



# RUBBER INDUSTRY TESTING

HITEC Luxembourg S.A.

# ABOUT US.

## THE BASICS

HITEC Luxembourg S.A., a Luxembourg based technology provider, offers innovative high-quality products and services for space, automotive and rubber, traffic management, humanitarian aid as well as government and security.

Our products in the field of rubber industry testing are used worldwide with all major producers of carbon black and rubber goods. We develop and produce standard and customized testing equipment used in product development and in quality control. The industry acknowledged IPHT™, Individual Pellet Hardness Tester, is designed for reliable measurement of carbon black pellet hardness. DABS™, the Oil Absorption Basic System, is an oil absorptometer to determine the structure of carbon black and silica, as well as other rubber chemicals. CVST®, Compressed Volume Structure Tester, is the next generation instrument for quantifying structure and other material characteristics of carbon black, and potentially of any other granulate or powder.

The company's know-how in industrial engineering as well as in-house manufacturing makes HITEC Luxembourg also the ideal partner to develop and produce customer-specific solutions. An example is single end dipping systems to support product development of reinforcing yarn.

More than 100 different customers in over 25 countries demonstrate the success of our products and services.



**SERVING OUR**



**CLIENTS WORLDWIDE**

# PORTFOLIO ●

## PRODUCT & SERVICE OFFERING

We offer test equipment for quality control of rubber fillers conforming to appropriate ASTM International and ISO standards. The company is a voting member in ASTM International and is actively contributing with scientific input to improve and extend applicable standards.

We provide our clients with worldwide sales and customer support.



IPHT  
Individual Pellet  
Hardness Test



PMST  
Pelleted Powder  
Mass Strength Tester



DABS  
Oil Absorption  
Basic System



CVST  
Compressed Volume  
Structure Tester



On-Demand  
Customer-specific  
solutions



Services  
Installation, training &  
maintenance

The image shows a large, industrial-grade metal cabinet with a glass door on the left side that is open. Inside the cabinet, a blue screen displays the IPHT logo and some text. Below the screen, there is a blue tray. The machine is mounted on a stand. The background is a plain, light-colored wall.

# IPHT

## INDIVIDUAL PELLET HARDNESS TESTER

### KEY FEATURES

Fully compliant to relevant international standards (ASTM D5230 and D3313 as well as ISO 8942)

Exceeds applicable standards

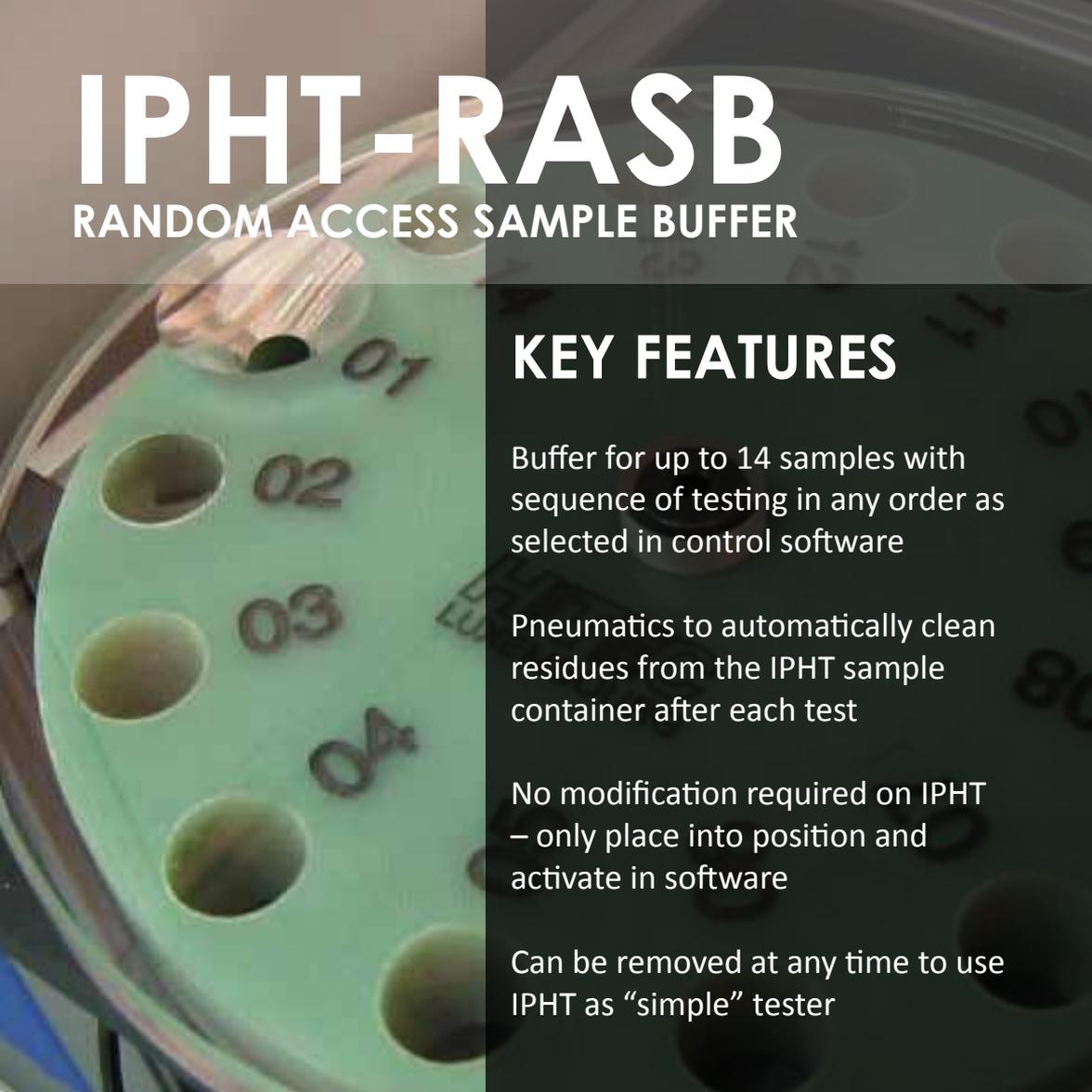
Automatic calibration

Connects to standard PC via serial port

IPHT is an automated tester to determine individual crush strength of carbon black pellets. The carbon black Pellet Hardness Tester has been initially developed in 1993 and is in use with many international manufacturers of carbon black and producers of rubber products.

Designed for reliable measurements of the individual pellet hardness and compliant to the relevant standards of ASTM International and ISO.

The extensive control software runs on standard Windows® based PCs and is constantly kept up to date to stay compatible with latest PC technology and to reflect possible changes to the respective standards.



# IPHT-RASB

## RANDOM ACCESS SAMPLE BUFFER

### KEY FEATURES

Buffer for up to 14 samples with sequence of testing in any order as selected in control software

Pneumatics to automatically clean residues from the IPHT sample container after each test

No modification required on IPHT – only place into position and activate in software

Can be removed at any time to use IPHT as “simple” tester

This option can take 14 samples. It provides random access to any position as selected in the control software.

The carousel is motorized and automatically transfers the samples to the tester. A transparent cover ensures easy filling and visual control of all positions and prevents accidental spillage.

The RASB connects via the IPHT's secondary serial port and is controlled by the IPHT's control software. The software supports test planning through instructions where to fill-in which sample according to your specific "Test List". Furthermore, the software allows a high degree of flexibility in conducting tests: tests can be added, deleted or re-ordered, even while measurements are running. A running sequence can be interrupted and tests can be inserted without actually going through the buffer.

# IPHT-DTBL

## VIBRATION DAMPING TABLE

### KEY FEATURES

Damping table to reduce amplitude of low frequency vibrations

Optimised for maximum damping of the IPHT's most critical vibrations

Sized to take a basic IPHT tester only or an IPHT with the optional random access sample buffer RASB

**HITEC**  
LUXEMBOURG



Model: DTBL  
S/N : 41175

Individual pellet hardness testing is by its nature sensitive to external noise. This optional damping table is designed to protect the tester against excessive external vibrations, which may disturb the measurements.

A pellet typically breaks at only about 0.07mm/0.003” compression, which under ASTM conditions happens within 0.6 seconds compression time. The IPHT samples at 50 measurements per second to ensure accurate determination of the compression curve and of the break point. For high measuring sensitivity and fast sampling rate, the possibility of filtering is therefore limited and external vibrations may disturb the instrument. The IPHT software automatically supervises vibration in the standby mode and it even prevents a test from starting if the mechanical noise is excessive.

Adding the damping table can thus relax the operating conditions, by suppressing the most unfavourable frequencies by up to 20dB.

# PMST

## PELLETED POWDER MASS STRENGTH TESTER

### KEY FEATURES

State-of-the-art design

Force measure by load cell

Motorized plunger with position feedback of sample height

Single supply: wide range mains  
90 to 240 VAC



## Test equipment to determine the mass strength of pelleted carbon black as per ASTM D1937

The test method ASTM D1937 “... is designed to determine the force required to pack a cylindrical column with pelleted carbon black. The results of this test are believed to relate to the ability of the carbon black to flow in bulk handling systems.” ... “Mass strength gives an indication of the flowability in bulk handling. It is affected by pellet properties such as hardness, size, shape, and especially fines content.”\*

\* *Excerpts from chapter 1 resp. 4, of ASTM D1937-13*

- Motor controlled accurate load application
- Linear carriage with load cell, stepper motor driven up to 15 mm/s and with position reading
- Programmable controller with 5.7” display, 640x480 px
- 4 robust push buttons for “dirty” operations
- Anodized aluminum frame and fully dust proof stainless steel electronic cabinet
- Software guided measurement sequence according to ASTM D1937
- Software guided load cell calibration
- Compact table model – small footprint
- AC mains supply only (no compressed air)

# DABS

## OIL ABSORPTION BASIC SYSTEM

### KEY FEATURES

Compact design with small table footprint

Fits standard mixing chambers, while safety cage allows for easy access to chamber for filling and cleaning

Configurable rotor speed and oil debit rate

Supports several burette models

State-of-the-art oil absorption data system compliant to ASTM D2414 OAN and D3493 COAN for carbon black, ASTM D6854 for silica, as well as ISO 4656

DABS is an oil absorption system to determine structure of carbon black and silica, as well as oil absorption of other powder material, also known as DPB absorption, DBP number or DOP number.

The data treatment for recording of a full mixing curve was initially developed by HITEC Luxembourg and is since then constantly further extended to satisfy increasing performance requirements. The curve fitting by a polynomial of 3rd order was a result of this initial development and has been introduced as “procedure B” in ASTM D2414.

The overall instrument comprises a data acquisition terminal and the absorptometer system. The terminal can also be acquired separately to enhance classic absorptometers without data treatment capability.

# DABS-MCEF

MIXING CHAMBER EXTENSION FUNNEL

## KEY FEATURES

Allows testing of high-volume materials (280 ml volume extension)

Perfectly fits on top of the DABS mixing chamber

Easy to clean

Testing fluffy materials such as non-pelletized carbon black requires higher volume to make up the same weight of sample. The MCEF chamber extension funnel, which fits tightly on top of the absorptometer mixing chamber, provides this additional space.

It also fits inside the safety cage of the HITEC Luxembourg DABS absorptometer. With its versatile design, the burette tip can be positioned at any height above the chamber, so the tip can be conveniently placed over the sample with or without the extension funnel.

Because the extension fits perfectly inside the hinged safety cage, its use has absolutely no effect on the handling of the sample, on the testing itself or on the cleaning.

On demand, an appropriate bracket for the “cover-safety-switch” can be offered to enable its use on a Brabender type E. This requires however also repositioning of the burette tip.

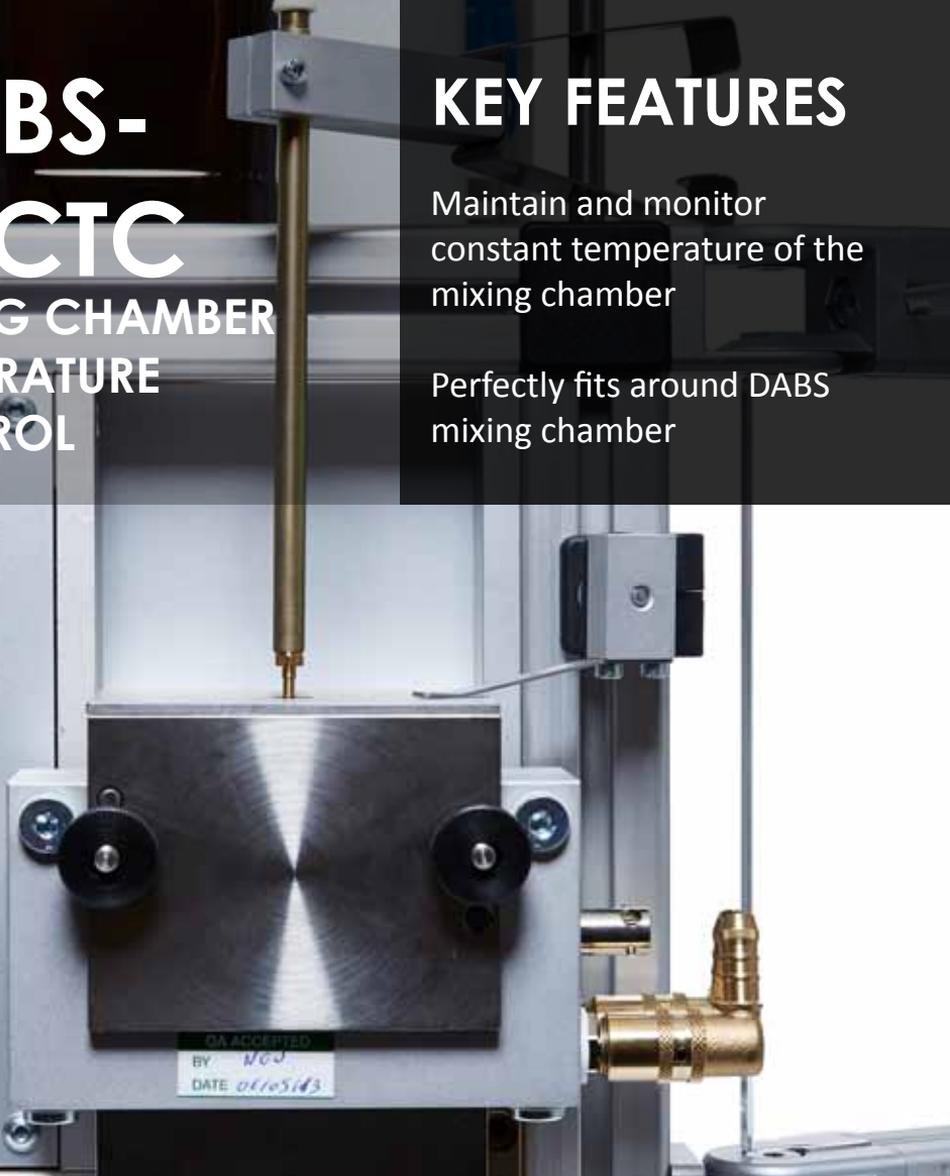
# DABS- -MCTC MIXING CHAMBER TEMPERATURE CONTROL



## KEY FEATURES

Maintain and monitor constant temperature of the mixing chamber

Perfectly fits around DABS mixing chamber



Continuous testing with the oil absorption system generates heat. The Mixing Chamber Temperature Control system allows keeping the bowl temperature low with the help of an external cooling bath. ASTM specifies the temperature of the mixing bowl to be  $23 \pm 5$  °C. HITEC Luxembourg even recommends keeping the tolerance at  $\pm 3$  °C to improve the repeatability.

The DABS-MCTC comprises 3 main parts:

- the cooling block MCCB fits around the mixing bowl and is connected to a separate cooling circuit.
- the quick coupling set CBQC, with which the cooling block can be easily coupled with a cooling circuit. The CBQC set can be connected to a standard 9mm (3/8") hose and prevents cooling liquid from exiting the cooling circuit if disconnected.
- the temperature sensor MCTS

The temperature sensor can also be used without the cooling block. DABS and DADS-TERM (version 2 and up) are equipped with a Pt100 3-lead signal input to monitor the temperature of the. The values at beginning and end of a test appear on the printout.

# CVST

## Compressed Volume Structure Test

### KEY FEATURES

Void volume vs. applied, transmitted & geometric mean pressure measurement

Controlled compression and decompression

Compatible with various porous materials (tested with carbon black, silica, and ceramics)

No wear parts

Minimal maintenance



The CVST by HITEC Luxembourg is a void-volume tester, measuring void volume versus pressure of a sample. Originally developed from the now superseded ASTM standard D6086, it now meets the requirements of the active ASTM D7854 “Standard Test Method for Carbon Black-Void Volume at Mean Pressure”.

Extensive research by HITEC Luxembourg and its partners has shown that:

- A very detailed physical characterisation can be achieved, obtaining several independent material properties, beyond the basic results from ASTM D7854
- The test method can be equally applied to various granulate, powder and porous materials (e.g. carbon black, silica, ceramics, ...)

Beyond the “raw” void volume data, the CVST generates metrics that reflect the sample structure (correlated to ASTM D3493 – COAN) and surface area (correlated to ASTM D6556).

The fact that the CVST does not need any additives or consumables (like the oil in ASTM D2414 and D3493 methods for oil absorption numbers), not only makes void volume testing a very clean method, but it also results in outstanding repeatability.

From a practical point of view, the compression chamber has been designed to facilitate sample handling, while optimizing accuracy.

**CUSTOMER-  
SPECIFIC  
SOLUTIONS ●**

We offer our clients comprehensive solutions: from analysis to consulting, from development and implementation of customer-specific solutions up to installation and maintenance. In all these phases a close cooperation with clients and partners to spot exactly the needs and requirements is essential.



Two examples of our customer-specific solutions are AMSC, an automated sampling cutting instrument and SEDU, a single end dipping unit for material & process development.

# AMSC

## AUTOMATED METRAVIB SAMPLING CUTTING

Trimming of rubber test samples for Metravib Dynamic Mechanical Analyser DMA\*

The AMSC is designed for preparing samples to be tested on a Metravib dynamic tester (DMA), in a way to minimize variations on the sample and its measuring results, which may be caused by operator influence (e.g. irregularities in the cutting edges).

\*) The DMA is available from O1dB-Metravib, 200 Chemin des Ormeaux, F-69578 Limonest, France

## KEY FEATURES

Precise and reproducible cutting of rubber edges

Minimizes risk of injuries compared to manual cutting

Typical sample dimensions:

- diameter 10 mm
- three steel blocks of 14 mm length
- two rubber sheets of 2 mm thickness



# SEDU

## SINGLE END DIPPING UNIT

Laboratory size single end dipping unit for material & process development for reinforcing yarn and validation of yarn-to-rubber adhesion

SEDU is a modular system to process a single yarn such that it is fully tension controlled from un-winding of standard bobbins, through dipping, through drying and finally up-winding on bobbins for further handling.

## KEY FEATURES

Modular number of zones, dipping stations or drying ovens – any combination is possible

Master-slave drive motor system – any motor can be master

Regulated yarn tension or fixed speed ratio, individually selected for every zone

Very precise and reproducible process conditions – can be changed on-the-fly

Fast stabilization of tensions concurrently in all zones and extremely stable conditions

Unwind station with unique tension-controlled yarn buffer for on-the-fly change-over of feeding bobbin

# SERVICES ●

INSTALLATION, TRAINING  
& MAINTENANCE





HITEC Luxembourg offers full life-cycle support of its products. That is why we provide extensive installation, training and maintenance services at customer premises or in our technical facilities in Luxembourg.

Our services catalogue:

- Instrument installation at customer premises
- Initial and ongoing training programs
- Rapid technical support
- Preventive maintenance
- Troubleshooting and corrective maintenance
- Spare and replacement parts provision
- Maintenance, warranty and service programs
- Material sample testing in our lab

To learn more about our service offering, please contact our team:  
[sales@hitec.lu](mailto:sales@hitec.lu).

www.hitec.lu

HITEC Luxembourg offers high technology solutions covering different business areas: satellite ground segment technology, customer specific and standard equipment for testing and measuring of physical properties, engineering, consulting, software & ICT development and project management.

Quality management and assurance, corporate social responsibility and environmental friendly business are the basis for sustainable growth and long-term partnerships with our stakeholders.



**HITEC Luxembourg S.A.**

5, rue de l'Eglise

L-1458 Luxembourg

Grand-Duchy of Luxembourg



Tel.: +352 498478-1

Fax: +352 401303

E-mail: [sales@hitec.lu](mailto:sales@hitec.lu)

[www.hitec.lu](http://www.hitec.lu)

Copyright © HITEC Luxembourg S.A. All rights reserved.  
Version 09/2015