

## HEAT OF HYDRATION. SEMI ADIABATIC METHOD

Standard EN 196-9

### COMPUTERIZED LANGAVANT CALORIMETER.

Ref. 111-101238

For the determination of cement heat hydration.

#### Features

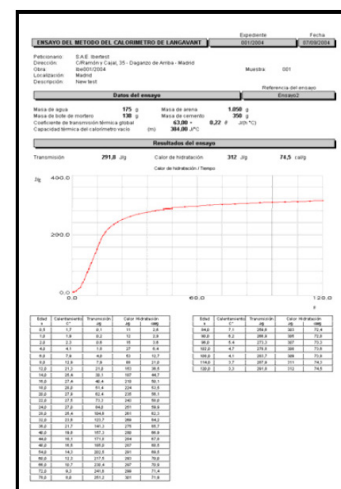
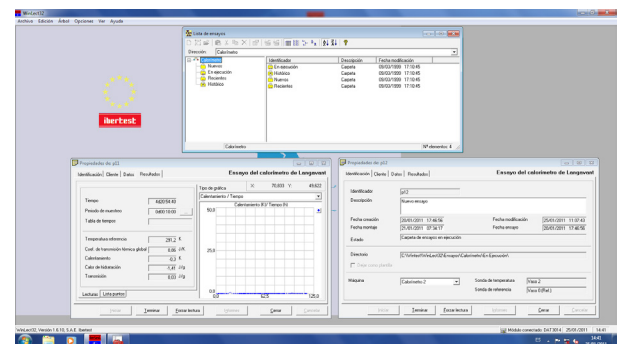
This equipment comprises a computerized system for the automatic data acquisition during the test. Test data can be managed by means of a specific test software WinLec32 (Test-Lang version), developed specifically by the R&D IBERTEST Dept. for the Langavant method.

The system automates data collection and performs the calculations required by computer, thus avoiding possible errors in the manual data collection, providing test results provided reliable and reproducible.

The test results are stored on computer files and can be retrieved at any time for reporting, comparison, statistical analysis, etc.

#### The minimum configuration comprises the following elements

- › Set of 2 isolated calorimeter bottles (one for reference), supplied with official calibration certificate.
- › Set of 2 temperature probes type Pt-100, supplied with official calibration certificate.
- › Set of 50 disposable mortar test cans.
- › Electronic module, with 4 measuring channels, for connecting up to 4 calorimeter bottles to the PC (3 for testing + 1 for temperature reference). The module is linked to the PC via USB 2.0
- › Next-generation PC (dual-core microprocessor or higher), keyboard, mouse, TFT widescreen, Windows® operating system, manuals and licenses.
- › WinLec32 IBERTEST Software License (Version Test-Lang), preinstalled on the provided PC, running on Windows®



**NOTE:** All the calorimeter bottles have been calibrated and certified by the "Laboratoire Regional Ponts et Chaussées". Each bottle is individually marked and comprises a metallic plate indicating its heat loss coefficient and heat mass.

#### Additional accessories

##### Calorimeter bottle for Langavant

Ref. 210-102361

For performing more test simultaneously. A reference calorimeter must be used for 6 calorimeters, as indicate in EN 196-1.

##### Disposable mortar tins (set of 50 pcs)

Ref. 210-100000

##### Additional data acquisition module

Plugged to the standard module. Allows to connect up to 4 additional temperature probes.

##### Aluminum cylinder

Ref. 210-104099

To be used instead of inert cement (mixed 12 months previously) indicated in the standard.

### Specifications - Computerized Langavant calorimeter

|   |   |
|---|---|
| Reference   | 111-101238  |
| Dewar flask   | <p>Manufactured in borosilicate glass, hemispherical bottom.<br/>         Inner diameter: 95 mm<br/>         Overall diameter: 120 mm<br/>         Depth: 280 mm<br/>         Includes a plug insulator and a rubber disc (Ø 85 mm - 20 mm thickness), which supports the sample container and evenly distributes the load on the glass wall.</p>   |
| Dewar housing   | <p>Ready to place inside the Dewar described above.<br/>         Made of duralumin (3 mm thickness), high rigidity and sturdy wide base ensures good stability.<br/>         The Dewar flask is separated from the sidewalls of the housing by an air gap of about 5 mm and rests on a support of about 50 mm thick.<br/>         The upper edge of the glass Dewar is in contact with a cap, crown-shaped, 5 mm thick, being so tied up in its accommodation. The crown locking provides a support surface of the glass stopper and ensures tightness.<br/>         Both support the glass and the crown locking are made of a material with low thermal conductivity.</p>   |
| Insulating cover  | <p>It's inserted into the vessel and limit heat loss.<br/> <b>Central part.</b> Consists of a disc made of foam rubber, 120 mm in diameter, which ensures the tightness of the calorimeter.<br/> <b>Upper part.</b> It consists of a hard case, with locking device that compresses the foam rubber disc of the central part, ensuring the sealing of the lid and the correct positioning of the cover of the Dewar flask.</p>  |
| Disposable Mortar tins.   | <p>Intended to receive the cement mortar sample to be tested, discarded after the test.<br/>         Manufactured standard sheet of 0.3 mm thick.<br/>         Diameter: 80mm<br/>         Height: 165 mm<br/>         Approx. volume: 850 cm<sup>3</sup><br/>         Steam-tight at a pressure of 0.3 bar.<br/>         In the middle of the tin lid, a tube is located to insert the measurement element (thermopar, Pt 100 probe, or thermometer). It is approximately 100 to 120 mm long, in order to reach the central inner part of the specimen.</p>  |
| Electronic module   | <p>4 measuring channels for Pt-100 probes (allowing the connection up to 3 test calorimetric bottles and 1 reference bottle, according stated in the standard).<br/>         Up to 24 additional modules can be linked, to measuring up to 96 temperature probes.<br/>         USB port for PC connection<br/>         16 bits A/D converter.<br/>         Linearity: ± 0,1% F.E.<br/>         Thermal drift: ± 0,01%/°C a F.E.<br/>         Protocol: MODBUS RTU/ASCII<br/>         Sampling rate: 0,5 - 2 readings/second (*)<br/>         Isolation to 2000 VCA (3 vías)<br/>         Influence of the R line: 0,05% Ω (50 Ω max, balanced).<br/>         Exiting current: 0,350 mA.<br/>         Data transfer speed: max 38,4 Kbps.<br/>         Compliance with: EN standards: Electromagnetic (CEE/336/89). Immunity EN 61000-6-2. Emissivity EN 61000-6-4</p> |
| Data acquisition software WIN-TEST.LANG Data acquisition under Windows® | <p>Exclusively developed by IBERTEST for the Langavant test.<br/>         Suitable for measuring up to 8 channels at the same time.<br/>         Allows a continuous reading of the reference heat and the amount of heat transmitted by the samples placed in the test. It calculates the hydration heat of each sample showing the test results graphics according with the standard<br/>         Full free parameterization of tests, samples data, etc.<br/>         Real time graphics for temperature/time.</p>   |
| Electric supply   | Single-phase 220-230 V + G ~ 50/60 Hz   |
| (*) Depending on the number of simultaneous reading channels.           |   |