



CONTROLS GROUP



ADVANCED PAVEMENTS TESTING SYSTEMS

AMPT PRO[®]

Next Generation Asphalt Mixture
Performance Tester

Next Generation AMPT PRO®



IPC Global, the researcher's choice for advanced asphalt testing equipment has again set the benchmark for innovation and performance with the new AMPT PRO.

AMPT PRO has been designed with the latest technologies and product developments to ensure that it surpasses any other product on the market.

AMPT PRO fully complies with AASHTO T378 (TP79) and can perform the three asphalt tests of NCHRP Projects 9-19 and 9-29 – Dynamic Modulus, Flow Number and Flow Time with ease.

In addition AMPT PRO can also perform Uniaxial Fatigue/SVECD, Overlay Test, Semi-Circular Bend, Indirect Tensile Dynamic Modulus, Small Diameter Dynamic Modulus, and iRLPD tests with the addition of optional hardware accessories.

AMPT PRO® will help you:

Improve



- Mix designs that perform
- Structural designs
- Pavement life and reduce maintenance

Evaluate



- HMA mixes
- Modified HMA

Create



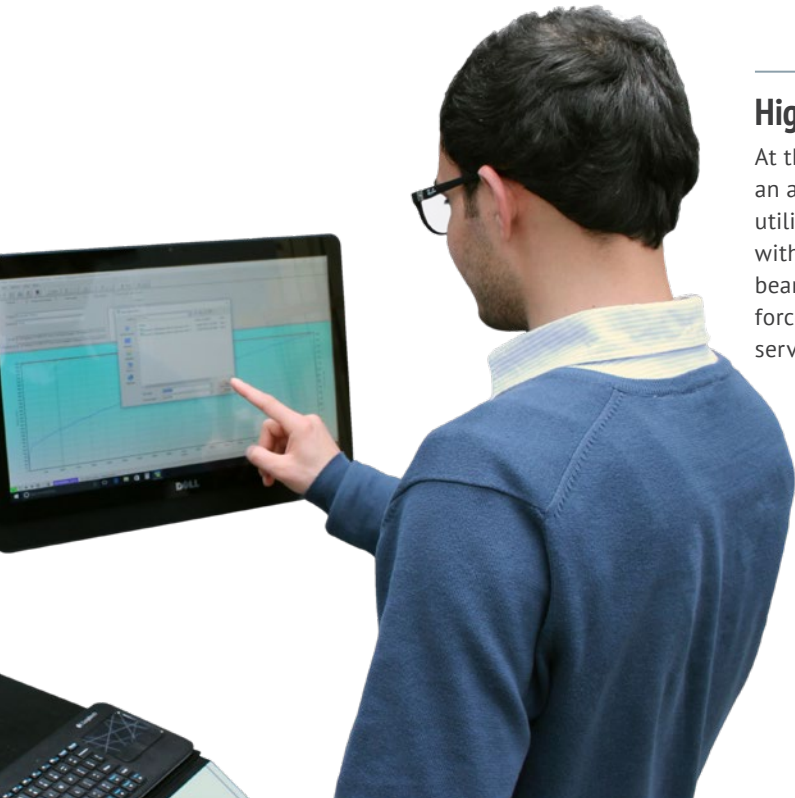
- Master curves

Analyze



- Pavement failure

Features and Benefits



Lower Temperatures

Significantly improved ECU performance and innovative cell design allow the AMPT PRO to rapidly reach sub zero temperatures previously not possible.

All-in-One Computer Control

AMPT PRO is ready to work straight out of the box with the latest All-in-One touchscreen PC technology at your finger tips (optional).

Easy and Versatile

AMPT PRO features interchangeable transducers and load cells with “plug and play” signal conditioners allowing for quick and easy transition of test set-ups.

Clarity in Results

Controlling the AMPT PRO is IPC Global's Integrated Multi-Axis Control System (IMACS). The tried and tested IMACS delivers leading edge performance, unparalleled control and the ultimate in flexible data acquisition.

High Performance

At the heart of the AMPT PRO is an all new Hydraulic Power Supply utilizing inverter technology coupled with a high performance labyrinth bearing actuator to deliver 19kN of force, greater reliability and longer service life.



Rapid Cooling

Experience increased productivity with AMPT PRO's rapid cooling functionality. AMPT PRO can cool from an ambient temperature of +23°C down to +4°C in under 30 minutes and reaches temperatures down to -5°C.

Fully Integrated (Optional Air Compressor)

Fully integrated and compact in design the AMPT PRO is the perfect solution for both static and mobile testing facilities. An optional integrated air compressor eliminates the need for an external air compressor with the whole system only requiring power to operate.

Testing Efficiency

AMPT PRO has been designed as an easy-to-use and ergonomic testing system that greatly increases the efficiency of asphalt testing.

IPC Global's original Asphalt Mixture Performance Tester (AMPT) was the culmination of two National Cooperative Highway Research Program (NCHRP) projects. IPC Global have been involved in these projects from the beginning with development work done on IPC Global equipment. IPC Global's AMPT has been evaluated successfully by NCHRP.

All-in-One Computer Control

Available with an optional all-in-one touchscreen PC, AMPT Pro is easy to set-up and operate. The all-in-one PC, with wireless keyboard and trackpad, minimizes cabling allowing for more workspace atop the AMPT Pro.

The PC is mounted using a spring activated desk stand that provides ergonomic support and a high range of movement, including generous upward tilt and long arm reach. Three points of articulation enables effortless adjustment and is the ideal solution for Activity Based Workplaces.

Fully-integrated and Robust

IPC Global's innovative thinking has produced the all-in-one compact AMPT PRO.

A fully-integrated HMA testing machine incorporating high-performance labyrinth bearing hydraulic actuator; quiet, air-cooled Hydraulic Power Supply; refrigeration and heating unit; compressed air-driven confining pressure system; integrated triaxial cell; environmental chamber with its own temperature control unit; digital control and data acquisition system; optional integrated air compressor; and optional all-in-one touchscreen computer.

AMPT PRO benefits from an all new Hydraulic Power Supply utilizing inverter technology coupled with a high performance labyrinth bearing actuator. AMPT PRO delivers 19kN of force, greater reliability, longer service life and accurate results every time. With greater force and unparalleled control AMPT PRO provides world leading performance and is ready for future testing requirements.

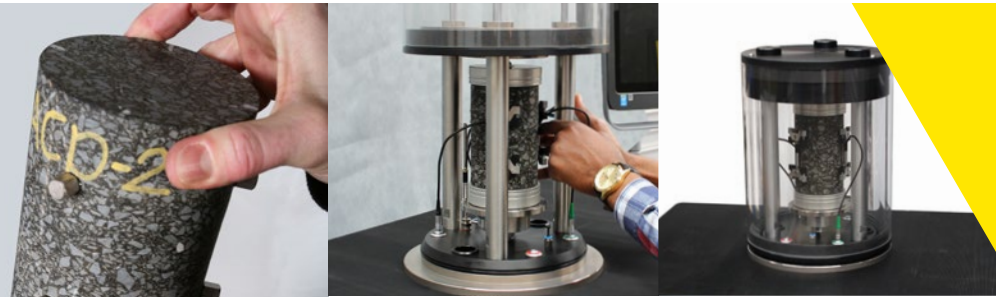
Robust and transportable, AMPT PRO is the ideal solution for both static laboratories and mobile facilities.

A United Effort

IPC Global's original AMPT was designed to perform, and has been approved for, the three asphalt tests of Projects 9-19 and 9-29 of the National Cooperative Highway Research Program (NCHRP). AMPT PRO complies with AASHTO T378/TP79 determining the Dynamic Modulus and Flow Number for Hot Mix Asphalt (HMA).

AMPT PRO can perform all the tests of the original AMPT with greater performance as well as new tests that have been developed specifically for the AMPT such as Uniaxial Fatigue/ SVECD, Overlay Test, Semi-Circular Bend, Indirect Tensile Dynamic Modulus, Small Diameter Dynamic Modulus, and iRLPD.





Quick and Easy

Improved Performance and Streamlined Operations

The Ultimate in HMA Testing Tools

The system's software and controller accurately and automatically control the confining pressure. Temperature controlled air, in the integrated pressure vessel, is re-circulated by an electric fan and is regulated by an internal heat exchanger. The air temperature is measured half way up the specimen and controlled using a dedicated temperature (PID) controller that provides thermal equilibrium within three minutes of closing the cell.

- Three axial strain transducers, equally spaced around the circumference of the specimen provide strain measurement averaging and eliminate errors caused by non uniform bending during the dynamic modulus test.
- The clip-on strain transducer mounts and spring-loaded displacement transducers are quick and easy to attach. Epsilon extensometers are available as an option.
- The Swiss-made base connectors make a quick and reliable connection.



Intelligent Testing Chamber

One of the most important features of the AMPT PRO is the specimen testing chamber. For this, IPC Global developed a new high specification triaxial cell, which doubles as an environmental chamber. The ingenious new design has improved air flow for heat removal resulting in increased energy efficiency and cooling performance. The internal fan utilizes a longer life DC brushless motor.

The crystal clear acrylic triaxial cell allows unimpeded (360 degree) view of the specimen and is automatically raised and lowered with a two-button safety interlock. This innovative design eliminates physical movement of the heavy cell assembly when changing test specimens.



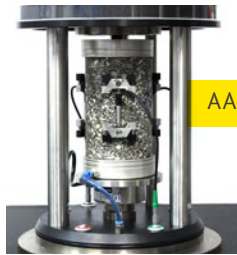
Easily Interchangeable, Pluggable Transducers

IPC Global's AMPT PRO features easily interchangeable transducers and load cells with "plug and play" signal conditioners allowing you to quickly change between different test set-ups. The lockable side drawer and interchangeable transducers are unique to IPC Global's AMPT PRO. Eight BNC connectors provide raw analogue outputs from the signal conditioners to permit the use of external data logging equipment.

Rapid Cooling

Significantly improved ECU performance and innovative cell design allows AMPT PRO to rapidly reach sub zero temperatures previously not possible. The test chamber can cool from an ambient temperature of +23°C down to +4°C in under 30 minutes and reaches temperatures down to -5°C.

Test Kits



AASHTO T378/TP79 | NCHRP 9-29

Dynamic Modulus E^*

A performance-related property, for mixture evaluation and characterising the stiffness of HMA. It is as an important input parameter for AASHTO+ “Mechanistic-Empirical Pavement Design Guide”.

- Create master curves for structural design
- Assess modified binders and local materials
- Forensic analysis of pavement failure

+ AASHTO T342/TP62 available on request, limitations apply



NCHRP 9-29 | AASHTO TP XX

Flow Number /Time /Stress Sweep Rutting (SSR)

Flow number:

- A measure of resistance to permanent deformation
- Repeated load creep tests
- Rutting evaluation
- Accurate simulation of actual loading

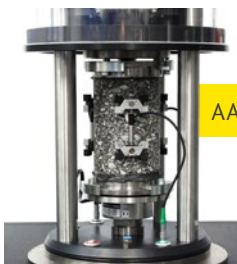
Flow time: static creep tests



AASHTO TP116

iRLPD

The iRLPD Kit has been designed to measure the resistance of asphalt mixtures to permanent deformation using Minimum Strain Rates from Incremental Repeated Load Permanent Deformation (iRLPD).



AASHTO TP107 (SVECD) | SCDUF

Uniaxial Fatigue Kit / SVECD

The Uniaxial Fatigue Kit allows AMPT PRO to perform tension tests (plus through zero push-pull fatigue), including the Simplified Continuum Damage Uniaxial Fatigue test (SCDUF) and Dr. Richard Kim’s Simplified Viscoelastic Continuum Damage test (SVECD) AASHTO TP107.



Tex-248-F | ASTM WK 26816

Overlay Test Kit

The advanced design provides high stiffness and extremely low compliance. This kit enables the AMPT PRO to conduct the Overlay Test for Fatigue Cracking which can be incorporated into Mechanistic-Empirical design system for flexible pavements.



Small Diameter Dynamic Modulus Kit

The Small Diameter Specimen Dynamic Modulus Kit allows researchers to perform dynamic modulus tests on 38mm and 50mm diameter specimens. Small diameter specimens are more easily obtainable from the field and allows dynamic modulus and flow number tests to be conducted for forensic analysis.



AASHTO TP124 (Illinois SCB) /
ASTM D8044 (LSU SCB)

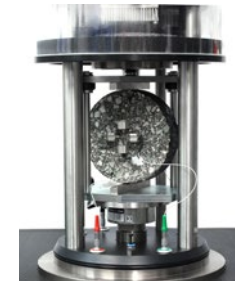
Semi-Circular Bend (SCB) Kit

Specifically designed to determine the critical strain energy of asphalt specimens to compare the fracture properties of asphalt mixtures with different binder types.



Small Diameter Uniaxial Fatigue Kit

The Small Diameter Specimen Uniaxial Fatigue Kit allows researchers to perform tension tests (plus through zero push-pull fatigue), on 38, 50 or 75mm diameter specimens. Small diameter specimens are more easily obtainable from the field therefore allowing Uniaxial Fatigue Tests to be conducted for forensic analysis.



Multi-indirect Tensile Kit

The AMPT PRO Multi-indirect Tensile Kit is specifically designed for analysis of Dynamic Modulus of bituminous mixtures by repeated load indirect tensile testing. The modulus tests are used to characterize asphalt mixtures for performance based road pavement design.



AASHTO T378/TP79/T342/TP62/TP107

Proving Ring

Proving Ring assembly:

- Compression/Tension operation
- Dynamic Modulus E* verification
- Uniaxial Tension Fatigue SVECD verification



Tension Platen Fixing Jig

Improve the accuracy, repeatability and efficiency of your specimen preparation with IPC Global's Tension Platen Fixing Jig. The Jig ensures accurate perpendicularity of specimens and parallel placement of platens.



Gauge Point Fixing Jig

Improve the accuracy, repeatability and efficiency of your specimen preparation at the flick of a switch. Equipped with the ability to quickly change between two, three or four gauge point setting arms at 180°, 120° or 90° spacing the Gauge Point Fixing Jig is also fitted with a "built-in" vacuum generator and handy membrane stretcher.

IMACS Control & Data Acquisition

Controlling the AMPT PRO is IPC Global's Integrated Multi-Axis Control System (IMACS). IMACS delivers leading edge performance, unparalleled control and the ultimate in flexible data acquisition.

For servo-controlled testing machines, IMACS provides excellent waveform fidelity from integrated channel acquisition and control functions at 5kHz simultaneously on all channels.

IMACS has low data noise performance with 4x over-sampled data and selectable filtration. It provides exceptional data resolution and control with up to 20-bit effective auto-ranging data acquisition. The flash-based firmware allows field updates of all modules.

AMPT PRO features two control axis and up to 8 channels of data acquisition. The Control & Data Acquisition system can be customized in accordance to your individual testing requirements. With IPC Global's IMACS you will have total confidence in your testing results.

“

In my 20 years of working with Testing Equipment related to Asphalt and Asphalt mixtures, I have never come across such beautifully engineered material testing equipment [*sic* AMPT].”

Dr. J. Murali Krishnan, Indian Institute of Technology Madras



IMACS – Integrated Control & Data Acquisition System

- Real-time digital computer control with 32-bit processing
- Fully integrated acquisition and control functions
- Acquisition at speeds up to 5kHz, simultaneous on all channels
- Low data noise performance with 4x over-sampled data
- Exceptional data resolution and control with up to 20-bit auto-ranging data acquisition
- Flash based firmware allows field updates of all modules
- USB communication USB 2.0 communication port at 12Mb/s and Ethernet communication port at 10/100Mb/s
- Total confidence in measurements from analogue inputs that auto-calibrate on power-up
- Acquisition and Control – 2 axis control (actuator and confining pressure), up to 8 channel data-acquisition (actuator displacement, axial load, confining pressure, temperature and 4x normalized transducer inputs e.g. for displacement).

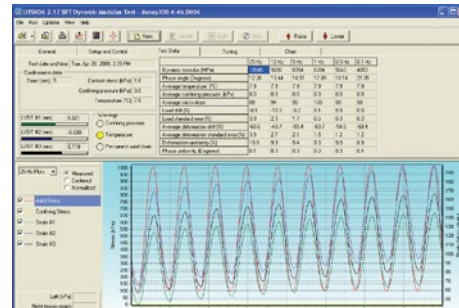
World-class Software Application

IPC Global's powerful and professional UTS Software draws upon over 25 years of advanced materials testing experience.

IPC Global's test and control software is known for its simplicity in use, clarity of results and analytical power.

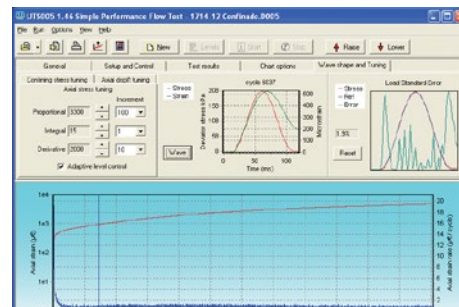
UTS Software is developed from expert knowledge of applications to run automated test routines and therefore speeds up testing. Written in powerful, professional Delphi, the UTS software features real-time graphs for monitoring the specimen under test; portable binary data files for sharing, reviewing & analysis; and 'live' transducer levels display.

The purpose-built UTS applications have dialogue help boxes for automated test routines and easy-to-read graphic screens for test set-up and reviewing.



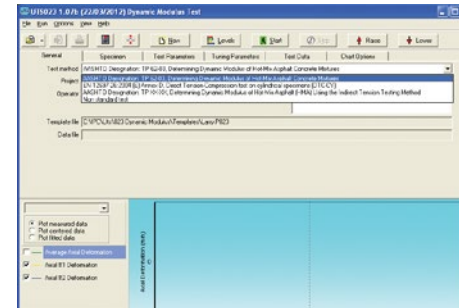
Powerful professional Delphi software

Save time analyzing your materials using UTS software's clear, precise, rich, user friendly tab-based interface with multiple real time graphical displays.



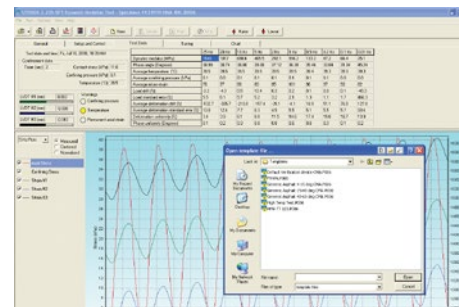
The ultimate in clean accurate data

IMACS integrated control and data acquisition with 4x oversampling technology, auto-ranging and effective 20-bit data resolution gives unparalleled control and waveform fidelity.



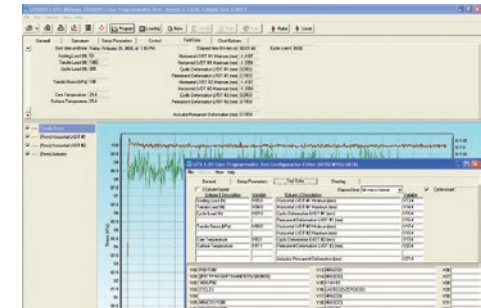
Purpose-written test applications

With UTS test applications written around international standards you can concentrate on analyzing your materials; not on programming your testing machine.



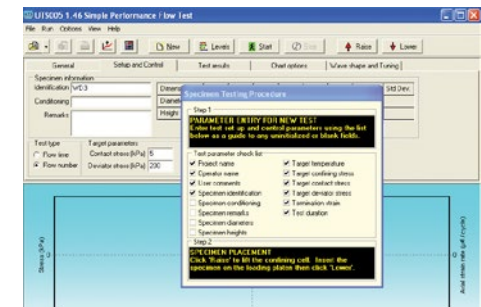
Test templates

Specific test settings can be entered and saved by the Chief Engineer or Laboratory Manager for easy recall and testing by laboratory technicians. There is no need to configure the machine each time you want to perform a specific test.



Automated test routines

Easy to follow tool tips built into UTS guides users with simple and clear step by step instructions for running pre-programmed tests. Ensuring that all required parameters are set and are able to be turned off by more advanced users.



All test data saved in portable binary files

A powerful feature unique to UTS software. When the test is finished UTS saves in a binary file the results, data points, test set-up parameters and calibration parameters. This means that at any time in the future the test can be reviewed as if it has just been performed complete with all test control, PID, specimen settings and results.

Specifications

Load Capacity	Static: 19kN / Dynamic: 17kN
Frequency Range	0.01 to 70Hz sinusoidal loading
Actuator Stroke	30mm (+/-15mm stroke)
Actuator Type	Labyrinth Bearing
Temperature Range	-5 to +70°C in an ambient temperature of +23°C
Temperature Accuracy	+/-0.2°C at temperature probe positioned close to specimen
Cooling Rate	Typically cools to +4°C in 30 minutes at an ambient temperature of +23°C

Triaxial Cell

Cell Dimensions	270 x 390mm (Dia. x H)
Confining Pressure	0 to 225kPa
Specimen Size	100 x 150mm (Dia. x H) nominally 50 x 135mm (Dia. x H) 38/50 x 110mm (Dia. x H)

Reaction Frame

Noise Level	Less than 70db at 2m
Computer Control	Integrated all-in-one touchscreen PC (optional)
Air Compressor and Dryer	Low noise, integrated, automated operate-on-demand (optional)
Dimensions	1,359 x 1,350 x 739mm (H x W x D)
Weight	275kg (including oil)

Transducers

Load Cell	Low profile pancake type
Built-in Actuator LVDT	30mm Stroke
Pressure	0kPa – 225kPa
On-Specimen Displacement	3 clip-on +/-0.5mm LVDTs, compatible with up to 4 (Various optional loose-core, strain gauge transducers available)
Temperature Probe Range	-25°C to +80°C
Plug-and-Play	Up to four interchangeable on-specimen displacement transducers, plus easily interchangeable load cells

Services

Power (without air compressor)	220V–240V, 50Hz, single phase, 17A 208V, 60Hz, single phase, 20A
Power (with air compressor)	220V–240V, 50Hz, single phase, 22A 208V, 60Hz, single phase, 25A
Air	Clean dry air at 450-800kPa; 2 L/sec (Optional integrated Air Compressor available)
Hydraulic Oil	Pre-filled with high specification pre-filtered, ISO 46 Premium Mineral Oil

Optional Accessories

- Uniaxial Fatigue Kit/SVECD
- Indirect Tensile Kit
- Overlay Test Kit
- Small Diameter Dynamic Modulus
- SCB (Semi-circular Bend) Kits
- iRLPD

Control & Data Acquisition—IMACS

Configuration	Fully integrated
Real Time Digital	
Computer Control	32-bit Processing
Acquisition Speeds	5kHz (simultaneous on all channels)
Data Oversampling	At least 4x
Data Resolution	20 bit auto-ranging data acquisition
Communication	USB 2.0: 12Mb/s / Ethernet: 10/100Mb/s
Firmware Update	Flash based
Analogue Inputs	Auto-calibrate on power up
Analogue Outputs	8 BNC connectors for raw data logging
Control	2 axis control (actuator and confining pressure)
Acquisition	Up to 8 Channel data acquisition (actuator displacement, axial load, 3 to 4 on-specimen displacement transducers, confining pressure and temperature)

Sample Preparation Equipment

Ordering information

Please see IPC Global Advanced Pavements Testing Systems catalogue and www.controls-group.com/ipcglobal.



PREsBOX®

Asphalt Prism Shearbox Compactor

PREsBOX provides the latest in asphalt specimen preparation and mix evaluation technology. High quality asphalt prisms are produced, from which beams and cylinders with excellent air voids distribution, homogeneity and particle orientation can be cut. With minimal operator involvement PREsBOX allows rapid and repeatable production of asphalt specimens in the laboratory.



Galileo and Galileo Research

Advanced Research Gyratory Compactors

The new flagship gyratory compactor that incorporates innovative Electromechanical Servoactuation and patented Orbital gyratory motion system.



Autosaw II

Advanced Automated Asphalt Saw

The new and improved Autosaw II is the most advanced asphalt cutting saw available and is the perfect device for advanced testing laboratories. Its fully automated asphalt sawing system with integrated clamping system allows for fast and easy cutting of rectangular beams, trapezoidal prisms, overlay test specimens, semi-circular specimens, and trimming of cylindrical specimens.



Multi Core-Drill

Advanced Asphalt Core Drill

The Multi Core-Drill is a superior laboratory asphalt core drill whose robust and rigid design provides precise coring of asphalt prisms, cylindrical and slab samples to the highest quality. Designed to be easy to use, flexible and adaptable, it ultimately provides users with precise drilling capabilities, enabling users to have absolute confidence in the quality of their test specimens and the reliability of their test results.

Testing Standards Available

- ✓ AASHTO T378/TP79 – Dynamic Modulus E*
- ✓ AASHTO TP XX – Flow Number
- ✓ Draft Stress Sweep Rutting (SSR)
- ✓ AASHTO TP107 – Damage Characteristic Curve from Direct Tension Cyclic Fatigue (SVECD)
- ✓ AASHTO TP124 (Illinois SCB) – Fracture Potential Using the Flexibility Index Test (FIT)
- ✓ ASTM D8044 (LSU SCB) – Cracking Resistance using Semi-circular Bend Test at Intermediate Temperatures

- ✓ AASHTO T342/TP62 – Dynamic Modulus (Limited temperature and force range)
- ✓ Indirect Tensile Dynamic Modulus
- ✓ ASTM WK 26816 – Cracking Using the Overlay
- ✓ Tex 248-F Overlay Test – Reflective Cracking or Fatigue
- ✓ SCDUF – Simplified Continuum Damage Uniaxial Fatigue
- ✓ AASHTO TP116 – Rutting Resistance Using iRLPD

► IPC Global Customer Care

At IPC global we are proud of our products.

We are dedicated to supplying high quality, accurate, affordable, easy-to-use systems for Advanced Testing of asphalt, binders and other pavement materials.

As a valued customer of IPC Global you will receive continuous, expert support and advice for your instrument. Furthermore, we offer full installation and training in the correct operation of your IPC Global equipment.

For support from our expert Customer Care Team, contact your local IPC Global-Controls office/distributor or email ipcglobalsupport@controls-group.com.

Visit our website for more information www.controls-group.com/ipcglobal.



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