

DENSITY CHECK - PC

PC-CONTROLLED-ELECTRONIC DENSIMETER FOR AUTOMATIC EVALUATION OF THE DENSITY, % MASS VARIATION (ΔM) AND % VOLUME VARIATION (ΔV) OF COMPACT AND CELLULAR (NON ABSORBENT) MATERIALS.

gibitre
INSTRUMENTS



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Standards the instrument complies with:

CELLULAR PRODUCTS

ASTM D1056 ASTM D3574 ISO 6916-1 ISO 6916-2

PLASTICS

ASTM D792 ISO 1183-1

RUBBER & ELASTOMERS

ISO 1817 ISO 2781 ISO 4649 ASTM D297 ASTM D47 IEN 681-1 ASTM D5963

RUBBER HOSES

ISO 7840



DENSITY CHECK - PC



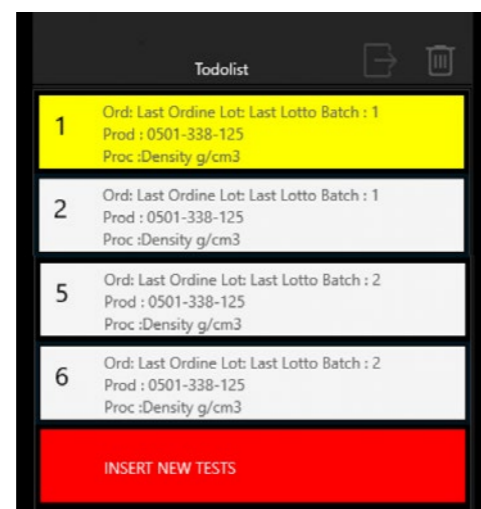
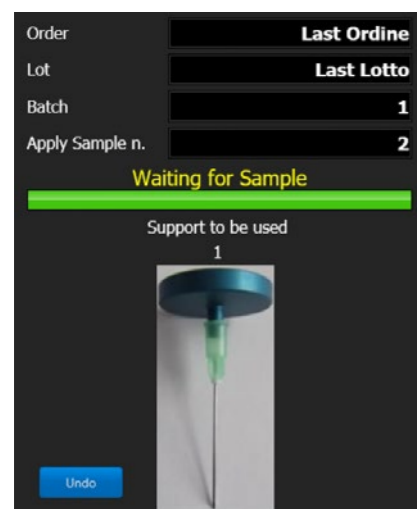
Tests on different products performed automatically

The instrument allows to measure the density of compact products, expanded (non-absorbent) products, pellets and liquids through the hydrostatic method.

Running a test is quick and easy:

- Enter the list of tests to be carried out (possibly with barcode reader)
- Apply the specimen to the sample holder
- Attach the sample holder to the magnetic clamp

Done !

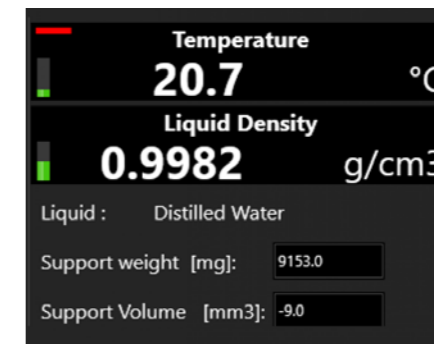


Everything is graphically highlighted for an immediate understanding of the test configuration, status and data results

Reading of the temperature of test liquid

The calibrated temperature probe inside the beaker measures the temperature of the reference liquids.

The software corrects the density of the test liquids based on the temperature and uses the correct value for the measurements. Each result is saved together with the temperature measurement and the real density of the comparison liquid. Seasonal variations in density measurement with changing laboratory temperature are just a memory!



Commands

- Start Tests
- Test After Aging Treatment
- Abrazion Test
- Stop Test
- Start
- Tare
- Stop
- Calibration
- Print
- Instrument Setup

To do list

- 4 Order: Order 23, 123456 Lot: Lot 234567 Batch: 1 Product: Product 1 Treatment: ASIM Fuel C Procedure: ISO 1817 - Density - Effect of Liquids
- 5 Order: Order 23, 123456 Lot: Lot 234567 Batch: 1 Product: Product 1 Treatment: ASIM Fuel C Procedure: ISO 1817 - Density - Effect of Liquids

INSERT NEW TESTS

Test running

Start waiting
Glass Up
Tare
Waiting for weight stability
Tare
Volume measure
Waiting for weight stability
Glass Down

Results

N.Batch	N.Prov	Test_Temp °C	Test_Liq_Dens g/cm3	Mass g	Vol cm3	Dens g/cm3	Mass_Trt g	Vol_Trt cm3	Dens_Trt g/cm3	Delta M% %	Delta V% %	Delta D% %
1	1	21.2	0.9980	2.943	2.305	1.277	2.958	2.318	1.273	0.51	0.20	-0.06
1	2	21.2	0.9980	3.068	2.401	1.278	3.088	2.421	1.272	0.85	0.83	-0.19
1	3	21.2	0.9980	2.776	2.173	1.277	2.760	2.175	1.274	0.14	0.11	0.07
1	4	21.2	0.9980	2.901	2.270	1.278						
1	5	21.2	0.9980	2.601	2.035	1.278						

Maximum 21.2 0.9980 3.068 2.401 1.278 3.088 2.421 1.274 0.85 0.83 0.07
 Minimum 21.2 0.9980 2.601 2.035 1.277 2.760 2.175 1.272 0.14 0.11 -0.19
 Average 21.2 0.9980 2.858 2.237 1.278 2.942 2.305 1.273 0.43 0.50 -0.06
 Median 21.2 0.9980 2.901 2.270 1.278 2.958 2.318 1.273 0.51 0.55 -0.19
 Std. Dev. 0.177 0.139 0.001 0.155 0.124 0.001 0.264 0.363 0.130
 Cp 12.171 3.80 1.84
 Cpk 7.546 0.72 -1.37

Drive

Active Procedure
ISO 1817 - Density - Effect of Liquids

Weight
-2.1170 g

Temperature
21.2 °C

Density of Test Liquid [g/cm3]
0.9980 g/cm3

Liquid : Distilled Water

Support weight tare [mg]: 9526.0

Support volume tare [mg]: -6.0

Connection

Sample presence

ShoreA Hardness 0.00

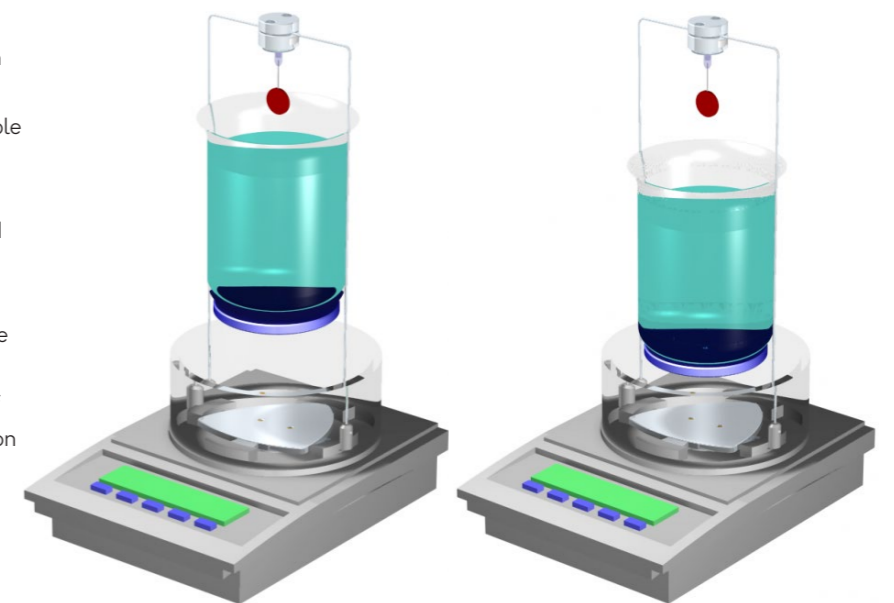
IRHD Hardness 0.00

Compression Set 0.00

Notes : Save for next test

Key Features

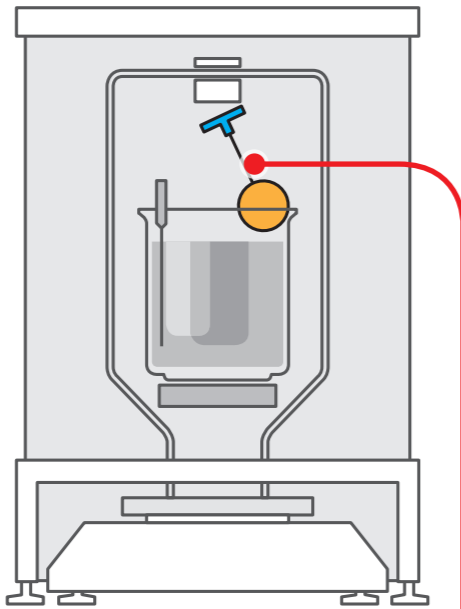
- Top quality scale with 0.001g resolution (optionally 0.0001g)
- Magnetic sample holder for quick sample replacement
- Thermal sensor for the reading of the temperature of the reference liquid and automatic density adjustment
- Motor controlled lifting system, which moves up and down a beaker during the automatic execution of the test
- Automatic calculation of Density and of % Mass Variation and % Volume Variation after aging treatment of samples
- Comparison of results with tolerance limits and statistic analysis
- Storage of data and curves in standard Gibitre SQL database
- Full license of Datagest_10 software for complete management of Gibitre SQL Database



DENSITY CHECK - PC

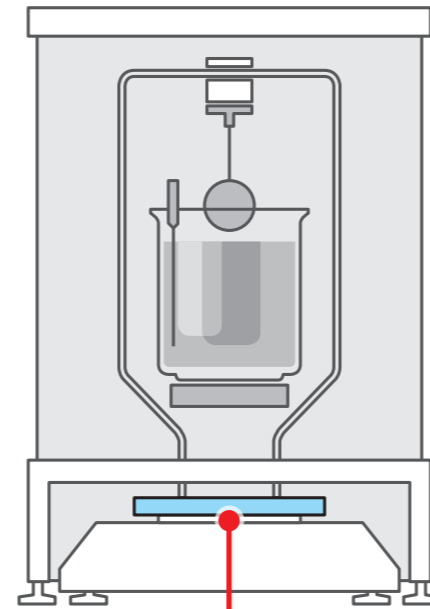
TEST SEQUENCE

1
Put in the magnetic sample holder and press start



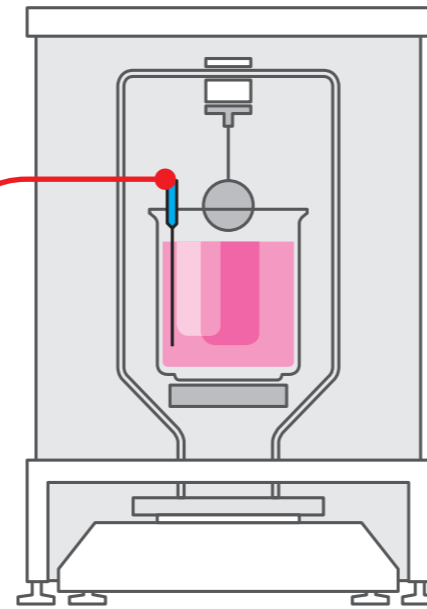
With the magnetic sample holder you can conveniently fix the samples in a safe place without the risk of urting the beaker

2
The instrument weighs the sample



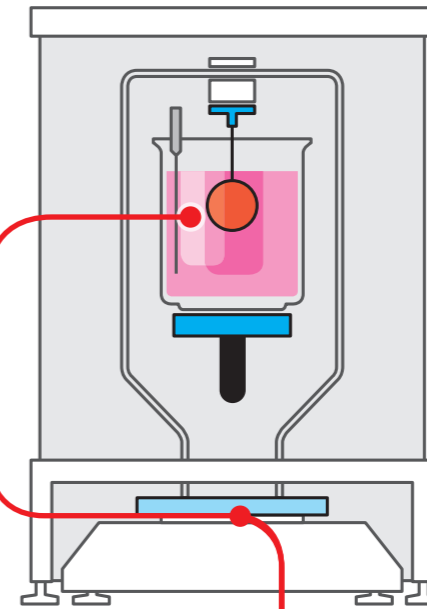
Once the test is started every step of the sequence is performed automatically starting from the weight of the sample

3
The instrument detects the liquid temperature



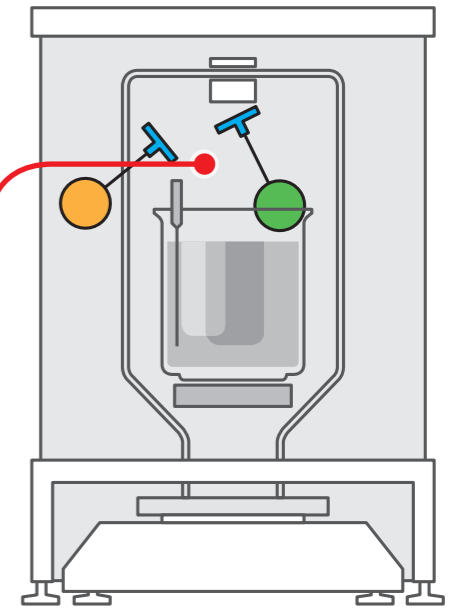
The exact liquid temperature must be known since enviromental temperature changes must be compensated by the software

4
The instrument plunges the sample, density is determined



Density is the result of the ratio between the weights of the sample in open air vesus the sample submerged (thank you Archimedes)

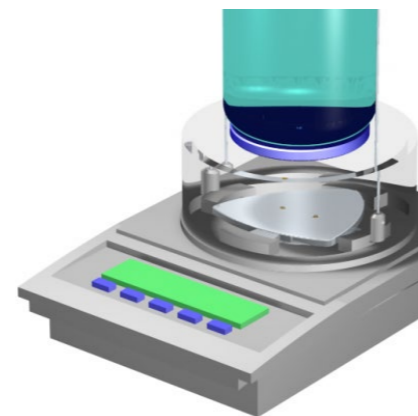
5
Test results are saved, then change the sample ad start again



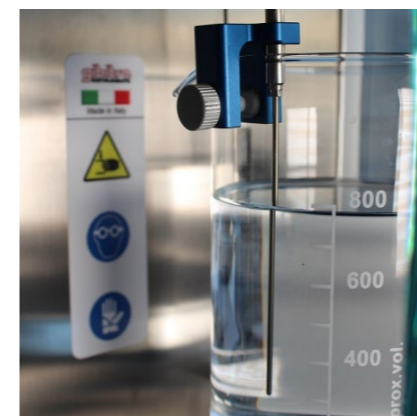
Results are recorded live and stored by the instrument software, a rapid change of the magnetic sample holder and a new test can begin



Detail of the magnetic sample holder



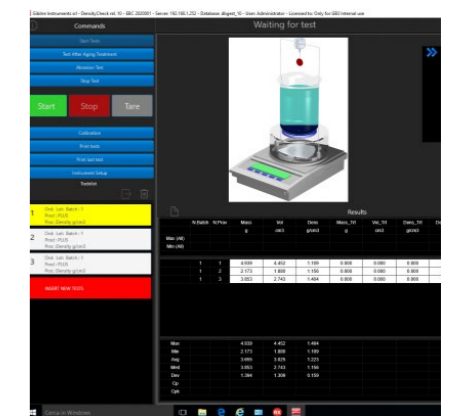
Detail of the digital balance



Detail of the temperature probe



Detail of the sample submerged



Detail of the test results

SEE THE SEQUENCE IN THE VIDEO PRESENTATION



DENSITY CHECK - PC

DIFFERENT MATERIALS, DIFFERENT SAMPLE HOLDERS

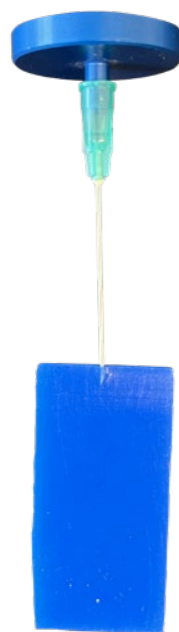


Density tests on Rubber and soft products

The test is carried out using a needle applied to a magnetic support.

- The needle is inserted into the specimen
- The magnetic support allows you to fix it to the scale.

Normally the reference liquids used are distilled water.



Density Tests of Plastic and Rigid products

The test is carried out using a clamp support designed to minimize the formation of bubbles during immersion in the liquid.

- The piece to be measured is applied to the support
- The holder is mounted on the scale.

The reference liquids used can be distilled water or ethyl alcohol.



Density Tests of Expanded Products

The test is carried out using a steel needle which avoids the upward displacement of the specimen during the immersion in the liquid with comparison.

- The steel needle is inserted into the specimen
- The magnetic holder is mounted on the scale.

The reference liquids used can be distilled water or ethyl alcohol. The test can be performed if the product is not absorbent (closed cell expanded products)



Density Tests of Plastic Pellets

The test is carried out using a standard filter that allows you to easily insert the product and minimize the formation of bubbles during immersion in the liquid.

- The pellets to be measured are inserted into the support
- The holder is mounted on the scale.

The reference liquids to be used is ethyl alcohol



Density Tests of Liquids

The test is performed using a standard volume medium.

- The liquid to be measured is poured into a glass
- The volume of the support is memorized on first use through the automatic tare procedure.
- The holder is attached to the scale via the magnetic holder.
- Pressing start the measurement cycle is carried out automatically.



DENSITY CHECK - PC

DensityCheck_10 software

The software enables the complete automatic performance of the test, the comparison of the results with the tolerance limits set for the product and the storage of the results in standard Gibitre database with SQL format. The software permits to store Mass and Volume results and to compare the results with the ones obtained using the same samples after aging test in order to calculate Mass and Volume

Percentage variation ($\Delta M\%$, $\Delta V\%$) according to ISO 1817 or ASTM D 471 standards. The reference liquid for volume calculation can be selected (default liquids are distilled water or ethyl alcohol). The density of the reference liquid is corrected according to the temperature of the lab entered in the program to ensure accurate volume calculation. Statistics: X-chart, Gaussian Curve, Max, Min, Mean, Std. Dev, Cp and Cpk for the

ongoing test or for a selection of stored results are automatically calculated. The test report for the test performed or for a selection of stored results includes test identification, tolerance limits, statistic, company logo, digital signature of the user and a legend with the description of the results calculated. The software is connected to the Gibitre Standard SQL database.

The To Do List: enter sample identification manually or using a Bar Code reader: eliminate identification mistakes

The actual temperature of the test liquid and the corresponding actual density: minimize the error

Temperature: 21.2 °C
Density of Test Liquid [g/cm³]: 0.9980 g/cm³
Liquid: Distilled Water

N. Batch	N. Prov	Test Temp °C	Test Liq. Dens. g/cm ³	Mass g	Vol. cm ³	Dens. g/cm ³	Mass, Trt g	Vol. Trt cm ³	Dens. Trt g/cm ³	Delta-M% %	Delta-V% %	Delta-D% %
1	1	21.2	0.9980	2.943	2.305	1.277	2.858	2.319	1.273	0.51	-0.05	-0.06
1	2	21.2	0.9980	3.058	2.401	1.278	3.083	2.421	1.272	0.65	-0.03	-0.19
1	3	21.2	0.9980	2.776	2.173	1.277	2.789	2.175	1.274	0.14	-0.01	0.07
1	4	21.2	0.9980	2.801	2.270	1.278						
1	5	21.2	0.9980	2.801	2.305	1.278						

Statistics:
Maximum: 21.2, 0.9980, 3.058, 2.401, 1.19, 3.083, 2.421, 1.274, 0.65, 0.63, 0.07
Minimum: 21.2, 0.9980, 2.601, 2.095, 1.17, 2.789, 2.175, 1.272, 0.14, 0.11, -0.19
Average: 21.2, 0.9980, 2.858, 2.227, 1.19, 2.942, 2.305, 1.272, 0.40, 0.50, -0.08
Median: 21.2, 0.9980, 2.801, 2.270, 1.18, 2.858, 2.318, 1.273, 0.81, 0.65, -0.19
Std. Dev: 0.177, 0.138, 0.11, 0.155, 0.124, 0.001, 0.264, 0.363, 0.130
Cp: 1.271
Cpk: 0.72, -1.37

Statistic of the results: the complete test at a glance

Maximum
Minimum
Average
Median
Std. Dev.
Cp
Cpk

Conformity with tolerance limits: check immediately the conformity of results for each product

g/cm ³
1.290
1.250
2.305
1.277
2.958
1.401
1.278
3.083
0.73
1.277
2.7
1.278

Automatic comparison of results before and after Aging: Repeat the test after aging and check Delta-Mass and Delta-Volume automatically.

Delta-M%
Delta-V%
%
1.00
-1.00
-5.00
-5.00
0.51
0.55
0.65
0.83
0.14
0.19

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.

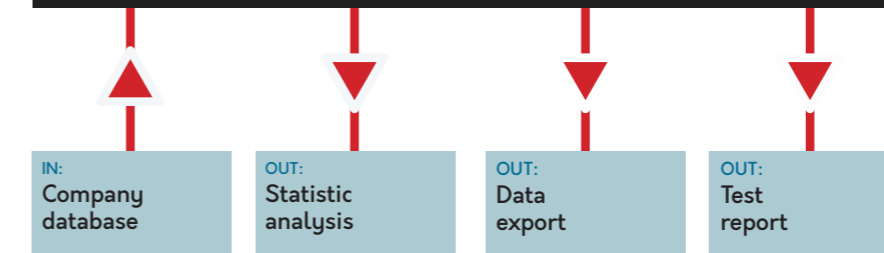


Datagest Program

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.



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. The automatic logging service permits

to send alarm information to the cloud-service platform of Gibitre Instruments in order to optimize the reaction times of the Service Support.

DENSITY CHECK - PC - TECHNICAL DETAILS

INSTRUMENT CHARACTERISTICS

Measurable density	The instrument can be set for measuring the density of rubber, rigid materials, foam (non absorbent), pellets, liquids. The instrument enables automatic measurements to be carried out even for samples with density of less than 1 g/cm ³ .
Scale Resolution and Capacity	Scale with 0,001 g resolution: 450 g Scale with 0,0001 g resolution: 100 g * Note: Scale with 0.0001 g resolution is required for compliance with some standards (e.g., ISO 1183-1)
Balance sensitivity	±0.001 g (±0.0001 g optional)
Calibration	Calibration certificate with traceability to primary standards

SOFTWARE

Cycle control	After the application of the sample, the test cycle, including the displacement of the beaker with the reference liquid, is fully automatic.
Numerical test data	Mass, volume and density (original state and after aging treatment) % mass Variation and % Volume variation
Selection of the reference liquid	The kind of reference liquid and the density according to the temperature of the lab can be selected.
Measure of temperature of reference liquid	PT 100 probe (Res. 0.1 ° C) for measuring the temperature of the test liquid and calculating the relative density in real time
Data analysis	Mean, Std. dev., max, min, Cp, Cpk, X-Chart
Software usage Languages	Italian, English, French, Spanish, German, Portuguese, Russian, Chinese, Japanese, Turkish, Polish, Czech.

SAFETY DEVICES

Labelling	CE Labelling
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CALIBRATION

Calibration	Calibration Report conforming to ISO 2781 with traceability to primary standards
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TECHNICAL SPECIFICATIONS

Power supply	220 VAC ±10%, 50 Hz ±3, 0.2 A, single phase, 50 W - 110 VAC ±10%, 60 Hz ±3 on request
Instrument dimensions	(W x D x H) 300 x 481 x 481 mm
Weight	25 Kg

PERSONAL COMPUTER (OPTIONAL)

Personal Computer (optional)	Minimum Configuration: Intel Core i5 4 GB RAM. Compatible Operating Systems: Windows 10 & 11; Connection to the instrument via USB Cable (included)
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DENSITY CHECK - PC - FAQ



Question

Should I purchase the instrument with scale with 0.001g or 0.0001g resolution?

Answer

The choice of scale type depends on the standard against which you wish to make measurements. ASTM D297; ASTM D471; ASTM D792; ASTM D1056; ASTM D3574; ISO 1817; ISO 2781 require resolution 0.001g. ISO 1183-1, IEC 60811-606 standards require 0.0001g resolution.



Question

Which is the minimum weight for a measurable sample ?

Answer

The minimum weight of a specimen is defined on the basis of the resolution of the scale used and the tolerance limits provided for the result of the density measurement: With tolerance limits of ± 0.02 g / cm³ (typical for rubber products) the minimum acceptable weight of a sample is: - 1 g using a scale with 0.001 g resolution - 0.1 g using a balance with resolution 0.0001 g



Question

Why purchase Gibitre Density Check instead of a standard digital scale with density kit ?

Answer

GIBITRE DENSITY CHECK: - Automatically moves the water glass to make the testing automatic and quick (about 9 seconds for the total process) - Automatically calculates the density of the test liquid according to the temperature of the liquid - Saves all the test results in the same database where the results of Tensile tester are stored - Checks the conformity



Question

Is it necessary to install the instrument on an anti-vibration plane ?

Answer

No, the scale installed with the instrument is configured to ensure accurate measurements without the need for an anti-vibration table. In case small vibrations are present during the measurement, the instrument waits to receive a stable measurement before acquiring the result.



Question

What i can do if air bubbles remain on the specimen?

Answer

The speed of movement of the glass and the shape of the specimen holders have been designed to minimize the risk of air bubbles remaining on the specimen. However, if bubbles remain, it is advisable to immerse the specimen in ethyl alcohol, allow it to dry and carry out the test, or directly use ethyl alcohol as the reference liquid

with tolerance limits for the product - Permit to calculate statistics about the density of different samples and among different productions - Permits to compare the results before and after ageing of the samples and automatically calculates % Mass Variation and % Volume variation according to ISO 188, ISO 1817, ASTM D471, ASTM D865 - Permits to calculate density of products with density below 1 (like foam, cellular products, etc) - In combination with an Abrasion tester, permits to calculate automatically Abrasion Index and Volume Abrasion Loss according to ISO 4649 (considering paper abrasivity in the calculation). ALL THE FUNCTIONS DESCRIBED ABOVE cannot be performed using a standard Scale with Density Kit.



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