



**PAVETEST**  
WHEN PERFORMANCE MATTERS

PAVEMENT  
TECHNOLOGY

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## PAVETEST, A DIVISION OF MATEST

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**Pavetest is the division of Matest committed to developing innovative, dynamic testing systems for asphalt.**

Whilst Pavetest Pty. Ltd. may be a new player in this growing market sector, they are certainly not lacking experience.

With many years of experience in developing pavement testing systems between them, Con Sinadinos (Managing Director) and Alan Feeley (Technical Director) bring a wealth of experience and talent to the company. The benefit is evident in every aspect of every product, which are designed to perform, built to last and easy to use.

From its inception, Pavetest's aim is to develop a range of **testing systems with unparalleled performance, ultimate versatility and exceptional reliability, at a price that represents real value for money.**

Pavetest's range of pavement testing systems both complements and completes Matest's Asphalt and Bitumen business unit.

## Con Sinadinos

Graduated as an electronic engineer in 1975, Con commenced his career with the Australian Road Research Board (ARRB). Whilst at ARRB, Con was actively involved in the design of the first data acquisition system developed by ARRB. In 1991, he accepted the position of Chief Engineer at IPC Global and was promoted to General Manager several years later. Con has been actively involved in numerous research committees and authored several papers during his time at ARRB and IPC.

Con's involvement in a number of National Cooperative Highway Research Program (NCHRP) projects has given him a great deal of knowledge and experience in the field of flexible pavement.

In 2012, Con founded Pavetest Pty. Ltd. with the aim of developing a new generation of pavement testing equipment.

Con is a Member of the Association of Asphalt and Paving Technologists (AAPT) and "Participating Member" of ASTM.





# CDAS

## CONTROL AND DATA ACQUISITION SYSTEM

Pavetest's compact Control and Data Acquisition System (CDAS) delivers unparalleled performance, real time control and ultimate versatility in acquisition and provide a flexible and user friendly testing solution.

**It provides excellent waveform fidelity from integrated acquisition and control functions, with low level sampling at speeds of up to 192,000 samples per second simultaneously on all channels and 20 bit resolution over the full dynamic input signal range.**

### MAIN FEATURES

- Directly communicates with the TestLab software, providing automatic test execution and data processing.
- Compact high reliability data acquisition and control.
- Up to 5 kHz data acquisition and feedback control provides excellent waveform fidelity.
- Up to 64 times oversampling gives superior low noise performance.
- Normalized ( $\pm 10$  V) analog data acquisition inputs provide flexibility to use any transducer in any channel.



**B206** CDAS 16 channels

### EASY DATA PROCESSING WITH THE INCLUDED SOFTWARE

The CDAS includes the TestLab software - supplied on USB flash drive - complete with relevant Method files (based on the test configurations supplied) and calibration files for all the transducers supplied. Software and test methods are expandable for future requirements.

### AVAILABLE MODELS

#### B205

**8 Channel CDAS** - Acquisition 8 CH, 20 bit resolution

- Sampling rate up to 192 kHz (all channels)
- Smoothing up to 64 times over-sampling
- Calibration on power up
- Control Axis 2
- Communication USB or Ethernet

#### B206

**16 Channel CDAS** - Acquisition 16 CH, 20 bit resolution

- Sampling rate up to 192 kHz (all channels)
- Smoothing up to 64 times over-sampling
- Calibration Automatically on power up
- Control Axis 4
- Communication USB or Ethernet

**Dimensions:** 110(h) x 325(d) x 265(w) mm

**Power Supply:** 90-264V 50-60Hz 1ph 240W

**Weight:** 5 kg

### TECHNICAL FEATURES

#### CONTROL:

- High speed, (18 bit) digital servo-control, up to 4 axis.
- Digital closed loop update sampling rate of 2.5 kHz.
- Computer programmable, Proportional, Integral and Derivative (PID) control algorithm.
- Adaptive Level Control (ALC) algorithm for best dynamic peak accuracy.
- 3 feedback control modes. E.g. force, position and on-specimen strain.
- "Bumpless transfer" between control modes.

#### ACQUISITION:

- Analog inputs are automatically calibrated on power up.
- Simultaneous sampling of all channels.
- 16 Analog ( $\pm 10$  Volt) input channels.
- Up to 64 times over sampling (set to 8 by default).
- 20 bit digital resolution (**approx. 1/1.000.000**), no auto ranging required.
- Sampling rate up to 192.000 samples/see.

## TESTLAB SOFTWARE

Developed with ultimate flexibility in mind, TestLab test and control software caters to all levels of operator experience. By using pre-programmed “Method files”, an inexperienced operator can run a range of international test methods without the need for any programming.

Moreover, a test “Wizard”, available with popular tests, can guide the operator step by step based on a “recipe book” approach.

Most importantly, the experienced engineer and/or researcher need not be constrained by the functions and analysis in the method files provided. The operator may clone, modify and/or generate his/her own method file to suit their specific requirements. The Excel based data analysis offers the operator the flexibility to implement alternative analysis and customize reporting facilities.

TestLab allows for real time graphing of results and configurable real time transducer levels display with unprecedented clarity of results and analytical power.

### MAIN FEATURES

- Open architecture software allows user to inspect calculations and results.
- Integrated data result post processing feature with MS Excel.
- Standard and user customizable test reporting.
- Real time graphing of results and configurable real time transducer.
- Flexible and user-friendly with unprecedented clarity of results and analytical power.
- Full access for advanced user to specify their own calculations, test results and charting.



## TESTLAB, A NEW APPROACH

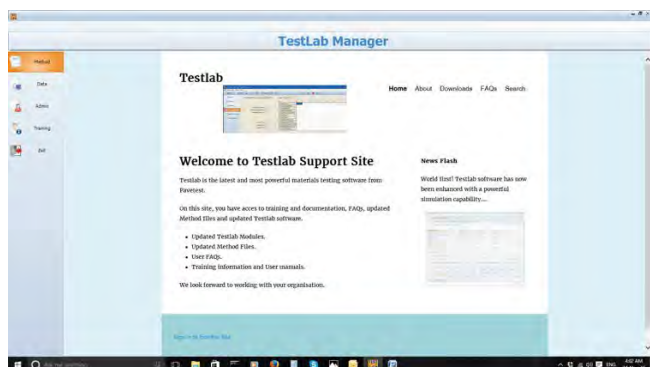
TestLab is an open architecture user programmable software application. Our engineers have taken the time to review all the relevant international test standards and used TestLab “Test Designer” to program method files according to these standards. Basically, any of these tests can be designed, cloned and/or modified by the user within TestLab. The user is no longer restricted to the test applications provided at time of purchase the possibilities are only limited by the skill and imagination of the user.

### TESTLAB MANAGER

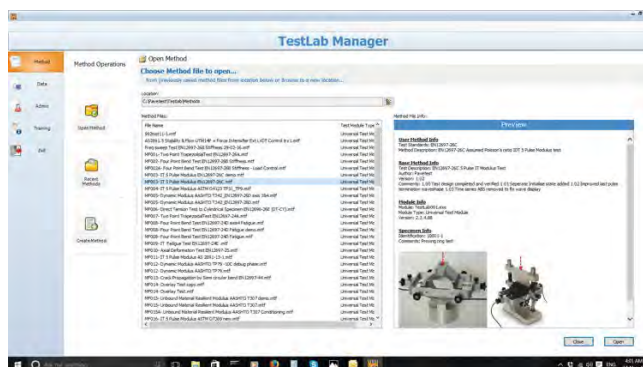
The Testlab materials testing software is a universal approach to materials testing and is designed to interface the CDAS – Control and Data Acquisition Systems - and the wide range of Pavetest machines. A Testlab Manager interface allows users to easily and efficiently locate the necessary method files to load and execute.

### TEST METHOD SELECTION

The operator can run pre-programmed Method files, in accordance to the requested Standards, or configure an application test and then save that configuration to a customised Method file. This includes the transducer and calibration allocations, control parameters, termination conditions and any other items, which allow users to enter data. Method files may easily be “cloned”, adapted and saved to be used at a later stage with pre-set preferences.



Testlab Manager



Selection of Method Files

## TESTLAB, USER FRIENDLY INTERFACE

### TEST WIZARD

The wizard section provides a prompted menu approach to running a test. The user is driven to enter information throughout a series of easy steps.

Test Wizard

Enter specimen details...

Step: 2 / 3

Identification: 10001-1

Comments: Proving ring test

Dimensions	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100.00						100.00	
Length (mm)	63.00						63.00	

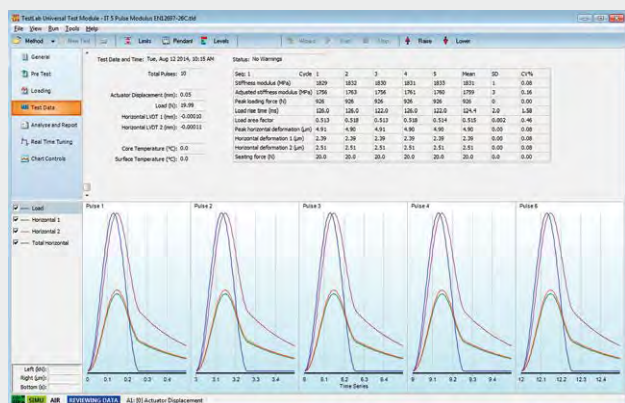
Area cross section (mm<sup>2</sup>): 7853.98

Buttons: Abort, Next

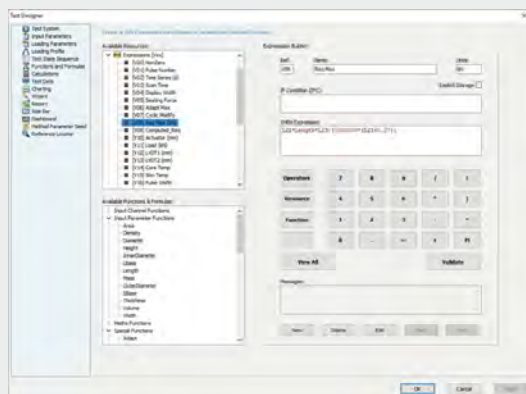
### User guided Test wizard

### TESTLAB UNIVERSAL TEST

The Test Data section displays run-time information, such as the loading time, cycle count, transducer readings (force, displacement, pressure, temperature), stress calculations, strain calculations and other test specific properties.



Test Data - EN12697-26C Indirect tension to cylindrical specimens



Test designer – Expressions editor

### REAL TIME DASHBOARD DISPLAY

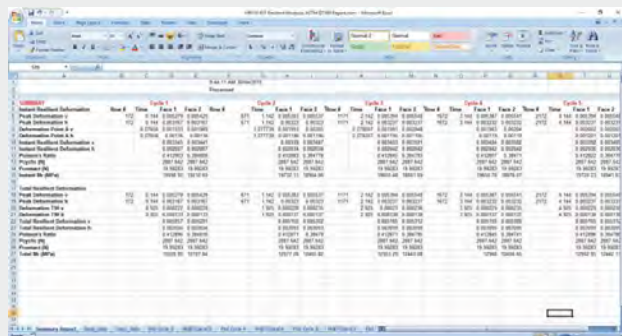
For the more sophisticated tests, Pavetest provides the user with an alternative, simpler and more intuitive representation of the current status of both machine and test method. This dashboard display feature of TestLab shows real time transducer levels, computed data and charted data before, during and after the test has completed.



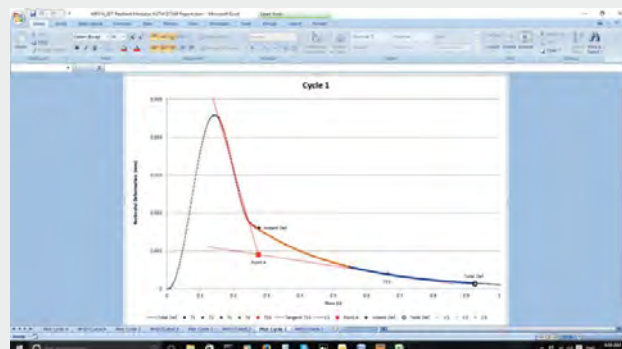
### Typical dashboard screen

### POST PROCESSING

All Testlab Method file tests provide the facility to send the data directly to an Excel workbook including test input and results data. This facility provides a means of efficiently post processing raw data results and customizing reports from within Excel and optionally displaying summary result in TestLab.



Post processing summary results





## 16 kN SERVO-PNEUMATIC DYNAMIC TESTING SYSTEM

TWO MODELS AVAILABLE:

**B220-01 KIT**

**DTS-16 WITH MANUAL CROSSHEAD**

**B220-02 KIT**

**DTS-16 WITH MOTORIZED CROSSHEAD**

The DTS-16 Dynamic Testing System is a servo-pneumatically controlled testing machine utilizing digital control of a pneumatic servo valve to provide accurate loading wave shapes up to 70 Hz. The DTS-16 can be operated in tension, compression dynamic loading and is suited to testing a diverse range of materials such as asphalt, soil, unbound granular materials, fibres and plastics.

The DTS-16 is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories, hardware and software in perfect unison.

### MAIN FEATURES

- Compact, robust 2-Column load frame.
- Precision engineered.
- Optional Motorized crosshead positioning.
- Fully configurable to suit a large range of testing applications.
- Digital Servo-Pneumatic control.
- 4 axis control and 16 Channel Control and Data Acquisition System.

The machines includes:

**B220-11** 20 kN Load frame with manual crosshead,  
16 kN Servo-pneumatic actuator with its  
LVDT (30 mm stroke),  $\pm 20$  kN load cell

or

**B220-12** 20 kN Load frame with motorized crosshead,  
16 kN Servo-pneumatic actuator with its  
LVDT (30 mm stroke),  $\pm 20$  kN load cell

**B206** 16 Channel Control and Data Acquisition System  
(CDAS) & TestLab software

**B270-12** Air reservoir assembly with membrane dryer

It requires pressurized air, minimum 7 bar (not included).

Model	B220-01 KIT	B220-02 KIT
B220-11	▼	
B220-12		▼
B206	▼	▼
B270-12	▼	▼



### **B220-02 KIT**

16 kN Servo-Pneumatic dynamic testing system (motorized crosshead)  
with **B221** Temperature controlled cabinet



## TECHNICAL SPECIFICATIONS

### Load frame

- Between Columns 345 mm
- Vertical Space 650 mm

### Servo actuator

- Capacity  $\pm 16$  kN
- Frequency up to 70 Hz
- Stroke 30 mm
- Air supply clean dry air
- Pressure 800-900 kPa
- Minimum rate up to 5 litres/sec

**Power Supply:** 90-264V 50-60Hz 1ph 240W (B220-11)  
 230V 50Hz 1ph 100W (B220-12)  
 230V 50Hz 1ph 1450W (B221)

**Dimensions:** 1262(h) x 400(d) x 470(w) mm B220-11 load frame  
 1262(h) x 400(d) x 510(w) mm B220-12 load frame  
 2170(h) x 840(d) x 760(w) mm load frame with  
 temperature controlled cabinet

**Weight:** 80 kg load frame B220-11 load frame  
 125 kg load frame B220-12 load frame  
 160 kg temperature controlled cabinet



**B220-02 KIT**  
DTS-16 detail



**B220-12**  
20 kN Load frame with motorized  
crosshead

## TECHNICAL FEATURES

### ■ Optional motorized crosshead.

A motorized crosshead allows an easier test set-up in terms of accessories positioning without using any extension rods.

### ■ Latest technology.

The DTS-16 advantage revolves around the Control Data Acquisition System (CDAS) and TestLab Software.

### ■ Durable powder coated aluminium base plate with stainless steel work platen.

### ■ Air reservoir assembly with membrane dryer.

It allows a great insurance against damages to the servo-valve in case of moisture in the compressed air.

## RECOMMENDED ACCESSORIES

**B221** Temperature controlled cabinet: -20 °C to +70 °C  
to suit DTS-16 or 4PBA

**B250-07 KIT** Temperature measuring kit comprising:

■ **B292-01** Temperature transducer (-80 °C to +80 °C)  
(2 pieces)

■ **B250-10** Dummy asphalt specimen

■ **B250-11** 100 mm "O" ring (3 pieces)

■ **B250-12** Thermal conducting grease (about 56 g)

**H009-01EN** PC complete with LCD monitor 22", keyboard,  
mouse, cables and installation of Testlab software

### **B270-12**

Air reservoir assembly  
with membrane dryer



**B250-07 KIT**  
Temperature measuring kit

We can upgrade your existing UTM (also from other manufacturers)

For test configurations and related jigs, please consult p.17-20

**B230****30 kN SERVO-HYDRAULIC DYNAMIC TESTING SYSTEM (DTS-30)**

The DTS-30 Dynamic Testing System is a servo-hydraulic testing machine utilizing digital control of a high performance servo valve to provide accurate loading wave shapes up to 100 Hz. The DTS-30 can be operated in tension, compression dynamic loading and is suited to testing a diverse range of materials such as asphalt, soil, unbound granular materials, fibres and plastics. The DTS-30 is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories, hardware and software in perfect unison.

**The DTS-30 Dynamic Testing System is compact, fully integrated, user and environmentally friendly.**

**MAIN FEATURES**

- Compact, robust load frame.
- Small footprint; 90 cm x 135 cm, including hydraulic power supply and climatic chamber.
- Reaction frame embedded in the test chamber.
- Portable temperature control unit.
- Fully configurable to suit a large range of testing applications.
- Digital Servo-Hydraulic control.
- 4 axis control and 16 channel data acquisition as standard.

The machine includes:

- Rigid two column load frame
- 30 kN Servo-hydraulic actuator (100 mm Stroke)
- 2.2 kW Hydraulic Power Supply
- 16 Channel Control and Data Acquisition System (CDAS) & TestLab software
- Load cell ( $\pm 30$  kN)
- 100 mm actuator LVDT

**B230 30 KN**

Servo-Hydraulic

Dynamic Testing System with B231 temperature controlled cabinet

## TECHNICAL SPECIFICATIONS

### Load frame

- Between Columns 600 mm
- Vertical Space 800 mm

### Servo actuator

- Capacity  $\pm 30$  kN static,  $\pm 25$  kN dynamic
- Frequency up to 100 Hz
- Stroke 100 mm

### Hydraulic Power Supply

- Pressure up to 160 bar, user defined
- Flow rate up to 7.5 litres/min
- Dimensions: 650(h) x 550(d) x 450(w) mm
- Power Supply: 230V 50-60Hz 1ph 2.5kW

### Power Supply:

- 230V 50-60Hz 1ph 2.5kW (B230)
- 230V 50Hz 1ph 1.3kW (B231)
- 230V 50Hz 1ph 3.1kW (B232)

### Dimensions:

- 2100(h) x 1220(d) x 800(w) mm load frame
- 2100(h) x 1320(d) x 800(w) mm with temperature controlled cabinet

### Weight:

- 430 kg load frame
- 650 kg load frame with temperature controlled cabinet and oil-filled HPS

## TECHNICAL FEATURES

- **The DTS-30 fatigue rated, servo-hydraulic actuator utilizes metal labyrinth bearings and seals.**  
The labyrinth bearings and seals are designed to reduce friction and maintain low operating temperatures. The bearings experience little-to-no wear, operate at high speeds and offer a long service life.
- **A bottom loading machine.** Before this current crop of universal testing machines, many dynamic testing machines were bottom loading. More recently, the Asphalt Mixture Performance Tester (AMPT) changed the mindset of the testing community by highlighting the benefits of a bottom loading machine.
- **Portable temperature control unit.** The temperature control unit attaches to the test chamber using a magnetic seal and can be wheeled away when not required or for servicing. It can be removed without dismantling the machine or disrupting the testing program.

## NEEDED ACCESSORIES

- B231** Temperature controlled cabinet:  
-20 °C to +80 °C to suit DTS-30
- or
- B232** Temperature controlled cabinet:  
-40 °C to +80 °C to suit DTS-30
- B233** Temperature controlled cabinet:  
-50 °C to +100 °C to suit DTS-30,  
supplied with humidity control, if required

## RECOMMENDED ACCESSORIES

- H009-01EN** PC complete with LCD monitor 22", keyboard, mouse, cables and installation of Testlab software
- B250-07 KIT** Temperature measuring kit comprising:
- **B292-01** Temperature transducer (-80 °C to +80 °C) (2 pieces)
  - **B250-10** Dummy asphalt specimen
  - **B250-11** 100 mm "O" ring (3 pieces)
  - **B250-12** Thermal conducting grease (about 56 g)

We can upgrade your existing UTM (also from other manufacturers)  
For test configurations and related jigs, please consult p. 17-20

**Can't see the Control and Data Acquisition System (CDAS)?** That's because **it's housed neatly, in the cabinet in front of the machine.**

You won't see a tangle of cables either; they enter the cabinet through the floor of the test chamber or through the back of the cabinet and connect to the CDAS.

The door of the cabinet can be held ajar to allow transducers to be re-allocated or opened completely for servicing. Unused transducers can also be stored out of harm's way.

Moreover, the DTS-30 reaction frame is symmetrical; **the servo-hydraulic actuator and reaction shaft can be interchanged to make the DTS-30 top loading.**



**B206** 16 Channel CDAS

## WHAT MAKES IT DIFFERENT MAKES IT BETTER!

The DTS-30 is Universal Testing Machine (UTM), but not as most people know it. **It does not conform to the “me too” attitude of most UTM manufacturers.** The innovations featured on the DTS-30 are built on many years of experience, developing, studying and using various universal testing machines from a number of manufacturers.

The first thing you will notice about the DTS-30 is the absence of a reaction frame. **The reaction frame** most certainly exists, but it's **embedded in the test chamber.**

Since it is mandatory to control the test temperature of most pavement materials, e.g. asphalt, **the test chamber is insulated and forms part of the temperature controlled cabinet.**

Most UTM manufacturers opt for an elaborate (and expensive) moveable crosshead, only to find that its range (and usefulness) is limited by the climatic chamber. The DTS-30 has a remotely positioned reaction shaft that adjusts the work space. However, you won't need to adjust it often because the **servo-hydraulic actuator has 100 mm of stroke.**



B230 DTS-30 Dynamic Testing System, detail



Portable temperature control unit



### DYNAFLO™ HPS

The speed of the pump motor is controlled using a **variable-frequency drive (VFD), or inverter.** This enables the motor to be slowed down, or turned off, when the oil flow from the pump exceeds the flow required by the actuator at any given time.



### QUIET

The servo-hydraulic testing machine is **almost silent during the majority of test applications.** The equipped Dynaflo-Hps not only reduces noise and heat generation but also offers cost savings, by reducing power consumption.



### DESIGN SOLUTION

A neat, compact and integrated solution where the **reaction frame is embedded** in the test chamber, for a very sleek appearance. Moreover, short hydraulic hoses connect the actuator to the HPS that's tucked neatly away behind the machine, under the test chamber.



### EASY MAINTENANCE

The **portable temperature control unit** makes servicing, replacing or upgrading the control unit virtually effortless.



### DIRECT COMMUNICATION

The test temperature and/or ramp rate may be set and monitored through TestLab software, via the virtual pendant.



**B240****130 kN SERVO-HYDRAULIC DYNAMIC TESTING SYSTEM (DTS-130)**

The DTS-130 Dynamic Testing System is a servo-hydraulic testing machine utilizing digital control of a high performance servo valve to provide accurate loading wave shapes up to 100 Hz. The DTS-130 is Pavetest's highest capacity Dynamic Testing System and completes the range of standard universal testing machines. The system can be operated in tension, compression dynamic loading and is suited to testing a diverse range of engineering materials and/or large asphalt specimens at very cold temperatures.

The DTS-130 is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories, hardware and software in perfect unison.

**MAIN FEATURES**

- Robust two column load frame.
- Double acting servo hydraulic, equal area type with low friction, long life bearings and seals.
- Portable temperature control unit.
- Fully configurable to suit a large range of testing applications.
- Digital Servo-Hydraulic control.
- 4 axis control and 16 channel data acquisition as standard.

The machine includes:

- Rigid two column load frame
- 130 kN Servo-hydraulic actuator (100 mm Stroke)
- 10 kW Hydraulic Power Supply
- 16 Channel Control and Data Acquisition System (CDAS) & TestLab software
- Load cell ( $\pm 130$  kN)
- 100 mm actuator LVDT

**B240**

130 kN Servo-Hydraulic Dynamic Testing System  
with **B231** temperature controlled cabinet

## TECHNICAL SPECIFICATIONS

### Load frame:

- Horizontal Space: 60 cm
- Vertical Space: 100 cm

### Servo actuator:

- Capacity:  $\pm 130\text{kN}$  Static  $\pm 100\text{kN}$  Dynamic
- Frequency: Up to 100Hz
- Stroke: 100 mm

### Hydraulic Power Supply:

- Pressure: Up to 210 bar, user defined
- Flow rate: 20 litres/min
- Dimensions: 1150 (h) x 600 (d) x 1100 (w) mm
- Power supply: 380V 50Hz or 208V 60Hz 11kW 3ph

### Power Supply:

- 400V 50Hz 3ph + neutral 12kW or
- 220V 60Hz 3ph + 12kW (B240)
- 230V 50Hz 1ph 1.3kW (B231)
- 230V 50Hz 1ph 3.1kW (B232)

### Dimensions:

- 3005 (h) x 1070 (d) x 1090 (w) mm load frame
- 3005 (h) x 1630 (d) x 1090 (w) mm with temperature controlled cabinet

### Weight:

- 680 kg load frame
- 1360 kg load frame with temperature controlled cabinet and oil-filled HPS



**B240** 130 kN Servo-Hydraulic Dynamic Testing System with **H009-01EN** complete PC, **B231** Temperature controlled cabinet, **B240-03** Exchanger oil/water, HPS (hydraulic power supply)

NEEDED ACCESSORIES		B240-02 Exchanger oil/air	B240-03 Exchanger oil/water *
<b>B240-04</b>	Chiller for water refrigeration		▼
<b>B240-05</b> or <b>B240-06</b>	Set of hoses to connect frame - pumping unit Lg. 3 m Set of hoses to connect frame - pumping unit Lg. 8 m	▼ ▼	▼ ▼
<b>B240-07</b> or <b>B240-08</b>	Set of hoses to connect pumping unit - Exchanger oil/air Lg. 5 m Set of hoses to connect pumping unit - Exchanger oil/air Lg. 10 m	▼ ▼	
<b>B240-09</b> or <b>B240-10</b>	Set of hoses to connect Exchanger oil/water - Chiller Lg. 5 m Set of hoses to connect Exchanger oil/water - Chiller Lg. 10 m		▼ ▼

\* (complete with set of hoses to connect pumping unit Exchanger oil/water)

The **Hydraulic Power Supply (HPS)** utilizes a variable flow pump with a working pressure up to 210 Bar. The customer can choose either water (heat exchanger) or air (Electric fan) oil cooling. Features include; low oil, over temperature and dirty filter indication, remote starting and user selectable working pressure (via TestLab).

**B231** Temperature controlled cabinet:  
-20 °C to +80 °C to suit DTS-30  
or

**B232** Temperature controlled cabinet:  
-40 °C to +80 °C to suit DTS-30

**B233** Temperature controlled cabinet:  
-50 °C to +100 °C to suit DTS-30, supplied with humidity control, if required

## RECOMMENDED ACCESSORIES

- H009-01EN** PC complete with LCD monitor 22", keyboard, mouse, cables and installation of Testlab software
- B250-07 KIT** Temperature measuring kit (refer to p. 9)

We can upgrade your existing UTM (also from other manufacturers)

For test configurations and related jigs, please consult p. 17-20

## TWO PIECE TEMPERATURE CONTROLLED CABINET

Pavetest offers a range of temperature controlled cabinet to complement our **DTS-30** and **DTS-130** servo-hydraulic Dynamic Testing Systems (DTS). **Pavetest is the first manufacturer to adopt a two piece temperature controlled cabinet**; comprising an insulate cabinet and a temperature control unit. The cabinet is permanently mounted on the dynamic testing machines, whilst the temperature control unit can be wheeled away when not required, leaving the back of the chamber open to accommodate longer jigs/specimens that do not require a controlled environment. The temperature control unit attaches to the cabinet using a magnetic seal. This isolates the cabinet from mechanical vibrations caused by the refrigeration unit and circulation fans whilst maintaining an air tight seal between the inside and outside of the chamber. This concept also makes servicing, replacing or upgrading the temperature control unit virtually effortless, because it can be removed with-out dismantling the machine or disrupting the testing program.

### MAIN FEATURES

- Two piece concept makes servicing, replacing or upgrading the temperature control unit effortless.
- Flexible temperature sensor ensures the temperature near the specimen is accurately controlled.
- Operator can monitor, set, adjust or “Auto tune” the temperature controller via the PC.
- Heavy duty stainless steel construction.
- Powerful re-circulation fans ensure even temperature through-out the chamber.
- Triple Glazed, Argon filled, Lo E glass door with built in heater.



Two piece temperature controlled cabinet

## ORDERING INFORMATION

**B231** Temperature controlled cabinet:  
-20 °C to +80 °C to suit DTS-130

or

**B232** Temperature controlled cabinet:  
-40 °C to +80 °C to suit DTS-130

**B233** Temperature controlled cabinet:  
-50 °C to +100 °C to suit DTS-30,  
supplied with humidity control, if required

Other temperature ranges and operating voltage/frequency available on request.

The temperature controller can be programmed using the virtual pendant within TestLab software, via a serial link between the temperature controller and the Control and Data Acquisition System (CDAS). This allows the operator to monitor, set or adjust a constant temperature or ramp without touching the temperature controller, including invoking the "Auto tune" function. This feature is particularly useful for the TSRST test, where programming the temperature controller is not a simple task.



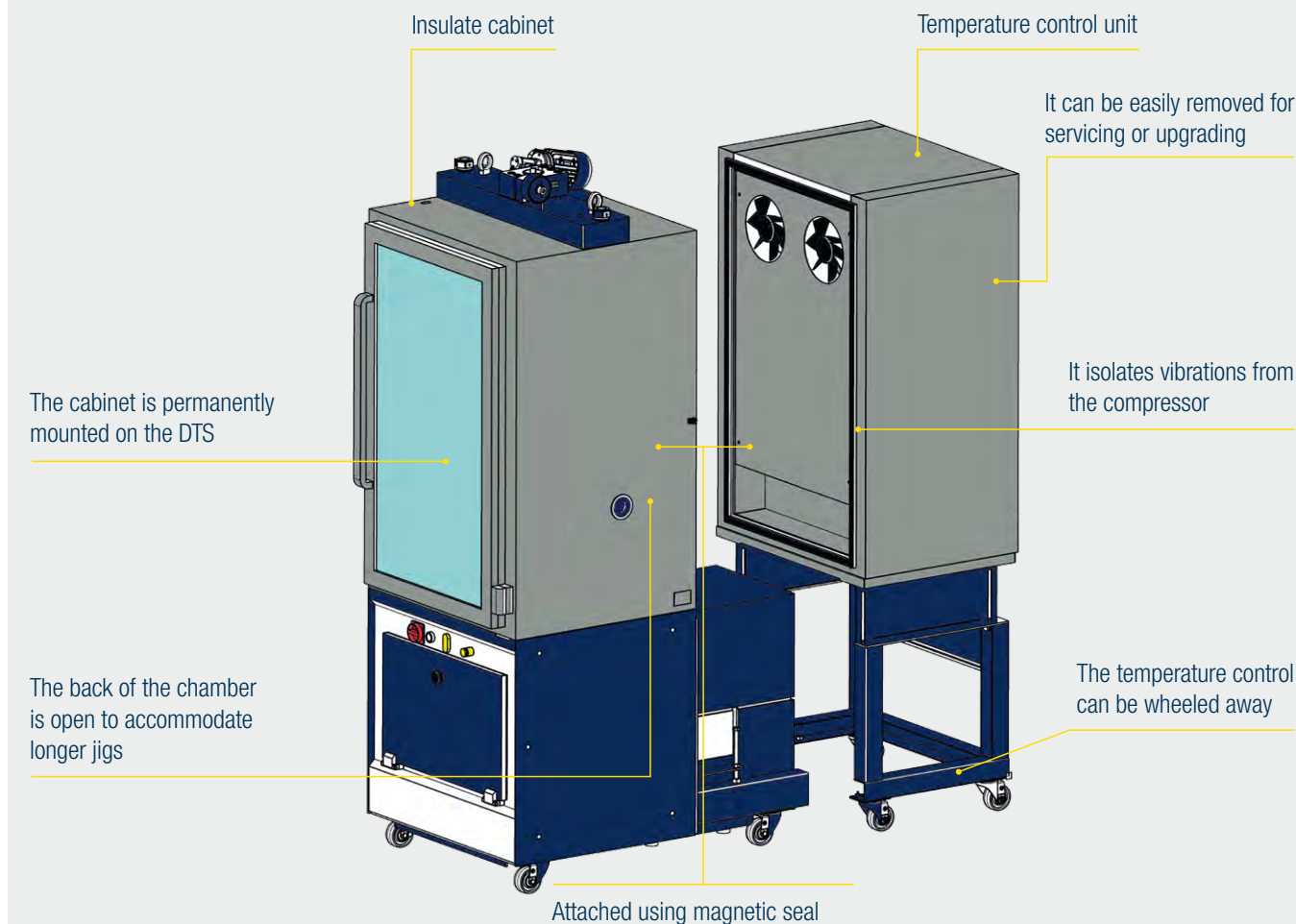
Temperature controller sensor

Pavetest has introduced some additional features to improve the functionality of our temperature controlled cabinets. **The sensor for the temperature controller is mounted on a flexible arm** which allows the operator to locate the sensor in the vicinity of the test specimen; providing accurate temperature control where it's needed most; right near the specimen.







Cabinet switches and temperature controllers





## A TWO PIECE TEMPERATURE CONTROLLED CABINET





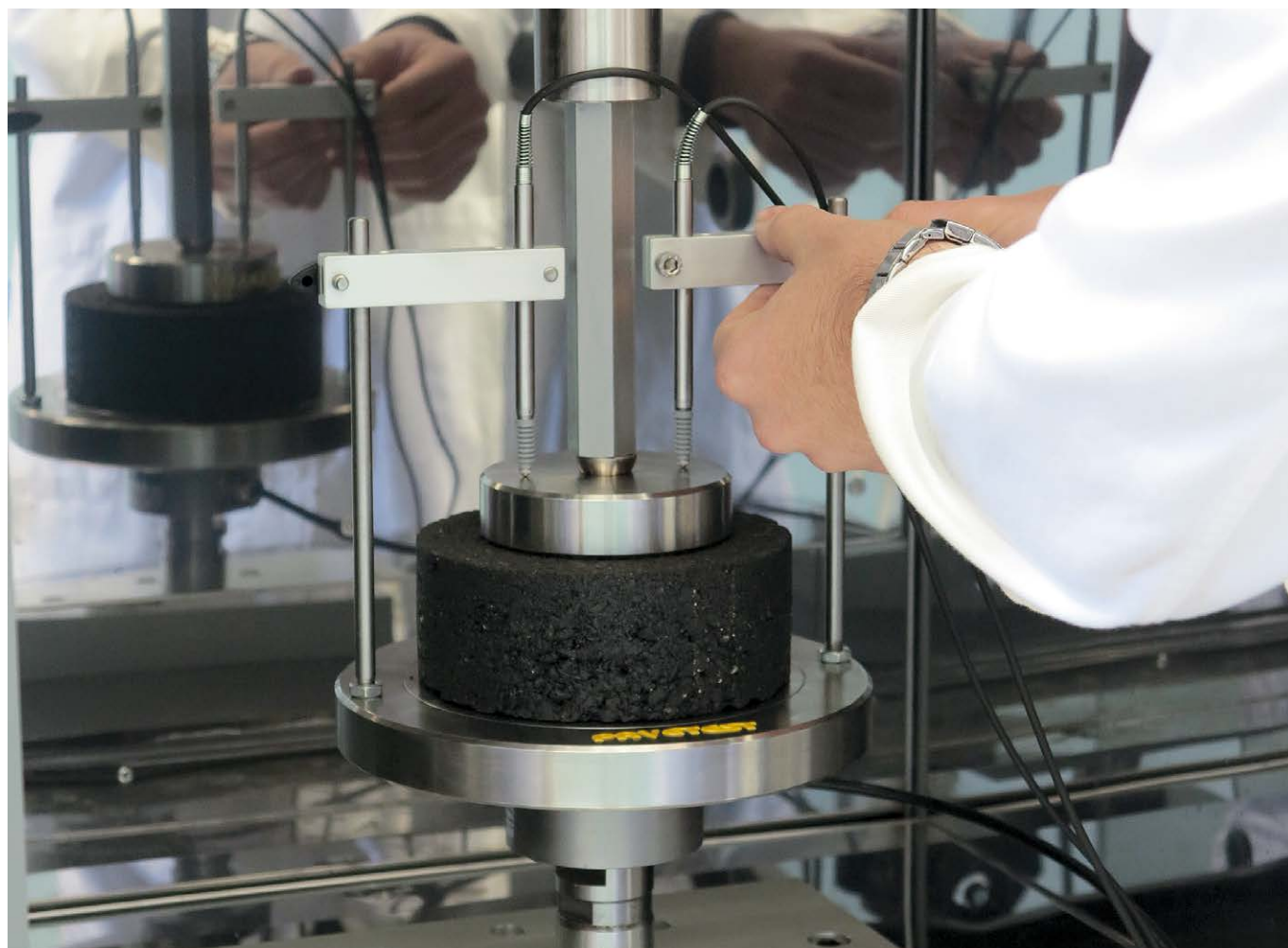


TESTING KIT	RELEVANT STANDARD(S)	WITH DYNAMIC SYSTEM	ACCESSORIES	PICTURE
<b>B250 KIT • IDTM</b> Indirect Tensile Modulus Comprises: <b>B250-01</b> Basic IDT Jig <b>B250-08</b> Yoke <b>B250-09</b> Assembly for B250 KIT <b>B290-01</b> LVDT (0.2 mm) (2 pieces)	AASHTO TP31 Resilient modulus of bituminous mixtures by indirect tension ASTM D4123 Indirect Tension Test for Resilient Modulus of Bituminous Mixtures AS/NZS 2891.13.1 Resilient modulus of asphalt - Indirect tensile method EN 12697-26 Annex C - Indirect tension to cylindrical specimens (IT-CY)	<b>B220-01 KIT</b> Manual DTS-16 with Climatic chamber (B221) <b>B220-02 KIT</b> Motorized DTS-16 with Climatic chamber (B221) <b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)	<b>B250-03</b> Asphalt proving ring <b>B250-04</b> 100 mm diameter PVC specimen <b>B250-05</b> 150 mm diameter PVC specimen <b>B250-06 KIT</b> Torque screwdriver (B250-13) with hexagonal head 4 mm (B250-14)	
<b>B251 KIT • IDTF</b> Indirect Tensile Fatigue Comprises: <b>B250-01</b> Basic IDT Jig <b>B290-03</b> LVDT, double ball ended (3.75 mm) (2 pieces) <b>B251-01</b> LVDT mounting strip gluing jig	EN 12697-24 Annex E – Indirect tensile test on cylindrical shaped specimens	<b>B220-01 KIT</b> Manual DTS-16 with Climatic chamber (B221) <b>B220-02 KIT</b> Motorized DTS-16 with Climatic chamber (B221) <b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)	<b>B251-51</b> Pair of LVDT mounting strip to suit 100 mm specimen (needed accessory) And/or <b>B251-52</b> Pair of LVDT mounting strip to suit 150 mm specimen (needed accessory) <b>B201-52</b> 5 Minute, two part epoxy 24 ml	
<b>B260 KIT • UCC</b> Uniaxial cyclic compression Comprises: <b>B260-01</b> Base assembly <b>B260-02</b> Chamfered top platen <b>B290-02</b> LVDT (10 mm) (2 pieces)	EN 12697-25 Cyclic compression. Test Method A - Uniaxial cyclic compression test with confinement	<b>B220-01 KIT</b> Manual DTS-16 with Climatic chamber (B221) <b>B220-02 KIT</b> Motorized DTS-16 with Climatic chamber (B221) <b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)		
<b>B253 KIT • IDTOS</b> Indirect Tensile modulus, creep compliance and strength using on-specimen transducers Comprises: <b>B250-01</b> Basic IDT Jig <b>B253-01</b> AASHTO T322 LVDT mounting Jig <b>B290-04</b> Miniature LVDT (1 mm) (4 pieces) <b>B253-02</b> AASHTO T322 gauge point template (100 mm specimen) <b>B253-03</b> AASHTO T322 gauge point template (150 mm specimen)	ASTM D7369 Resilient Modulus of Bituminous Mixtures by Indirect Tension Test AASHTO T 322 Creep Compliance and Strength of Hot-Mix Asphalt (HMA) Using the Indirect Tensile Test Device	<b>B220-01 KIT</b> Manual DTS-16 with Climatic chamber (B221) <b>B220-02 KIT</b> Motorized DTS-16 with Climatic chamber (B221) <b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)	<b>B253-53</b> Gauge point (24 needed pieces) <b>B201-52</b> 5 Minute, two part epoxy 24 ml	

TESTING KIT	RELEVANT STANDARD(S)	WITH DYNAMIC SYSTEM	ACCESSORIES	PICTURE
<b>B212 • 4PB</b> Four Point Bending for use with Pavetest B230	AASHTO T 321 Fatigue Life of Compacted Hot-Mix Asphalt (HMA) Subjected to Repeated Flexural Bending ASTM D7460 Fatigue Failure of Compacted Asphalt Concrete Subjected to Repeated Flexural Bending AG:PT/T233 & ASTM 03 Fatigue life of compacted bituminous mixes subject to repeated flexural bending EN 12697-24 Annex D - Four point bending test on prismatic shaped specimens EN 12697-26 Annex B - Four point bending test on prismatic specimens (4PB-PR)	<b>B230</b> DTS-30 with Climatic chamber (B231 or B232)	<b>B210-02</b> 4PB PVC Beam <b>B210-03</b> 4PB Reference beam	
<b>B280 KIT • 2PB</b> Two Point Bending (2PB) to suit B230. Comprises: <b>B280-01</b> 2PB Jig <b>B280-51</b> 2PB Mounting plate (25 mm apex) <b>B280-52</b> 2PB Mounting plate (50 mm apex) <b>B280-53</b> 2PB Mounting plate (base)	EN 12697-24 Annex A - Two-point bending test on trapezoidal shaped specimens (2PB-TR) EN 12697-26 Annex A - Two point bending test on trapezoidal specimens (2PB-TR)	<b>B230</b> DTS-30 with Climatic chamber (B231 or B232)	<b>B290-05</b> LVDT (2 mm) (needed accessory) <b>B280-02</b> Two point Bending (2PB) gluing jig <b>B201-52</b> 5 Minute, two part epoxy 24 ml	
<b>B261 KIT • PD</b> Permanent deformation Comprises: <b>B260-01</b> Base assembly <b>B260-03</b> 100 mm top platen <b>B290-02</b> LVDT (10 mm) (2 pieces)	AS/NZS 2891.12.1 Determination of the permanent compressive strain characteristics of asphalt - Dynamic creep test	<b>B220-01 KIT</b> Manual DTS-16 with Climatic chamber (B221) <b>B220-02 KIT</b> Motorized DTS-16 with Climatic chamber (B221) <b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)	<b>B260-04</b> 150 mm top platen	 B261 KIT   B262 KIT
<b>B255 KIT • E*</b> Dynamic modulus Comprises: <b>B200-02</b> 105 mm bottom loading platen <b>B200-03</b> 105 mm top loading platen <b>B253-04</b> AASHTO T342 LVDT mounting jig (3 pieces) <b>B290-06</b> LVDT (1 mm) (3 pieces) <b>B253-05</b> Screwdriver hex bit with spherical head size 2 mm	AASHTO T342 Determining Dynamic Modulus of Hot Mix Asphalt (HMA)	<b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)	<b>B202</b> Gauge Point Fixing Jig <b>B203</b> Dynamic Verification Device <b>B253-53</b> AASHTO T342 gauge point <b>B201-52</b> 5 Minute, two part epoxy 24 ml	

TESTING KIT	RELEVANT STANDARD(S)	WITH DYNAMIC SYSTEM	ACCESSORIES	PICTURE
<b>B271 KIT • CCT</b> Cyclic triaxial compression Comprises: <b>B270-01</b> Triaxial cell, suitable for 100 mm dia., up to 200 mm height specimens <b>B270-02</b> Triaxial cell external LVDT mounting jig <b>B293-01</b> Pressure transducer ( $\pm 300$ kPa) <b>B270-06</b> 110 mm diameter top loading platen for EN 12697-25B <b>B270-15</b> 110 mm diameter base pedestal for 100 mm height specimen	EN 12697-25 Cyclic compression. Test Method B - Triaxial cyclic compression test	<b>B220-01 KIT</b> Manual DTS-16 with Climatic chamber (B221) <b>B220-02 KIT</b> Motorized DTS-16 with Climatic chamber (B221) <b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)	<b>B290-02</b> Displacement transducer (10 mm) (2 pieces needed) <b>B270-04</b> Air reservoir assembly confining pressure upgrade kit (needed accessory for DTS-16) or <b>B270-03</b> Air reservoir assembly with confining pressure control (needed accessory for DTS-30/130) Requires pressurized air, minimum 7 bar (not included)	
<b>B272 KIT • TRM</b> Triaxial resilient modulus Comprises: <b>B270-01</b> Triaxial cell, suitable for 100 mm dia., up to 200 mm height specimens <b>B270-02</b> Triaxial cell external LVDT mounting jig <b>B293-02</b> Pressure transducer ( $\pm 600$ kPa) <b>S315-07</b> 100 mm diameter bottom platen <b>S314-03</b> 100 mm diameter top platen	AASHTO T307 Determining the resilient modulus of soils and aggregate materials	<b>B220-01 KIT</b> Manual DTS-16 with Climatic chamber (B221) <b>B220-02 KIT</b> Motorized DTS-16 with Climatic chamber (B221) <b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)	<b>B290-02</b> Displacement transducer (10 mm) (2 pieces needed) <b>B270-04</b> Air reservoir assembly confining pressure upgrade kit (needed accessory for DTS-16) or <b>B270-03</b> Air reservoir assembly with confining pressure control (needed accessory for DTS-30/130) Requires pressurized air, minimum 7 bar (not included)	
<b>B254 KIT • SCB</b> Semi-Circular Bending Comprises: <b>B254-01</b> SCB jig <b>B254-51</b> Pair of SCB wear plates	EN 12697-44 Tensile Strength and Fracture Toughness-Crack Propagation	<b>B220-01 KIT</b> Manual DTS-16 with Climatic chamber (B221) <b>B220-02 KIT</b> Motorized DTS-16 with Climatic chamber (B221) <b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)	<b>B250-01</b> Basic Indirect Tensile Jig (needed accessory) <b>B290-07</b> Deformation gauge <b>B290-02</b> Displacement transducer (10 mm) (2 optional pieces)	
<b>B282 KIT • TSRST</b> Thermal Stress Restrained Specimen Test Comprises: <b>B282-01</b> TSRST Temp. Transducer ( $-80^{\circ}\text{C}$ to $+80^{\circ}\text{C}$ ) (3 pieces) <b>B282-02</b> Rod End (2 pieces) <b>B282-03</b> Clevis Yoke and Pin (2 pieces) <b>B282-04</b> Platen (2 pieces) <b>B282-05</b> LVDT Holder (2 pieces) <b>B282-06</b> Invar Rod (250 mm long) (2 pieces) <b>B282-07</b> Multi tack adhesive squares	AASHTO TP10 Thermal Stress Restrained Specimen Tensile Strength EN 12697-46 Low Temperature Cracking and Properties by Uniaxial Tension	<b>B230</b> DTS-30 with Climatic chamber (B232) <b>B240</b> DTS-130 with Climatic chamber (B232)	<b>B290-09</b> Displacement transducer (5 mm) (2 pieces needed) <b>B261-01</b> B230/B240 tension base (needed accessory for DTS30/130) <b>B282-08</b> TSRST specimen gluing jig (1 piece needed) <b>B201-52</b> 5 minute, two part epoxy 24 ml	

TESTING KIT	RELEVANT STANDARD(S)	WITH DYNAMIC SYSTEM	ACCESSORIES	PICTURE
<b>B264 KIT • DT</b> Direct tension testing kit Comprises: <b>B261-02</b> Spherical seat coupling (2 pieces) <b>B261-03</b> 100 mm tension platen (2 pieces)	EN 12697-26 Annex E - Test applying direct tension to cylindrical specimens (DT-CY) or to prismatic specimens (DT-PR) Annex D - Direct tension-compression test on cylindrical specimens (DTC-CY) AASHTO TP 107-14 Standard Method of Test for Determining the Damage Characteristic Curve of Asphalt Mixtures from Direct Tension Cyclic Fatigue Tests	<b>B230</b> DTS-30 with Climatic chamber (B232) <b>B240</b> DTS-130 with Climatic chamber (B232)	<b>B253-04</b> LVDT mounting (3 pieces needed) jig <b>B290-06</b> LVDT (1 mm) (3 pieces needed) <b>B253-05</b> Screwdriver hex bit with spherical head size 2 mm <b>B201-52</b> 5 Minute, two part epoxy 24 ml <b>B202</b> Gauge point fixing jig <b>B253-53</b> Gauge Point (24 pieces) <b>B261-01</b> B230/B240 tension base (needed accessory for DTS30/130)	
<b>B284-01 • DC(T)</b> Disk Shaped Compact Tension Test Kit	ASTM D7313-07a Determining fracture energy of asphalt aggregate mixtures using the disk-shaped compact tension geometry	<b>B230</b> DTS-30 with Climatic chamber (B231 or B232) <b>B240</b> DTS-130 with Climatic chamber (B231 or B232)	<b>B290-12</b> Epsilon Clip-On gauge 12.5 mm (needed accessory) or <b>B290-07</b> Deformation gauge (needed accessory) <b>C090-18</b> Knife edge (Pack of 24)	





## B210 KIT STAND-ALONE SERVO-PNEUMATIC FOUR POINT BENDING (4PB) SYSTEM

STANDARDS: EN 12697-24 Annex D | EN 12697-26 Annex B | AASHTO T321 | ASTM 03 | ASTM-D7460

The Pavetest Servo-pneumatic Four Point Bending (4PB) System is a servo-pneumatic testing machine utilizing digital control of a high performance servo valve to provide accurate loading wave shapes up to 60Hz. The 4PB system can be operated in haversine or sinusoidal, controlled strain or sinusoidal controlled stress mode to determine the flexural stiffness/modulus and resistance to fatigue of asphalt beams of various sizes.

### MAIN FEATURES

- Robust four point loading frame.
- Backlash free rotation and translation on all load and reaction points.
- Fully configurable to suit a large range of testing applications.
- High performance servo-valve.
- Long life pneumatic actuator.
- Digital Servo-pneumatic control.
- 2 axis control and 8 channel data acquisition.



**B210 KIT** comprises:

- **B210-01** Servo-pneumatic Four Point Bending (4PB) Device with 10 mm actuator LVDT,  $\pm 5$  kN load cell. and 2 mm On-specimen LVDT
- **B205** 8 Channel Control and Data Acquisition System (CDAS) & TestLab software
- **B270-12** Air reservoir assembly with membrane dryer

It requires pressurized air, minimum 7 bar (not included)

### B210-01

Servo-pneumatic four point apparatus

The 4PB System is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories, hardware and software in perfect unison.

## TECHNICAL SPECIFICATIONS

### Load frame

- Outer clamp span 355.5 mm (14") and 420 mm
- Nominal beam size(s): 50 mm (h) X 50 mm (w)  
50 mm (h) X 63.5 mm (w)  
70 mm (h) X 70 mm (w)

### Servo actuator

- Capacity  $\pm 5$  kN
- Frequency Up to 60Hz;
- Stroke 10 mm
- Air supply clean dry air
- Pressure 800-900 kPa
- Minimum rate up to 5 litres/sec

### On-specimen transducer

- Range  $\pm 1$  mm
- Resolution 0.0002  $\mu$ m
- Accuracy Better than 5  $\mu$ m

**Power Supply:** 90-264V 50/60Hz 1ph 240W (B210 KIT)

**Dimensions:** 590(h) x 250(d) x 570(w) mm (B210-01)  
410(h) x 250(d) x 570(w) mm (B212)

**Weight:** 45 kg (B210-01)  
35 kg (B212)

## NEEDED ACCESSORIES

**B210-02** 4PB PVC Beam

**B210-03** 4PB Reference beam

**B250-07 KIT** Temperature measuring kit comprising:

- **B292-01** Temperature transducer (-80 °C to +80 °C) (2 pieces)
- **B250-10** Dummy asphalt specimen
- **B250-11** 100 mm "O" ring (3 pieces)
- **B250-12** Thermal conducting grease (about 56 g)



**B210-02** PVC Beam



**B210-01** Servo-pneumatic four point apparatus, detail

## RECOMMENDED ACCESSORIES

**B221** Temperature controlled cabinet: -20 °C to +70 °C to suit DTS-16 or 4PBA

**H009-01EN** PC complete with LCD monitor 22", keyboard, mouse, cables and installation of Testlab software

### 4PBA on DTS16:

**B210-01** Servo-pneumatic Four Point Bending (4PB) device with 10 mm actuator LVDT,  $\pm 5$  kN load cell and 2 mm Onspecimen LVDT (sharing CDAS with DTS 16)

It requires pressurized air (not included).

### 4PBA on DTS30:

**B212** 4PB JIG (sharing CDAS with DTS 30)

### 4PBA on DTS130:

**B210-01** Servo-pneumatic Four Point Bending (4PB) device with 10 mm actuator LVDT,  $\pm 5$  kN load cell and 2 mm Onspecimen LVDT (sharing CDAS with DTS 130)

**B270-12** Air reservoir assembly with membrane dryer

It requires pressurized air (not included).



**B270-12**

Air reservoir assembly with membrane dryer

The specimen is securely clamped using servo-motor driven ball screws **to maintain the prescribed clamping force** and accommodate any compliance of the specimen between the clamping surfaces, during the test. The clamping force is controlled by regulating the motor current.

An **on-specimen (LVDT) displacement transducer** is used **to measure and control the deflection** at the centre of the beam with respect to the outer load/reaction points, as prescribed in the relevant standards.

**Specimen alignment guide**

**Specimen height spacer** to adjust the height of the specimen



A low profile, high performance stainless **steel ring torsion load cell** is used **to measure and control the load**.

The servo-pneumatic system uses a **bottom loading pneumatic actuator coupled to a high performance servo valve**, with PID closed-loop control and run time adaptive control to achieve/maintain the requested strain/stress for the duration of the test.

**Inner and outer clamp control switches**, located on the front of the device, are used to activate and release the inner and outer specimen clamps. The four specimen yokes provide **backlash free rotation and translation** at all load and reaction points.

**B200****AMPT/SPT****ASPHALT MIXTURE PERFORMANCE TESTER**

COMPACT, FULLY SELF CONTAINED, PRECISION ENGINEERED UNIT

The Pavetest AMPT is a servo-hydraulically controlled testing machine specifically designed to perform the three asphalt tests developed under NCHRP Projects 9-19 and 9-29; Dynamic Modulus, Flow Number and Flow Time.

It is also the prescribed equipment in AASHTO TP 79-09 Standard Method Test for Determining the Dynamic Modulus and Flow Number for Hot Mix Asphalt (HMA) using the Asphalt Mixture Performance Tester (AMPT).

In addition, the Pavetest AMPT can also perform Direct Tension Cyclic Fatigue, Indirect Tensile Dynamic Modulus, Incremental Repeated Load Permanent Deformation, Semi-circular bend, and Overlay Testing of Asphalt Mixtures.

The Pavetest AMPT is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and a full complement of accessories, hardware and software in perfect unison.

**MAIN FEATURES**

- Thermoelectric (TE) Heating/Cooling  
More reliable and environmentally friendly than mechanical refrigeration & heating elements.
- Magnetically mounted on-specimen transducer system, based on loose core LVDTs or optional epsilon extensometers.
- Gauge point fixing jig facilitates gluing gauge points and the (top and bottom) platens for proposed AMPT Direct Tension Cyclic Fatigue (S-VECD) Test.
- Dynamic Verification Device.
- Dynaflo™ HPS provides dynamic speed control of the pump motor ensuring quiet operation.
- Optional built-in, silent, air compressor with associated air preparation equipment.

The machine includes:

- 8 Channel Control and Data Acquisition System (CDAS) & TestLab software
- 30 mm Actuator LVDT
- Load cell ( $\pm 20$  kN)
- Pressure transducer ( $\pm 300$  kPa)
- Temperature transducer ( $-80$  °C to  $+80$  °C)
- Magnetically mounted on-specimen LVDT (2 mm) (3 pieces)
- 105 mm bottom loading platen
- 105 mm top loading platen
- Silent air compressor (optional)



**B200 AMPT/SPT Asphalt Mixture Performance Tester**



## TECHNICAL SPECIFICATIONS

<b>Load capacity:</b>	19kN (Static) - 17kN (Dynamic)
<b>Actuator stroke:</b>	30 mm
<b>Specimen size:</b>	100 mm (diameter) x 150 mm (h)
<b>Temperature range:</b>	0 °C to 70 °C
<b>Confining pressure:</b>	0 to 210 kPa
<b>Noise level:</b>	Less than 70 db at 2 m
<b>Power Supply:</b>	230V 50Hz 1ph 3.5 kW
<b>Dimensions:</b>	1510(h) x 680(d) x 1200(w) mm 1870(h) x 680(d) x 1200(w) mm with raised cell
<b>Weight:</b>	330 kg (including oil)

## NEEDED ACCESSORIES

**B201 KIT** AMPT Consumables kit. Comprises:

- **B253-53** Gauge point (24 pieces)
- **B201-52** 5 Minute, two part epoxy 24 ml
- **S311-03** 100 mm Sealing Rings (Pack of 10)
- **B201-53** 100 mm Rubber membrane 0.3 mm thickness (Pack of 10)

## TESTING KITS

**B204 KIT** AMPT Overlay kit. Comprises:

- **B204-01** AMPT Overlay jig
- **B204-02** Pair of Overlay Tester (OT) specimen plates
- **B204-03** OT specimen preparation Jig

**B200-04** AMPT tension platens (2 optional pieces)

**B207-01 KIT** AMPT Indirect Tensile (IDT) kit. Comprises:

- **B207-01** AMPT IDT Jig
- **B253-01** LVDT mounting Jig
- **B253-03** Gauge point template (150 mm specimen)
- **B290-04** AMPT Miniature LVDT (1 mm) (4 pieces)
- **B253-53** Gauge point (32 pieces)
- **B207-02** Cable gland (4 pieces)

**B208** AMPT Semi-Circular Bending (SCB) Jig



Asphalt specimen with on-specimen LVDTs and load cell

## RECOMMENDED ACCESSORIES

- B202** Gauge Point Fixing Jig
- B203** AMPT Dynamic Verification Device
- H009-01EN** PC complete with LCD monitor 22", keyboard, mouse, cables and installation of Testlab software



**B202** Gauge point fixing jig

## CDAS - Control and Data Acquisition System

Pavetest's compact Control and Data Acquisition System (CDAS) delivers unparalleled performance, real time control and ultimate versatility in acquisition.

The AMPT has a stand-alone CDAS, which is common to all Pavetest systems.



**B205** CDAS 8 channels

## B215 OVERLAY TESTER

The Pavetest Overlay Tester is a servo-pneumatic controlled testing machine utilizing digital control of a high performance servo valve to provide accurate loading wave shapes up to 60Hz, specifically designed to determine the susceptibility of asphalt mixtures to cracking according to Texas DOT test procedure Tex-248-F and proposed ASTM Standard WK 26816.

The machine applies cyclic loading to a specimen that is cut from a 150 mm diameter sample into the shape of a rounded end beam. The system comprises a load frame, with one fixed and one moving plate, temperature control system, Control and Data Acquisition System (CDAS) and optional silent air compressor. The specimen is glued to two plates and this assembly is placed in the machine for testing. This is intended to simulate the action of movement under an asphalt overlay to assess how failure might occur in the field due to factors such as thermal expansion / contraction and reflective cracking.

The Pavetest Overlay Tester is underpinned by Pavetest's leading edge CDAS digital controller, TestLab software and all the necessary accessories, hardware and software in perfect unison.

### MAIN FEATURES

- Compact, fully self contained, precision engineered unit.
- Thermoelectric (TE) Heating/Cooling - More reliable and environmentally friendly than mechanical refrigeration & heating elements.
- Optional silent, air compressor membrane dryer.
- Built in verification (Dial gauge).
- Integral stand with wheels.

The machine includes:

- Load frame with one fixed and one moving plate
- 15 kN Servo-pneumatic actuator (10 mm stroke)
- 8 Channel Control and Data Acquisition System (CDAS) & TestLab software
- Load cell ( $\pm 15\text{kN}$ )
- 10 mm displacement transducer
- Thermoelectric Heating/Cooling system
- Temperature transducer  $-80\text{ }^{\circ}\text{C}$  to  $+80\text{ }^{\circ}\text{C}$

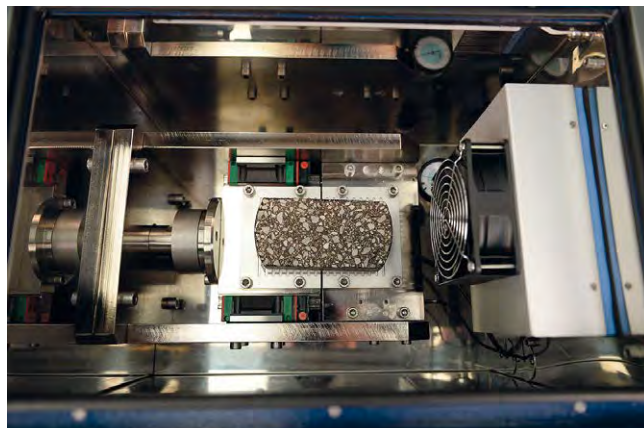
It requires pressurized air, minimum 7 bar (not included)



**B215** Overlay tester

## TECHNICAL SPECIFICATIONS

<b>Load Capacity:</b>	Up to 16 kN (Static)
<b>Actuator stroke:</b>	10 mm
<b>Temperature range:</b>	10 to 60 °C
<b>Noise Level:</b>	Less than 70 db at 2 m
<b>Power supply:</b>	230V 50Hz 1ph 750W or 110V 60Hz 1ph 750W
<b>Dimensions:</b>	980 (h) x 475 (d) x 1085 (w) mm
<b>Weight:</b>	150 kg approx.



## TECHNICAL FEATURES

- **Temperature controller.** The overlay tester is fitted with a temperature controller, which controls the heating/cooling provided by the thermo-electric unit fitted to the machine.
- **The specimen preparation jig allows users to properly locate and glue the specimen on plates.** It can accommodate up to three sets of platens. It includes 2 mm teflon strip, which helps aligning the specimen plates and eliminate the need to saw the glue afterwards, and a dead weight.
- **The Overlay Tester main unit comes fully assembled.** It can be placed on the folding stand supplied, complete with wheels.

## NEEDED ACCESSORIES

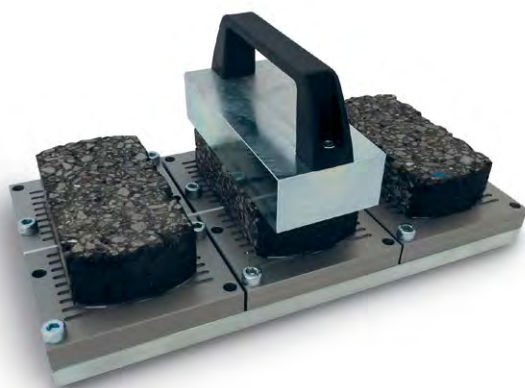
**B204-03** Specimen preparation jig

**B204-02** Pair of specimen plates

**Note:** The quantity depends on the customer's need.



Detail of the wheels



**B204-03**  
Specimen preparation jig



**B204-02**  
Specimen plates

## TSRST-MULTI

### MULTI STATION THERMAL ASPHALT SYSTEM

#### STANDARDS:

**AASHTO TP10-1993** Standard test method for Thermal Stress Restrained Specimen Tensile strength

**EN 12697-46:2012** Test methods for hot mix asphalt Part 46: Low temperature cracking and properties by uniaxial tension tests

## FIRST STAND ALONE SERVO-HYDRAULIC TSRST

#### MAIN FEATURES

- Up to three working stations (electromechanical and/or servo-hydraulic stations).
- Servo-hydraulic actuator: 30 kN static, 25 kN dynamic, double acting, fatigue rated and equal area type with long life Labyrinth bearings & seals.
- Dynaflo™ Hydraulic Power Supply: Variable Frequency Drive 2.2 kW pump motor; Silent operation.
- Ability to clone, modify and/or generate user's own method file(s) to suit their specific requirements.
- Programmable test "Wizard" to guide the operator step by step based on a "recipe book" approach.
- Temperature controller programmed via PC software.



TSRST-MULTI





## PAVETEST TSRST-MULTI: THE NEXT GENERATION OF MULTI-STATION THERMAL ASPHALT SYSTEM

The **Thermal Stress Restrained Specimen Test (TSRST)** is used to determine the low temperature cracking susceptibility of asphalt concrete. In the early 1990s the TSRST was developed by Oregon State University (OSU) as part of the Strategic Highway Research Program. The test method became AASHTO TP10.

# 1

### FIRST STAND-ALONE SERVO-HYDRAULIC TSRST ON THE MARKET

With up to three servo-hydraulic testing station in one unit, Pavetest TSRST-Multi is **the first stand-alone servo-hydraulic low temperature cracking asphalt testing system on the market** able to test up to three different specimens simultaneously, under the same temperature conditions.

### FLEXIBLE

Designed with flexibility in mind, **Pavetest** TSRST-multi can use different combinations of servo-hydraulic and/or electro-mechanical testing stations with **no need for a compressed air supply**.



### VERSATILE

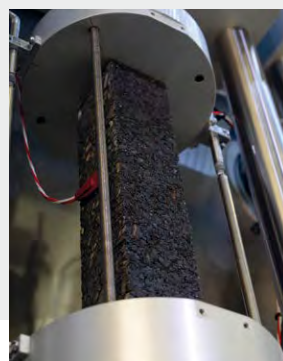
Pavetest versatile TSRST-Multi can be used to evaluate:

- Uniaxial tension stress test (UTST)
- Thermal stress restrained specimen test (TSRST)
- Relaxation time, using the relaxation test (RT)
- Tensile creep tests (TCT)
- Uniaxial cyclic tension stress test (UCTST)
- Uniaxial thermal stress & strain test (UTSST)  
it requires additional hardware



### POWERFUL

Equipped with Pavetest's leading edge Control and Data Acquisition System (CDAS) and TestLab software, the user can control up to 3 testing stations in one unit, with unparalleled performance and ultimate versatility.





### EASY TO OPERATE

Pavetest TestLab software makes it easy to operate the system because it enables the operator to program the temperature controller with ease.



### SAFE

Pavetest TSRST-Multi employs a reliable refrigeration system, capable of cooling at a rate of 10° per hour. **Mechanical refrigeration eliminates the need for liquid nitrogen**, offering a completely safe working environment for the operator.



### QUIET

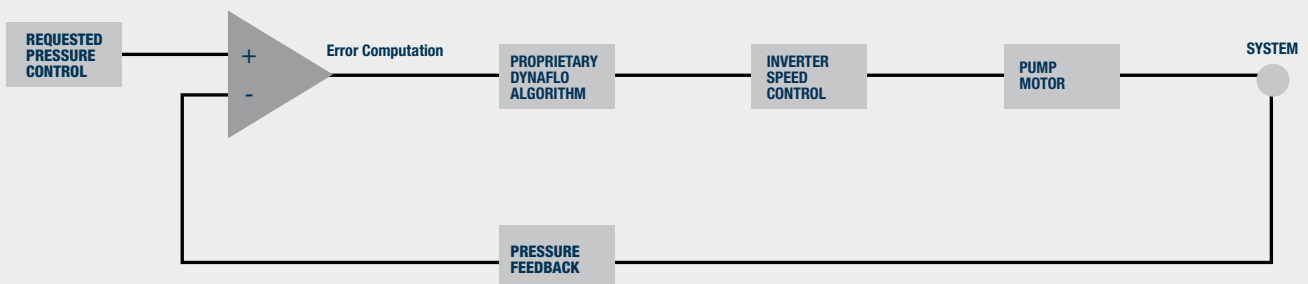
The Electro-mechanical and/or dynamically controlled hydraulic power supply are almost silent during testing.



### DYNAFLO™

The servo-hydraulic station(s) are powered by the Dynaflo Hydraulic Power Supply (HPS). The Dynaflo HPS is an innovative concept based on “inverter” technology: An inverter is used to control the speed of the pump motor to control hydraulic oil flow based on the requirements; **reducing noise and heat generation**, rendering the HPS silent in most applications. It also **improves the longevity of the pump** because it only works as hard as it needs making it quiet, cool and long lasting.

## THE DYNAFLO™ CONCEPT



The **environmental chamber** is constructed from **top quality stainless steel**; stylish, durable and easy to clean.

**Mechanical refrigeration** capable of cooling at  $-10\text{ }^{\circ}\text{C}$  per hour down to  $-40\text{ }^{\circ}\text{C}$ ; no need for liquid nitrogen.

The **modular concept** allows the system to be configured in any combination of, **up to three electro-mechanical and/or servo-hydraulic stations**, without the need for compressed air supply.

The **high performance digital temperature controller** can be programmed through the software; eliminating the arduous task of setting the controller using the tiny buttons on the controller.

**Triple glazed, low-e glass door** offers excellent insulation without compromising visibility.

**Internal lighting** ensures good visibility under all conditions.

Uniquely **low coefficient of thermal expansion invar rods** offer accurate measurement and control over the full temperature spectrum.

**Axial alignment** is achieved using self-aligning couplings.

**Small footprint** makes best use of precious laboratory space.

**Only** requires **electrical power** for easy installation.

**Fully integrated digital control and data acquisition system (CDAS).**





## CONTROL AND DATA ACQUISITION SYSTEM (CDAS)



**B206 16 CHANNEL CDAS**

### CONTROL:

- High speed, (18 bit) digital servo-control, 4/6 axis.
- Digital closed loop update sampling rate of 2.5 kHz.
- Computer programmable, Proportional, Integral and Derivative (PID) control algorithm.
- Adaptive Level Control (ALC) algorithm for best dynamic peak accuracy.
- 3 feedback control modes. E.g. force, position and on-specimen strain.
- "Bumpless transfer" between control modes.

### ACQUISITION:

- Analog inputs are automatically calibrated on power up.
- Simultaneous sampling of all channels.
- 16 Analog ( $\pm 10$  Volt) input channels.
- Up to 64 times over sampling (set to 8 by default).
- 20 bit digital resolution (no auto ranging required).
- Sampling rate up to 192,000 samples/sec.

### COMMUNICATION:

- USB or Ethernet

## ENVIRONMENTAL CHAMBER

- REFRIGERATION RANGE: -40 °C to + 40 °C, capable of cooling at a rate of 10 °C per hour.
- Optional: -50 °C to + 40 °C version.

**Real Time Dashboard** display shows transducer levels, computed data and charted data before, during and after the test has completed.

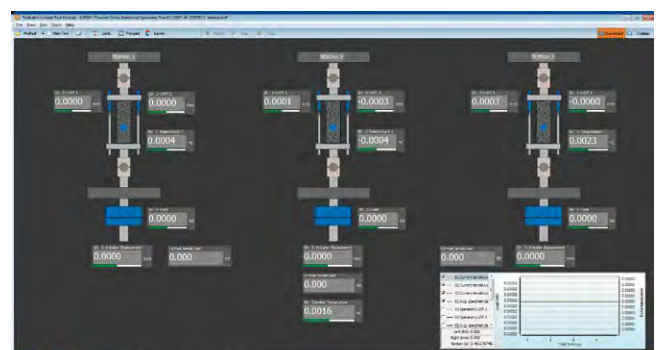
Dynamic image update feature shows visual image representation of specimen failure Multi- axes representation for clear visual presentation of test status for each axes.

Very user friendly presentation simplifies specimen setup in the machine.

The dashboard display feature of Testlab provides the user with an intuitive visual representation of the current status of both the machine and test method. The dashboard shows live transducer level measurements along with nominated key test data information and real time chart updates. This feature is individually customisable for each method file. Pavetest has already available dashboard designs for the more sophisticated tests including multi station TSRST.



**TestLab Universal Test Module**



**TSRST-Multi Dashboard**





## TECHNICAL SPECIFICATIONS

### Loading frame(s)

- Rigid two column frame
- Width of work space: 240 mm
- Height of work space (between the two platens): 285 mm

### Electro-mechanical actuator(s)

- 25kN static with  $\pm 50$  mm stroke (100 mm)
- Internal displacement transducer

### Servo-hydraulic actuator

- 30kN static, 25kN dynamic, double acting, fatigue rated, servo hydraulic actuator, equal area type with long life seals & bearings
- $\pm 50$  mm stroke (100 mm)
- Internal displacement transducer
- Close coupling of servo valve to actuator for best servo performance
- 10  $\mu$ m pressure line filter at actuator for ultimate contamination control
- 0.5 lt hydraulic accumulator with 40 Bar pre-charge for best pressure line regulation at servo-valve.
- High response, VCD direct drive, servo-valve: -3 db @ 350 Hz,  $\pm 5\%$  amplitude (performance curves available on request)

### Load cell(s)

- Low profile Precision Transducers load cell,  $\pm 30$ kN, 0.1%. Normalized output with in-line signal conditioning

### Hydraulic power supply

- Working pressure of up to 160 Bar (low pressure adjustable)
- High/Low pressure selectable from control pendant
- Variable flow rate up to 7.5 liter/min
- Variable Frequency Drive (VFD) 2.2kW pump motor; speed based on demand
- 3  $\mu$ m return line filtration
- Low oil, over temperature and dirty filter displayed
- Remote starting
- Pressure gauge
- Air cooling (Electric fan)



**B282-08** TSRST specimen gluing jig

Simple and easy to use gluing jig for preparing TSRST specimens. The jig provides for perfect alignment and adjustment for different sized specimens. The clamping force is easily set and ensures the end plates are glued perpendicular to the specimen.

## ORDERING INFORMATION

The basic MULTI TSRST includes the main frame, the CDAS, the climatic chamber, the refrigeration unit and at least one between the electro-mechanical or servo-hydraulic station. All available configurations are summarized in the following table:

	ELECTROMECHANICAL STATION	SERVO-HYDRAULIC STATION
<b>B282-10</b>	1	-
<b>B282-11</b>	2	-
<b>B282-12</b>	3	-
<b>B282-13</b>	-	1
<b>B282-14</b>	1	1
<b>B282-15</b>	2	1

## TO PERFORM

- Uniaxial tension stress test (UTST)
- Thermal stress restrained specimen test (TSRST)
- Relaxation time, using the relaxation test (RT)
- Tensile creep tests (TCT)
- Uniaxial cyclic tension stress tests (UCTST)\*\*
- Uniaxial thermal stress & strain test (UTSST)\*\*\*

### External dimensions load frame (including environmental chamber):

1853(h) x 1020(d) x 1230(w) mm

### Hydraulic Power Supply (for Servo-hydraulic station(s)):

700(h) x 520(d) x 570(w) mm

**Weight load frame:** 200 kg approx. without the selected stations configuration

### Electrical requirement for:

**Servo-hydraulic station (each):** 230V 50-60Hz 1ph 2.2kW

### Electro-mechanical station (each):

100-230V 50-60Hz 1ph 0.75kW

**Refrigeration unit:** 380-420V 50Hz 3ph 2.5kW



\*\* Only applicable to servo-hydraulic work station(s)

\*\*\* Additional hardware required

## B040-20 ACD AUTOMATED CORE DRILL

Matest has developed an Automated Core Drill (ACD) for fast, accurate cutting of cores from cylinders, prisms and slabs prepared using Matest's range of asphalt compaction machines; GYROTRONIC-Gyratory Compactor, ASC-Asphalt Shear-box Compactor and field specimens for subsequent testing using Matest/Pavetest's range of leading edge testing systems.

### MAIN FEATURES

- Three selectable drill speeds.
- Clear protective/splash screen conforming to CE standards.
- Ideal for coring prismatic specimens compacted in Asphalt Shear-box Compactor (ASC).
- Suitable to core cylindrical specimens compacted in Gyratory compactor(s).
- Includes water container/tray.
- Adjustable specimen clamp eliminates specimen movement during coring.
- Three position fixture provides easy and accurate specimen positioning.
- Three core supports at fixed spacing yields two or three cores from one prism.
- Optional cylindrical specimen jig.

### SPECIFICATIONS

Drill Bit Diamond/tungsten alloy, laser welded.

Core diameter 100 mm or 150 mm.

Core height up to 40 cm.

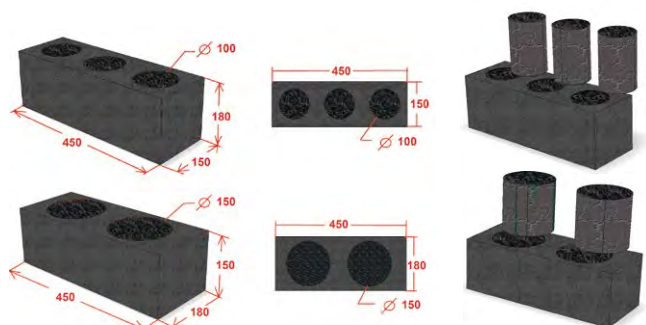
Specimen sizes:

- Cylindrical: 70 mm to 400 mm high x up to 160 mm diameter.
- Prism: 450 mm long x 400 mm high x up to 185 mm wide.
- Prism: 450 mm long x 150 mm wide x up to 400 mm high.
- Slabs: 320 mm x 260 mm, 300 mm x 300 mm  
400 mm x 300 mm, 500 mm x 300 mm

**Dimensions:** 60 cm (L) x 80 cm (D) 140 cm (H)

**Net weight:** 85 kg

**Power supply:** 230V 10A 50Hz 1ph (540/1, 300/1, 800 rpm)  
230V 10A 60Hz 1ph (560/1, 330/1, 850 rpm)  
115V 20A 60Hz 1ph (560/1, 330/1, 850 rpm)



**B040-20**

### ORDERING INFORMATION

**B040-20** Asphalt Core Drill (230V/50-60Hz) for prisms

**B040-20Y** Asphalt Core Drill (110V/60Hz) for prisms

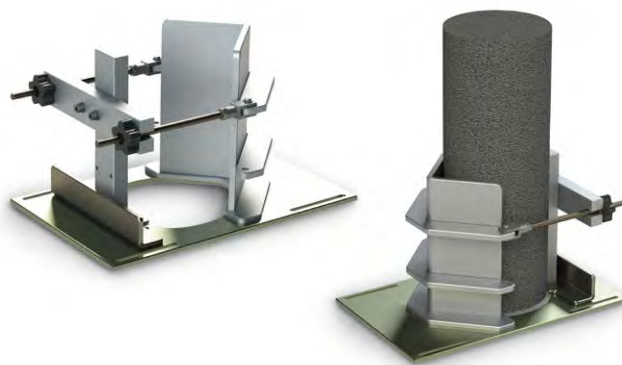
**C339-01** 50 mm Ø x 420 mm long drill bit

**C339-02** 75 mm Ø x 420 mm long drill bit

**C339-03** 100 mm Ø x 420 mm long drill bit

**C339-04** 150 mm Ø x 420 mm long drill bit

**B040-21** Clamping cylindrical specimen jig to suit from 50 mm to 150 mm diameter specimens



## MATEST

### INNOVATIVE. GLOBAL. MANUFACTURER.

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Matest is the leading manufacturer of material testing equipment for the construction industry.

Our vision and mission have constantly been focused on R&D and manufacturing, with an emphasis on innovation and quality.

As a result, in 2012 we have established **Pavetest**, a division committed to developing **innovative dynamic testing systems for asphalt** that are designed to perform, built to last and easy to use.

Pavetest is the brainchild of Australian industry veterans Con Sinadinis (CEO), and Alan Feeley (Technical director), engaged in developing dynamic testing systems with unparalleled performance, ultimate versatility and exceptional reliability, at a price that represents real value for money.

With a proven track record in value engineering, **we can now offer a complete range of static and dynamic products and testing solutions from sample preparation to advanced material research.**

We provide excellent technical support, either directly or through our network of distributors.

Contact us at [info@matest.com](mailto:info@matest.com)  
for any further information on Pavetest products!



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[www.pavetest.com](http://www.pavetest.com)





PAVETEST IS A DIVISION OF MATEST  
COMMITTED TO DEVELOPING INNOVATIVE  
DYNAMIC TESTING SYSTEMS.

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