



Full Conformity to
NCHRP 9-29

ADVANCED PAVEMENTS TESTING SYSTEMS

AMPTQUBE[®] EMS TECH

Electromechanical Servoactuation
Superpave QC Testing System

Ground Breaking Electromechanical Servoactuation (EmS)

As the recognized technological and market leader in Advanced Asphalt Testing, IPC Global is proud and excited to once again break new ground with a radically new approach to meeting our customers' needs and requests.



Full conformity to NCHRP 9-29 – instrumentation, installation, confining pressure and temperature equilibration in 5 minutes.



Easy installation with no HPS, water cooling or laboratory compressed air required.



Exceptional cooling performance with advanced integrated water-cooled thermoelectric refrigeration.



Excellent wave-shape fidelity and improved dynamic performance compared to servo-pneumatic systems.



Consistent and compliant cooling performance across full temperature range.



A small footprint for any laboratory, office, classroom or mobile facility.



Designed to be easy to use, robust and durable. A resilient testing solution.



Optional integrated compressor for Triaxial Cell.



Thermoelectric cooling and EmS greatly reduce maintenance costs.



Performs high frequency fatigue to slow speed static testing with ease.



Single phase electrical connection makes powering AMPTQube hassle free.



No hydraulic oil ensures an environmentally friendly testing solution.

2002

SPT Pioneer since 2002

2003

AMPT Clear Market Leader

2017

AMPT PRO

The Researcher's Choice

NEW

2018

AMPT QUBE

QC Innovator's Choice

NEW



AMPT PRO

Asphalt Mixture Performance Tester



AMPT QUBE

Electromechanical Servoactuation Quality Control Testing System



Democratizing SuperPave Testing

Our radical new approach democratizes important dynamic SuperPave mix performance tests that were previously only available to high-end research laboratories.

The AMPTQube is the logical follow-on of the SPT, a pioneer since 2002, AMPT and AMPT Pro, the clear Researcher's Choice.

A unique collaboration between CONTROLS Group and IPC Global, the AMPTQube is democratizing important dynamic SuperPave mix performance tests that were previously only available to high-end research laboratories.

Perfect for routine testing, the AMPTQube combine the performance of the research-friendly AMPT PRO with affordability making this NEW Testing System the **Quality Control Innovator's choice.**



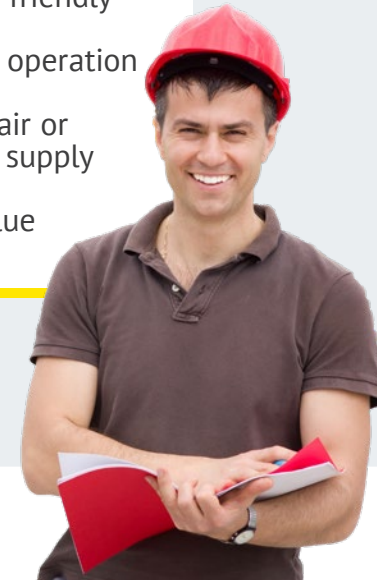
Electromechanical Servoactuation (EmS)

AMPTQube benefits from IPC Global's revolutionary new EmS technology utilizing a high pre-load ball-screw that delivers 15kN backlash free force with minimal noise. EmS technology is environmentally friendly with clean operation, requiring no hydraulic oil. It offers excellent reliability, accurate testing, lower maintenance and is more economical compared to Servo-hydraulic and Servo-pneumatic testing solutions. The innovative design ensures it can be quickly and easily maintained only requiring a lubrication cycle every 500 hours.

The EmS technologies are housed in a robust frame only occupying a small laboratory footprint. This and the heavy duty casters, adjustable feet and requiring less than 3.4kW of power makes the AMPTQube the ideal solution for both static and mobile laboratories.

Easy, quick, versatile and low maintenance

- > Purpose-built for dynamic testing of asphalt
- > Excellent wave-shape fidelity
- > Environmentally friendly
- > Silent and clean operation
- > No compressed air or hydraulic power supply
- > Unparalleled value



Unique Ground Breaking Technology

Features and Benefits

AMPTQube is:

Easy-to-use and Ergonomic

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

Fully Integrated

Optional integrated Air Compressor equipped with in-built multi-phase filtration eliminates the need for an external air supply. Integrated water chiller for water-cooled thermoelectric refrigeration.

Compact but Capable

New advanced system with integrated water-chiller allows consistent cooling performance across full temperature range from +2°C to +60°C.

Thermoelectric Temperature Control

High performance water-cooled thermoelectric temperature control and innovative cell design allow AMPTQube to rapidly reach testing temperatures between +2°C and +60°C

Optimum Cooling

Consistent and compliant cooling performance across full temperature range with advanced water-cooled thermoelectric refrigeration.

Easy and Versatile

AMPTQube 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 AMPTQube 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.

All-in-One Computer Control

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

High Performance Technology

AMPTQube includes a range of new technologies, including the revolutionary Electromechanical Servoactuation (EmS) delivering 15kN of force with no need for a Hydraulic Power Supply.





Quick and Easy

Improved Performance and Streamlined Operations

All-in-One Computer Control

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

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.

The Ultimate in HMA Testing Tools

The system's software and controller accurately and automatically control the confining pressure. Temperature controlled air is re-circulated by electric fans. The air temperature is measured half way up the specimen and controlled using a dedicated temperature (PID) controller.

- For Dynamic Modulus E* three or four 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 robust spring-loaded LVDT displacement transducers are quick and easy to attach. Epsilon extensometers are available as an option.

- The high quality transducer connectors make a quick and reliable connection and facilitate the easy interchange of load cells and on-specimen strain measurement transducers.

Thermoelectric Cooling and Heating

Fully conformant to NCHRP 9-29, the AMPTQube allows for specimen instrumentation, installation, application of confining pressure and temperature equilibration in five minutes over the complete range of temperatures.

Its maintenance-free and long life thermoelectric cooling and heating will deliver high performance and utmost reliability. The solid state construction of Peltier Devices and innovative advanced engineering by IPC Global, provides market leading cooling and heating performance utilizing sophisticated temperature control algorithm.

Intelligently designed manifolds force airflow through heat sinks that are highly conductive featuring an efficient pin system for faster cooling and heating.

With no moving parts, Peltier Thermoelectric Modules are virtually maintenance-free and have typical life span greater than 200,000 hours. Separate heat sinks and Peltier Devices improve serviceability and allow for easy maintenance.

Easily Interchangeable, Pluggable Transducers

AMPTQube features easily interchangeable displacement 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.** Eight BNC connectors provide raw analogue outputs from the signal conditioners to permit the use of external data logging equipment.





Intelligent Testing Chamber ▶

IPC Global has developed a high specification Triaxial Cell*, which doubles as an environmental chamber. The ingenious design has excellent air flow for heat removal resulting in increased energy efficiency and cooling performance.

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.

AMPTQube integrates into the triaxial cell the thermoelectric cooling and heating modular system, reducing the footprint whilst still retaining the full testing space.

* Optional fully integrated silent air compressor eliminates the need for an external air compressor.



Test Kits



AASHTO T378/TP79

Dynamic Modulus E*

A performance-related property, for mixture evaluation and characterizing the stiffness of HMA. It is 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



AASHTO TPXX

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

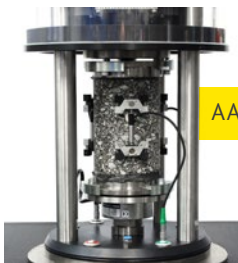
Flow time: static creep tests



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 AMPTQube 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 TP107.



Tex-248-F | ASTM WK 26816

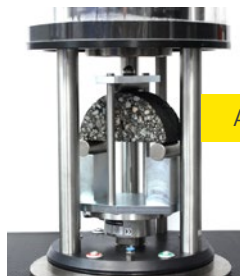
Overlay Test Kit

The advanced design provides high stiffness and extremely low compliance. This kit enables the AMPTQube 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 & 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, ASTM D8044

Semi-Circular Bend (SCB) Kits

AASHTO TP124 (Illinois SCB) – Fracture Potential of Asphalt Mixtures Using the Flexibility Index Test (FIT)

ASTM D8044 (LSU SCB) – SCB Cracking Resistance Test at Intermediate Temperature



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 AMPTQube 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 AMPTQube 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.

AMPTQube 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.

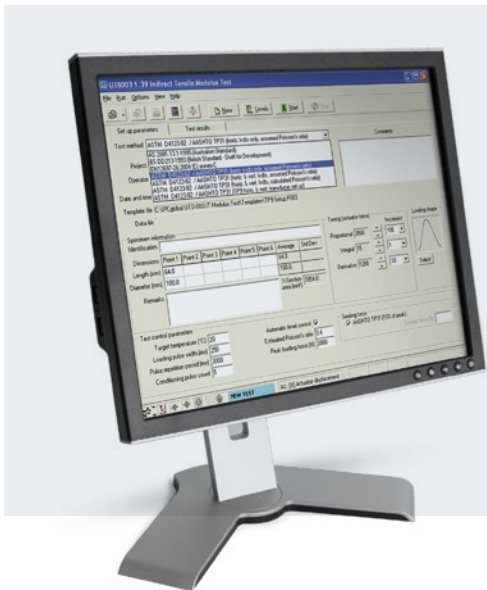
“

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
- 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).



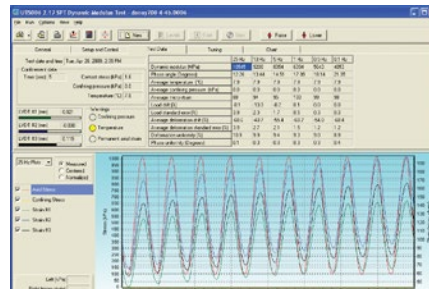
World-class Software Application

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.

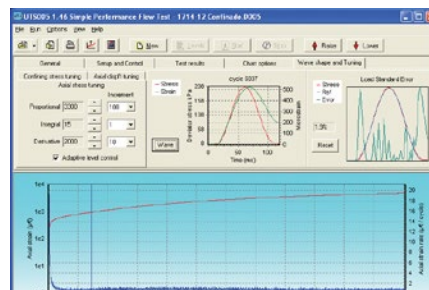
UTS Software is developed from expert knowledge of applications to run automated test routines and therefore speeds up testing. Written in powerful, professional Delphi, the UTS software features real-time graphs for monitoring the specimen under test; portable binary data files for sharing, reviewing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



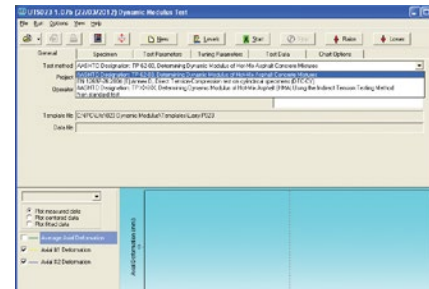
Powerful professional Delphi software

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



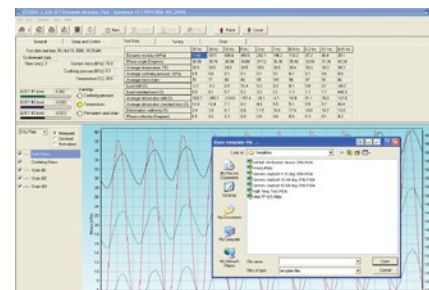
The ultimate in clean accurate data

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



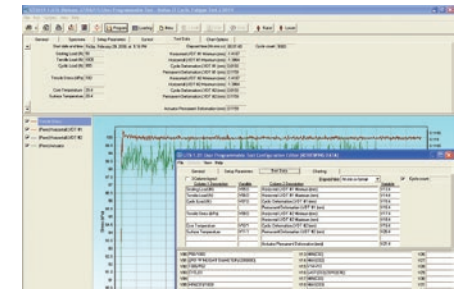
Purpose-written test applications

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



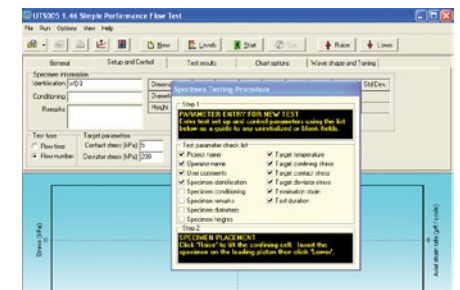
Test templates

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.



User programmable test

When you are developing a new test method or want to run a novel test, UTS User-programmable test allows you to take full control and determine all the test, control and analysis parameters.



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.

Testing Standards Available

- ✓ AASHTO T378/TP79 – Dynamic Modulus E^*
- ✓ AASHTO TPXX – 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



Specifications

Load Capacity	Dynamic: 15kN \geq 0.1Hz / Static: 10kN $<$ 0.1Hz
Actuator Stroke	30mm (+/-15mm stroke)
Actuator Type	Electromechanical Servoactuation (EmS)
Temperature Control	Thermoelectric heating and cooling
Temperature Range	+2 to +60°C in an ambient condition of 15–27°C
Temperature Accuracy	+/-0.5°C at temperature probe positioned close to the specimen

Triaxial Cell

Cell Dimensions	305 x 584mm (Dia. x H)
Confining Pressure	0 to 225kPa
Specimen Size	38/50/75/100mm (Dia.) 110/130/135/150mm (H)

Technical Data

Noise Level	Less than 70db at 2m
Computer Control	Integrated all-in-one touchscreen PC (optional)
Air Compressor and Dryer (optional)	Low noise, integrated, automated operate-on-demand
Dimensions with closed cell	1,526mm x 832mm x 739mm (H x W x D)
Weight	250kg

Transducers

Load Cell	+/- 20kN low profile pancake type
Built-in Actuator LVDT	30mm Stroke (+/- 15mm)
Pressure	0kPa – 225kPa
On-specimen Displacement (Various available)	3 clip-on +/-0.5mm LVDTs, compatible with up to 4 optional loose-core, strain gauge transducers
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)	230V, 50Hz, single phase, 12A 110V, 60Hz, single phase, 24A
Power (with air compressor)	230V, 50Hz, single phase, 14A 110V, 60Hz, single phase, 28A
Air	Clean dry air at 450-800kPa; 2 L/sec (Optional integrated Air Compressor available)

Optional Accessories

- Uniaxial Fatigue Kit/SVECD
- Overlay Test Kit
- SCB (Semi-circular Bend) Kits
- Indirect Tensile 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 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 Gyrotory Compactors

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



Autosaw II

Advanced Automated Asphalt Saw

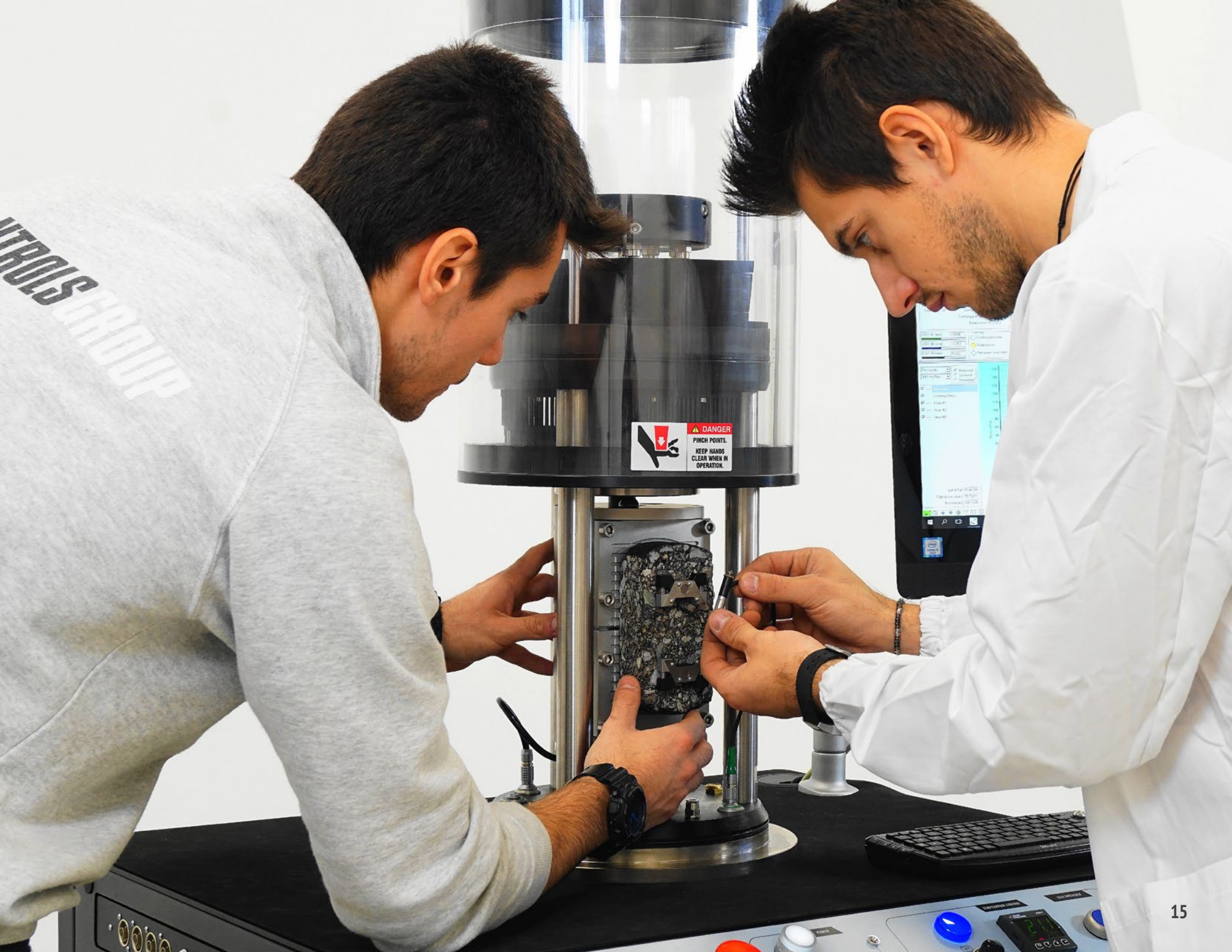
The new and improved Autosaw II is the most advanced asphalt cutting saw available and is the perfect device for advanced testing laboratories. Its fully automated asphalt sawing system with integrated clamping system allows for fast and easy cutting of rectangular beams, trapezoidal prisms, overlay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



▶ 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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