

## B210 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.

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.

The machine is supplied with:

- B210-01** Servo-pneumatic Four Point Bending (4PB) Device with 10 mm actuator LVDT (B210-05),  $\pm 5$  kN load cell. (B210-04) and 2 mm On-specimen LVDT (B290-05)
- B270-12** Air reservoir assembly
- B205** 8 Channel Control and Data Acquisition System (CDAS) & TestLab software (see page 104)

### 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

### OTHER MODELS:

- B210-01** SERVO-PNEUMATIC 4PB APPARATUS for use with Pavetest DTS-16, including:
  - B210-04**  $\pm 5$  kN load cell.
  - B210-05** 10 mm actuator LVDT
  - B290-05** 2 mm On-specimen LVDT
- B212** 4PB JIG, for use with Pavetest DTS-30 (see page 110)

### 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 60 Hz;  
Stroke 10 mm
- **On-specimen transducer** Range  $\pm 1$  mm; Resolution 0.0002  $\mu$ m;  
Accuracy Better than 5  $\mu$ m

Power Supply: 110-230V/50-60 Hz/1ph (B210)

Dimensions: 600(h) x 250(d) x 570(w) mm (B210 and B210-01)  
420(h) x 250(d) x 570(w) mm (B212)

Weight: 39 kg

### ACCESSORIES:

- B210-02** 4PB PVC Beam
- B210-03** 4PB Reference beam
- B211** Temperature controlled cabinet: +2°C to +60°C to suit 4PB Apparatus
- B250-07** Temperature measuring kit comprising two (-80°C to +80°C) RTDs and dummy asphalt specimen



**B210-01**

Servo-pneumatic four point apparatus

### TECHNICAL FEATURES:

- 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.
- Two 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.
- Markings on the top clamp pads assist the operator to centre the beam laterally prior to clamping.
- 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.
- A low profile, high performance stainless steel ring torsion load cell is used to measure and control the load and a co-axially mounted (LVDT) displacement transducer on the actuator is used to position the centre cradle.
- 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.
- The Windows based, TestLab software provides a user interface that is as simple and efficient as possible and application software according to the above mentioned international Standards.