays a table with columns for 'Date', 'Time', 'Operator', 'Instrument', 'Product', 'Lot', 'Status', 'Value', and 'Tolerance'. Below the table, there is a 'Filter' section and a 'Graph' section showing a line plot of test results over time.

Gibitre Standard SQL Database

All the Gibitre programs use a database with SQL structure for saving the results.

The database can be installed inside an SQL instance present on the company server or it can be installed on a PC connected to a measuring instrument. The installation of the Microsoft SQL service (Express version) is included in the delivery.



Industry 4.0 integration

The instrument and the software have been specifically developed to optimize integration with other environments. The database in SQL format and the Gibitre_Company_Connect program allows you **synchronize your company management software** with Gibitre database and to speed up the identification of the tests and **to use bar-code readers** or similar devices.

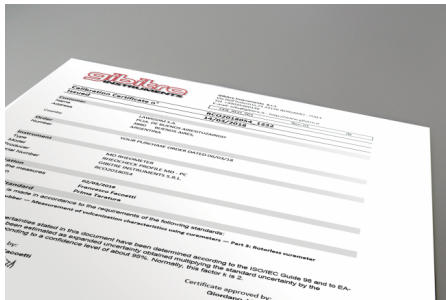


Standard Calibration service for Low Temperature Check

The calibration is performed with reference to the requirements of ISO 2921 and ISO 812 standards.

The service includes:

- Ordinary maintenance of the instrument
- Calibration of the temperature of the cooling bath at 4 temperatures (0, -5, -35, -70°C).
- Calibration of the heating speed (gradient) of the cooling bath
- Calibration of the time reading device
- Calibration of the displacement of the 6 extensometers for TR Test (at 50, 70, 100 mm run).
- Verification of the pre-load force on the extensometers
- Calibration of the speed of the striker.
- Calibration of the distance between the nose of the striker for Brittleness point test and the sample holder.
- Issue and e-mail shipment of the Calibration Certificate with traceability to primary standards.



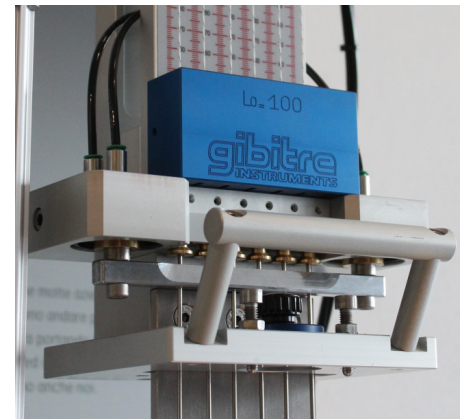
Cutters for sample Preparation

Die cutters conforming to international standards for preparing samples for TR-Test and Brittleness Point Test. The cutters are provided with dimension calibration report



Templates for Different TR Samples

The templates allow you to change the reference distance of the specimen holder support in order to use the different types of specimens required by the ISO 2921 and ASTM D1329 standards.



Hardware requirements

- Programs can be installed on standard PCs with WINDOWS 10 OPERATING SYSTEM.
- The CONNECTION between the instruments and the PC is made using the USB CABLE supplied with the instrument.
- The programs are COMPATIBLE WITH ANTIVIRUS, and other programs installed on the PC.



Safety devices

The instrument is equipped with:

- Safety sensor for automatic blocking of heating at room temperature
- Safety Push-button
- CE Labelling



Development and production

The instrument is totally developed and produced in the plant of Gibitre Instruments in Italy.

All the mechanical parts are produced in the company workshop using modern CNC machines.

Components and sensors from well-known brands are selected in order to ensure the maximum reliability in the measures

Internal trained personnel takes care of all the production stages: **assembly, start-up, calibration, packing, shipment and installation.**



Test Temperature

Cooling systems With Refrigeration unit or
With Liquid nitrogen tank

Test Temperature -120 ÷ +20 °C (with liquid nitrogen tank)
-73 ÷ +20 °C (with refrigeration unit)

Temperature Control The regulation of the temperature is performed automatically by the instrument according to the temperature set in the selected test Procedure.
The regulation is made by means of thermo-regulator with PID microprocessor with 0.1 °C accuracy

Connection to Liquid Nitrogen tank The instrument can be connected to a standard nitrogen tank via the connection tube supplied. The connection connector is DIN 2353 type, 8L ¼ inch.

Refrigeration unit Technical characteristics:
- Cooling bath capacity: 9 l
- Liquid to be used: ethanol
- Overall dimensions (WxDXH): 55x60x92 cm
- Power supply: 220 VAC, 50/60 Hz, single phase

Temperature Retraction (TR) Test

Sample holders for TR Test Permits to test 6 samples at the same time
Resolution for retraction reading: 0.02 mm

Software for TR Test The program Gibitre-TR-test, compatible with Windows 7, 8 and 10, controls the complete test sequence and permits to save test results and retraction curves in the standard SQL gibitre database

Numerical Test Data - TR test TR-Test: TR10, TR30, TR50, TR70, TRx (x customer defined) Time at set TR.

Graphic representation and printout Curves of % Retraction vs. Temperature for each sample. Temperature vs Time

Lifting System Pneumatic system for lifting sample holder for TR-Test.

Brittleness Point Test

Sample holders for Brittleness Point Sample holder for 10 samples.

Software for Brittleness Point Test	The program Gibitre-Brittleness-test, compatible with Windows 10, controls the complete test sequence and permits to save temperature retraction temperature in the standard SQL gibitre database
Test Results Stored - Brittleness Point	Test temperature, Striker Speed, Result of visual inspection (passed - failed)
Speed of striker for Brittleness Point test	Pressure regulator for pneumatic piston Striker with automatic or manual start-up
Gap between striker and sample holder	Can be set to: 4,8 5,2 5,7 6,4 mm
Construction Characteristics	
Test chamber	Test chamber capacity of 5 litres; Stainless steel chamber equipped with mixer to ensure the temperature of the test bath is uniform (ethyl alcohol - silicon oil).
Weight	120 Kg
Power Supply	220 VAC,50/60 Hz, single phase (110 VAC, 60 Hz on request)
Electrical Power	750 Watt
Compressed air	Min 6 bar. Air treatment unit (cleaning and lubrication) is included.
Instrument dimensions	(Width x Depth x Height) 700 x 710 x 1500 mm
Safety Devices	
Safety Devices	Safety Pushbutton Safety temperature limit switch CE labelling
Labelling	CE Labelling
Calibration	
Calibration Report	Calibration report with traceability to primary standards in conformity with the Calibration requirements specified in ISO 2921 and ISO 812 standards.
Calibrated parameters	<ul style="list-style-type: none"> • Temperature of the bath (0, -5, -35, -70°C) • Heating speed of the cooling bath • Test Time • Displacement and pre-load of the 6 extensometers for TR Test • Speed of the striker for Brittleness Point • Distance between striker and sample holder
Personal Computer (optional)	
Minimum configuration	Intel Core i3 2 GB RAM
Compatible Operating Systems	Windows 10
Connection to the instrument	USB port
Software usage Languages	Italian, English, French, Spanish, German, Portuguese, Russian, Chinese, Japanese, Turkish, Polish, Czech



GIBITRE INSTRUMENTS

VIA DELL'INDUSTRIA, 18

BERGAMO (ITALY)

TE. +39 035 461146

WWW.GIBITRE.IT

INFO@GIBITRE.IT

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