IPC global
A division of CONTROLS

ADVANCED PAVEMENTS TESTING

# DWT

## Double Wheel Trackers

www.controls-group.com

# Now also conforming to AASHTO T324-19

78-PV32E05

**Standards:** AASTHO T324, EN 12697-22 (small size device)

## Wet and/or dry versions

The wheel tracking test is used for determining the susceptibility of Hot Mix Asphalt (HMA) to deformation under load by measuring the rut depth formed by repeated passes of a loaded wheel
at a fixed temperature.

The two methods according AASHTO T324 and EN 12697-22 "small size device" are practically identical except for:

- **Test environment:** dry and wet for EN; wet for AASHTO
- **Wheel material and size:** rubber wheel, 203 x 50 mm (diameter x width) for EN; steel wheel, 203 x 47 mm (diameter x width) for AASHTO

### Main features

- Full conformity to EN, DOT methods and AASHTO T324-19, including sinusoidal movement (RMSE certificate available on request) and rut depth measurement in 11 defined points
- Fully automatic test performance on two specimens or one specimen.Variable wheel speed from 20 to 30 cycles/min
- Fixed table, mobile wheel 230 mm travel
- Wheel load of 700/705 N or adjustable from 700 to 1500 N (universal models 78-PV33D05/06 only)
- Temperature range from ambient to 80° C (± 0.5°C)
- Accurate temperature control (±0.5°C) for both in water and air test
- Rut depth transducers feature 50 mm travel, 0.01 mm accuracy
- Direct rut depth measurement system, with transducers axially mounted in alignment with the wheel's center
- Motorized wheel-assembly lifting system for easy removal of slabs
- Free access to the wide testing area
- Optional independent lifting system for double or single wheel testing
- Slab mold size of 400 x 300 mm, 360 x 300 mm (for 320 x 260 mm slabs), double 150 mm gyratory compactor cylinders, 200 mm/8"/10" diameter cores
- Slab thickness adjustable from 40 to 100 mm (in 10 mm steps)
- Extensive use of stainless steel in the machine's construction;
  not limited to the parts in contact with water
- Laptop PC and software included
- Automatic water filling and leveling system, no need to adjust or control the water level above the specimen during the test not included in model 78-PV31A16/5)
- Laptop PC control with dedicated software including results performance, test database management and multiple test elaboration

## Machine body

Sheet steel, powder coated. Transparent sliding cover.

## Loaded wheel system

The wheel load is 700/705 N or adjustable in 100 N steps from 700 to 1500 N in the Universal AASHTO/ EN version models 78-PV33D05/06 only. The system includes a motorized lifting system for raising the wheel assembly at the end of the test.

## Wheel tracking carriage

The wheel is moved 230 mm backwards and forwards on the top of the slab, which is fixed. The speed is adjustable via the PC from 20 to 30 cycles per minute (40 to 60 passes). The longest slab dimension is oriented to the wheel's direction of travel. Special slab molds for circular samples obtained from coring or gyratory compactors are also available. Refer to the Accessories section p7.

## Temperature control system

The AASHTO Hamburg type Standard states that the test must be performed in a water bath with a temperature range of 25 to 70° C±1°C, whilst the EN requires either an air or water environment. In both systems a water level of about 20 mm above the sample has to be maintained. Where a heated air environment is specified, the specimen, during testing, must be maintained at the specified temperature ±1°C. with a temperature accuracy of ±0.5°C, all versions fully satisfy and exceed the above requirements.

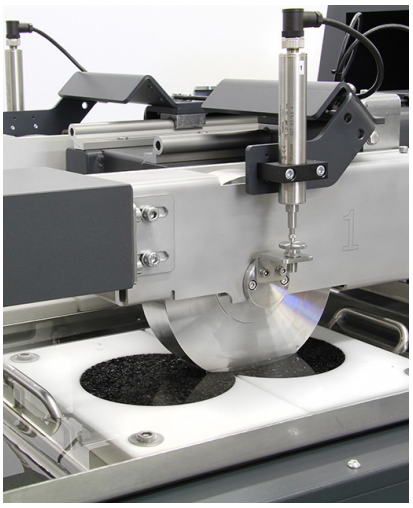
## Temperature controlled cabinet

The Universal AASHTO/EN version models 78-PV33D05/06 feature an inbuilt temperature controlled cabinet for testing in air or in water, designed to avoid condensation problem (in water testing) and prevent overtemperature which may damage the mechanical parts or alter the transducer accuracy. Furthermore the system ensure thermal stability and provide rapid test start by fast initial temperature increase, and automatic test start when the conditioned temperature has been reached.

## Impression measurement system

Each wheel is fitted with RUT DEPTH transducers for measuring deformations from 0 to 50 mm ±0.01mm (rut depth).

Detail of the motorized lifting system that raises the wheel assembly at the end of the test, making the use of hoists obsolete.



Detail of the testing wheels

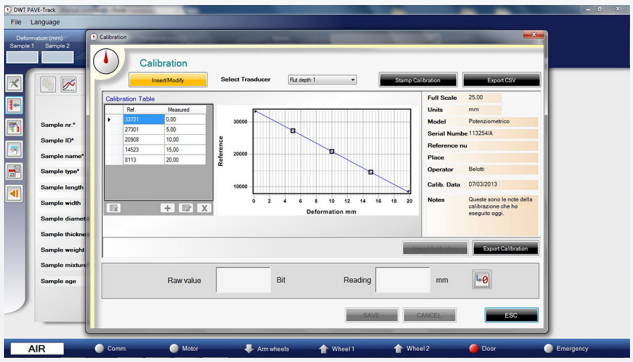
# Testing software features

With the user-friendly Windows® software, the operator can set the (fully customizable) test procedures to conform to AASHTO or EN Standards, and follow the test progress in real time, monitoring water (or air) temperature, specimen temperature, rut depth and a graph of deformation/ cycles with the specimen profile, metric or imperial unit selection. Software also features exporting of test data to CSV format (Excel©), management of test data such as asphalt mix, client information, etc. and different screen background colours for water or air temperature control.

The software allows the user to select different temperature probes to monitor the two sample temperatures and/or the water or air temperature.

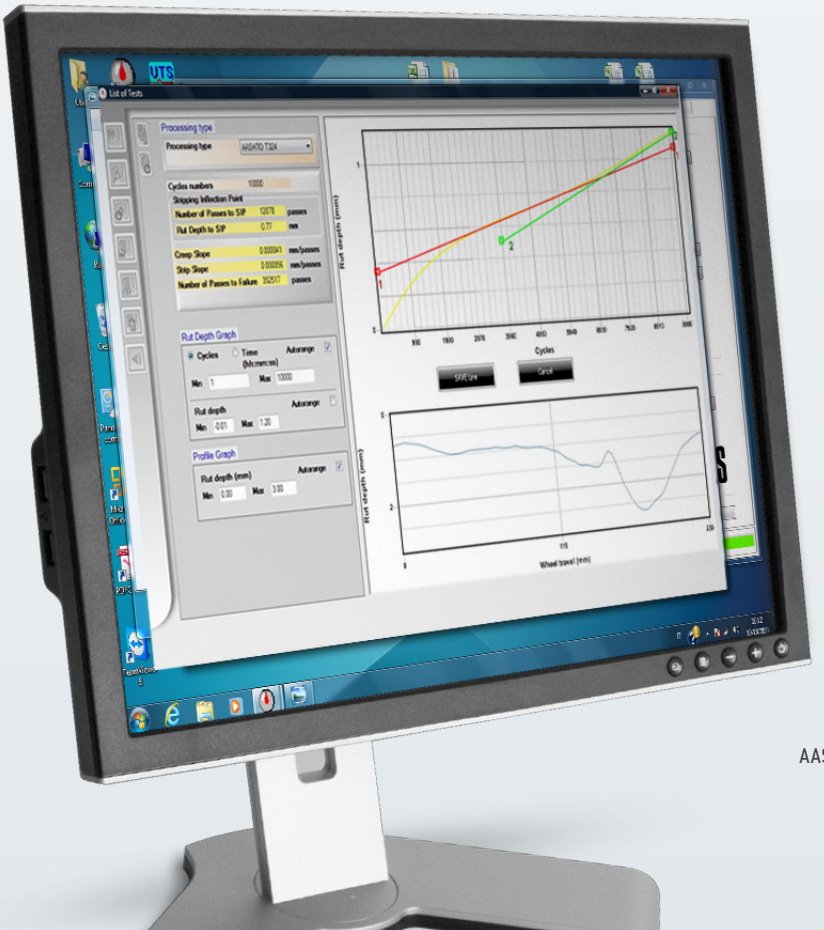
The user can select the deformation sampling frequency and the deformation length (0 ÷ 230 mm) used to calculate the mean deformation.

The software includes the possibility to program pre-heating and machine start (without operator intervention) and to measure the rut depth measurement in user-defined positions for research purposes or local specifications




Typical screenshot: calibration

Typical screenshot: final test report



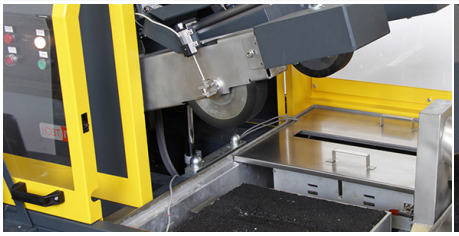
AASHTO T324 elaboration for stripping inflection point calculation.

# Available versions

IPC Global offer three versions which satisfy all Standards requirements.

## Main features

- Displacement motion: the arm is moving and the carriage is fixed
- Wheel travel: 230 mm
- Wheel speed: variable 20 to 30 cycles/min
- Wheel load: 700/705 N by weights (78-PV33D05/06 models), adjustable from 700 to 1500 N in 100 N steps (78-PV33D05/06 models)
- Temperature range: ambient to 80°C, +/-0.5°C
- Rut depth transducer range: 50 mm, 0.01 mm accuracy
- Molds: not included, to be ordered separately
- Slab thickness: adjustable from 40 to 100 mm in 10 mm steps
- Overall dimensions (W x D x H): 1540 x 1020 x 1600 mm
- Weight approx.: 600 kg
- PC and Software: included

| Standards | AASHTO T324 | EN 12697-22 | | AASHTO T324 / EN 12697-22 |
|---|---|---|---|---|
| **Testing mode** | **in water** | **in air** | **in air and water** | **in air and water** |
| **Models 78** | PV31A16** PV31A26<br>PV31A15** PV31A25 | PV32E05 | PV33E05 | PV33B05 PV33B06<br>PV33D05 (1500 N)<br>PV33D06 (1500 N) |
| **Description** | |  | | |
| | DWT Hamburg type double wheel tracker, wet conditioning version | DWT double wheel tracker, dry conditioning version | DWT double wheel tracker, wet and dry conditioning version | DWT, Hamburg and EN type, double wheel tracker, interchangeable wheels (steel for AASHTO and rubber for EN), wet and dry conditioning |
| **Material and dimensions (diameter x width) of the two loaded wheels** | Stainless steel 203 x 47 mm | Rubber tyre 203 x 50 mm | Rubber tyre 203 x 50 mm | Stainless steel 203 x 47 mm and Rubber tyre 203 x 50 mm |
| **Temperature control method (accuracy ±0.5°C for both water and air)** | Three 1500 W heaters, re-circulating pump, automatic filling and control level* | Three 1200 W electronically controlled air blowers | Water :<br>Three 1500 W heaters, re-circulating pump, automatic feed and control level | Water :<br>Three 1500 W heaters, re-circulating pump, automatic feed and control level |
| **Power rating** | 5,500 W | 4,600 W | 5,500 W | 5,500 W |

*Model 78-PV31A26 and 78-PV31A25 only

**Protection sliding cover not included

## DWT Double Wheel Tracker Hamburg type

**Standards:** AASHTO T324

**Water conditiong series**

Stainless steel wheels 203 x 47 mm (dxw)

**Proposed in two configurations:**

Standard (78-PV31A16) and complete with clear transparent sliding door (78-PV31A26)

78-PV31A16/5 with water tank covers (78-PV3UP30)

**78-PV31A16**

DWT double wheel tracker (Hamburg type). Conforming to AASHTO T324, in-water specimen conditioning. Complete with laptop PC and software. Set of molds to be ordered separately.

220V, 60Hz, 3Ph

**78-PV31A15**

As above but 380 V, 50 Hz, 3 ph.

**78-PV31A26**

**Water conditiong specimens version**

**with transparent sliding door**

DWT double wheel tracker (Hamburg type). Conforming to AASHTO T324,in-water specimen conditioning. Complete with laptop PC and software and clear transparent sliding door. Set of molds to be ordered separately.

220V, 60Hz, 3Ph.

**78-PV31A25**

As above but 380 V, 50 Hz, 3 ph.

## DWT Double Wheel Tracker

**Standards:** EN 12697-22 (Small Size Device)

Rubber tyre wheels 203 x 50 mm (diameter x width)

**Proposed in two configurations:**

Dry conditioning series (78-PV33E05) and Wet and Dry conditioning series (78-PV33E05)

78-PV32E05, 78-PV33E05

**Dry conditioning series**

**78-PV32E05**

DWT Dry double wheel tracker.

Conforming to EN 12697-22 (Small Size Device).

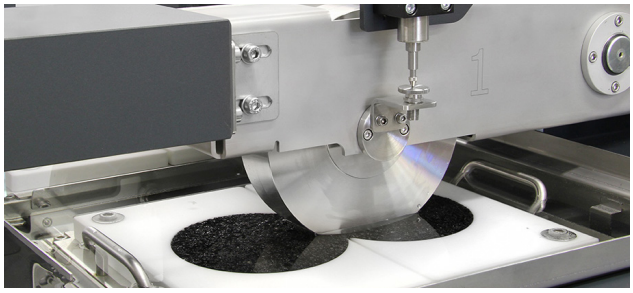
Complete with PC, software and clear transparent sliding doors. Set of molds to be ordered separately.

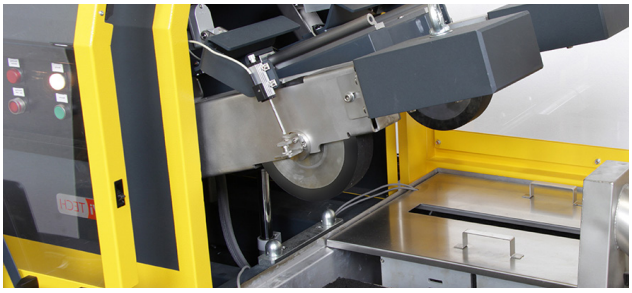
380V, 50Hz, 3Ph.

**Wet and Dry standard conditiong series**

**78-PV33E05**

DWT Wet and Dry double wheel tracker. Conforming to EN 12697-22 (Small Size Device). Complete with PC, software and clear transparent sliding doors. Set of molds to be ordered separately. 380V, 50Hz, 3Ph.





## DWT Double Wheel Tracker
## Universal Hamburg type and EN 12697-22

Including 1500 N wheel load versions

**Standards:** AASHTO T324 and
EN 12697-22 (Small Size Device)

Interchangeable Stainless steel or rubber wheels 203 x 47/50 mm (diameter x width)

### Water and air conditioning series

**78-PV33B05**

DWT Wet and Dry Universal double wheel tracker. Conforming to Hamburg type AASHTO T324 and EN 12697-22 Small Size Device, in-air and in-water conditioning. Complete with both stainless steel and rubber wheels, laptop PC, software and clear transparent sliding doors. Set of molds to be ordered separately. 380V/50Hz/3ph+N

**78-PV33B06**

As above but 220 V, 60 Hz, 3 ph.

**78-PV33D05**

DWT Wet and Dry Universal double wheel tracker. Wheel load adjustable up to 1,500N (by 100N steps). Conforming to Hamburg type AASHTO T324 and EN 12697-22 Small Size Device, in-air and in-water conditioning. Complete with both stainless steel and rubber wheels, laptop PC, software and clear trasparent sliding doors. Set of molds to be ordered separately. 380V/50Hz/3ph+N

**78-PV33D06**

Same as above but 220 V, 60 Hz, 3 ph.

### Upgrading Options (common to all models) AASHTO and EN

**Lifting system**
**78-PV3UP10**

System for the independent lifting of the loading wheel at the rut target, continuing the test, without interruption with the other wheel.

*To be specified at time of order.*

**Additional Temperature Probes**
**78-PV3UP20**

Additional two temperatures probes to monitor the two sample temperatures.

*To be specified at time of order.*

**Water Tank cover**
**78-PV3UP30**

Water tank covers.

*(Only for 78-PV31A16/5 models)*

**Top transparent cover**
**78-PV3UP40**

Upper closing panel made from transparent plastic.

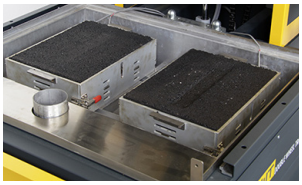
*To be specified at time of order.*

## Accessories (common for all versions)

Some guidelines on how you can complete the actual DWT range in different configurations:

**78-PV3/001**

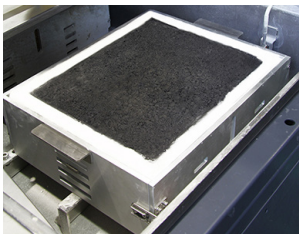
Set of two molds for 400x300 mm samples, thickness from 40 to 100 mm, recommended for test according to EN 12697-22 in water or in air.



**78-PV3/002**

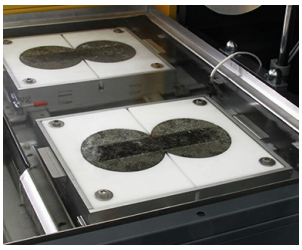
Set of two molds 360 x 300 mm (also suitable for 320 x 260 mm samples by using 20 mm thick plaster spacers), thickness variable from 40 to 100 mm.

For tests conforming to AASHTO T324 in water.



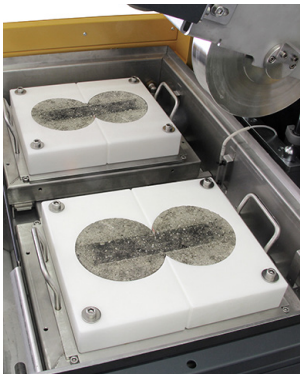
**78-PV3/003**

Set of two mold adaptors for double 150mm dia core (total 4 adaptors made of special self-lubricating acetal copolymer), thickness 60 mm, fitted in 78-PV3/002 360 x 300 mm molds (not included). For test conforming to AASHTO T324 in water.



**78-PV3/005**

Set of trays with handles for double 150 mm diameter cylindrical samples, conforming to AASHTO T324. 78-PV3/003 adaptors for 150 mm dia. cylindrical sample to be ordered separately.



***Note:*** *Other models are available on order*

### Spare molds for all models

**MOLDS FOR UNIVERSAL AASHTO/EN MODELS**

(78-PV33D05, 78-PV33D06)

**78-PV3/011**

Set of two molds 400x300 mm, 38 to 120 mm height.

**78-PV3/012**

Set of two molds 360 x 300 mm (suitable for 320x260 mm slabs), 38 to 120 mm height.

**AASHTO Verification kit**
**78-PV3/KIT**

DWT Hamburg Wheel Tracker verification kit to AASHTO T324-2019.

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