IPC Global®

AMPT PRO™
Next Generation Asphalt Mixture Performance Tester

The science of testing made easy®

Watch the AMPT video:
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.

The 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 TP 79 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 the 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.
Clarity in Results
Controlling 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.

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

High Performance
At the heart of the AMPT Pro is an all new Hydraulic Power Supply utilising 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.

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.

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

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.

Key Features and Benefits:
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 all-in-one touchscreen PC the AMPT Pro is easy to set up and operate. The all-in-one PC, with optional wireless keyboard and trackpad, minimises 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 pump; 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.

The AMPT Pro benefits from an all new Hydraulic Power Supply utilising 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 TP 79 Determining the Dynamic Modulus and Flow Number for Hot Mix Asphalt (HMA).

The 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.
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 utilises 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 allow the 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

**DYNAMIC MODULUS E* (Included as standard)**
AASHTO TP 79 | NCHRP 9-29
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

**FLOW NUMBER (Included as standard)**
NCHRP 9-29 | AASHTO TP XX
Flow number is related to the resistance of HMA to permanent deformation.
- Repeated load creep tests
- Evaluate rutting
- Accurate simulation of actual loading

**FLOW TIME (Included as standard)**
NCHRP 9-29
Flow time is a quick and simple measurement of the resistance of HMA to permanent deformation.
- Static creep tests
- Measure permanent deformation for rutting evaluation

**UNIAXIAL FATIGUE KIT / SVECD**
AASHTO TP 107 (SVECD) | SCDUF
The Uniaxial Fatigue Kit allows the AMPT P to perform tension tests (plus through zero push-pull fatigue), including the Simplified Continuum Damage Uniaxial Fatigue (SCDUF) test and Dr. Richard Kim’s Simplified Viscoelastic Continuum Damage test (SVECD) AASHTO TP 107.

**OVERLAY TEST KIT**
Tex-248-F | Draft ASTM WK 26816
The advanced design provides high stiffness and extremely low compliance. This kit enables the AMPT P to conduct the Overlay Test for fatigue cracking which can be incorporated into Mechanistic-Empirical design system for flexible pavements.

**SEMI-CIRCULAR BEND (SCB) KIT**
LSU Draft ASTM SCB | Illinois Draft for AASHTO SCB
Specifically designed to determine the critical strain energy of asphalt specimens to compare the fracture properties of asphalt mixtures with different binder types.
The Small Diameter Specimen Dynamic Modulus Kit allows researchers to perform dynamic modulus tests on 38mm & 50mm diameter specimens. Small diameter specimens are more easily obtainable from the field and allows dynamic modulus, flow number and uniaxial fatigue tests to be conducted for forensic analysis.

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).

The gauge point fixing jig makes it quick and easy to accurately fix gauge points for on-specimen transducers with just the flick of a switch. This eliminates potential errors and saves time. The fixing jig comes with 'built-in' vacuum generator and handy membrane stretcher.

Quad gauge point fixing jig also available

The overlay test specimen preparation kits incorporate specially designed gluing jig base plates, straight edge and sample templates, allowing for accurate sample cutting, easy alignment and gluing of the specimen onto the test platens. Overlay test gluing jigs are available in both triple specimen and single specimen base plates.

The AMPT Pano 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 characterise asphalt mixtures for performance based road pavement design.

The Tension Platen Fixing Jig improves 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.

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

AMPT Indirect Tensile Dynamic Modulus Test

The AMPT Pano 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 characterise asphalt mixtures for performance based road pavement design.

The Small Diameter Specimen Dynamic Modulus Kit allows researchers to perform dynamic modulus tests on 38mm & 50mm diameter specimens. Small diameter specimens are more easily obtainable from the field and allows dynamic modulus, flow number and uniaxial fatigue tests to be conducted for forensic analysis.
Controlling AMPT Pro is IPC Global’s Integrated Multi-Axis Control System (IMACS). IMACS delivers leading edge performance, unparalled 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 2 control axis and up to 8 channels of data acquisition. The Control & Data Acquisition system can be customised in accordance to your individual testing requirements. With IPC Global’s IMACS you will have total confidence in your testing results.

† See White paper ‘Ensure Reliable Results: The Case For Robust Control & Data Acquisition’. Contact sales@ipcglobal.com.au for your copy.

Integrated Control & Data Acquisition System (IMACS):
• 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 normalised transducer inputs e.g. for displacement.

“In my 15 years of working with testing equipment related to asphalt and asphalt mixtures, I have never come across such beautifully engineered material testing equipment.”

Dr. J. Murali Krishnan, Indian Institute of Technology Madras
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. UTS Software is written in powerful, professional Delphi. IPC Global’s 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 analysing your materials using UTS software’s clear, precise, rich, user friendly tab-based interface with multiple real time graphical displays.

Purpose-written test applications
Benefit from more than 25 years of IPC Global’s expert software application development. With UTS test applications written around international standards you can concentrate on analysing your materials; not on programing your testing machine.

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.

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.

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.

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 setup 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.
Load Capacity
Static: 19kN / Dynamic: 17kN

Frequency Range
0.01 to 70Hz sinusoidal loading

Actuator Stroke
30mm (+/-15mm stroke)

Actuator Type
Labyrinth Bearing

Specimen Size
- 100 x 150mm (Dia. x H) nominally
- 50 x 135mm (Dia. x H)
- 38/50 x 110mm (Dia. x H)

Temperature Range
-5°C to +70°C*

Cooling Rate
Typically cools to +4°C in under 30 minutes*
*At an ambient temperature of +23°C.

Temperature Accuracy
+/-0.5°C

Cell Dimensions
270 x 390mm (Dia. x H)

Confining Pressure
0 to 225kPa

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 (HxWxD)

Weight
250kg (excluding oil)

Transducers
Load Cell
Low profile pancake type

Built-in Actuator LVDT
30mm Stroke

Pressure
35kPa–225kPa

On-Specimen Displacement
3 clip on +/-0.5mm LVDTs
Compatible with up to 4 (Various optional loose-core, strain gauge transducers available)

Temperature
-10°C to +75°C

Plug-and-Play
Up to 4 interchangeable on-specimen displacement transducers, plus easily interchangeable load cells

Services
Power
208V~230V, 50Hz/60Hz, single phase, 15A

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

Testing Standards Available
- NCHRP 9-29 - SPT Equipment Specification
- AASHTO TP 79 - Dynamic Modulus and Flow Number for Hot Mix Asphalt
- AASHTO TP XX - Flow Number for Asphalt Mixtures
- AASHTO TP 107 - Damage Characteristic Curve from Direct Tension Cyclic Fatigue Tests on Asphalt Mixtures (SVECD)
- AASHTO TP 116 - Rutting Resistance Using iRLPD
- AASHTO T 342/TP 62 - Dynamic Modulus of Hot-Mix Asphalt Concrete Mixtures (Limited temperature and force range)
- Draft ASTM WK 26816 - Cracking Using the Overlay Tester
- AMPT Indirect Tensile Dynamic Modulus Test
- LSU Draft ASTM SCB - Semi-Circular Bend Cracking Resistance Test
- Illinois Draft for AASHTO SCB - Semi-Circular Bend Crack Propagation
- Tex 248-F Overlay Test - Reflective Cracking or Fatigue
- SCDUF - Simplified Continuum Damage Uniaxial Fatigue

Optional Accessories
- Uniaxial Fatigue Kit / SVECD
- Overlay Test Kit
- Small Diameter Dynamic Modulus
- iRLPD

Control & Data Acquisition—IMACS
Configuration
Fully Integrated

Real Time Digital

Computer Control
32-bit Processing

Acquisition Speeds
5kHz (simultaneous on all channels)

Data Over-Sampling
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**

**PReSBOX**
Asphalt Prism Shearbox Compactor
IPC Global’s PReSBOX was designed and engineered in collaboration with the technical team from Pioneer Road Services (Ian Rickards & Tom Gabrawy). 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.

**AUTOSAW II**
Advanced Automated Asphalt Saw
IPC Global’s new and improved Autosaw II is a second generation fully automated asphalt sawing system with integrated clamping system. The Autosaw II allows for fast and easy cutting of rectangular beams, trapezoidal prisms, overlay test specimens, semi-circular specimens, and trimming of cylindrical specimens. Autosaw II has been designed with easy-to-use spacers and automatic controls that allow for perfect specimen dimensions for AASHTO, ASTM and EN standards without the need for manual measurements. It is the most advanced asphalt cutting saw available and is available with an optional protection cabinet (pictured bottom left) for safety and water containment for use within laboratory environments.

**SERVOPAC**
Advanced Research Gyratory Compactor
The research specification Servopac is a fully automated, servo-controlled gyratory compactor designed to compact asphalt mixes. IPC Global’s Servopac surpasses the requirements of AASHTO, ASTM, AS and EN Standards. The Servopac has been designed to produce homogenous specimens as well as produce specimens having characteristics that closely resemble those obtained from asphalt as laid in the field.

**MULTI CORE-DRILL**
Advanced Asphalt Core Drill
IPC Global’s 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. The Multi Core-Drill has been designed to be easy to use, flexible, and adaptable and ultimately provide users with precise drilling capabilities. This will enable users to have absolute confidence in the quality of their test specimens and the reliability of their test results. User safety is enhanced by the transparent protection covers which conform to CE specifications and allow monitoring of the drilling process.
At IPC Global we are proud of our products. We’re dedicated to supplying high quality, accurate, affordable, easy-to-use systems for advanced testing of asphalt, soil, unbound granular and other construction materials.

As a valued customer of IPC Global you will receive continuous, expert support and advice for your instrument. Furthermore, we ensure new users are trained in the correct operation of your IPC Global equipment.

For support from our expert customer care team, contact your local IPC Global distributor or IPC Global directly on +61 3 9800 2200 or email techsupport@ipcglobal.com.au.

Visit our website for more information: www.ipcglobal.com.au