



## CEMENT

Cement is an inorganic material largely used in the construction industry, both on site and during the production of semi-manufactured products.

By mixing with water, the cement becomes a paste with adhesive properties: for this reason, it is considered a hydraulic binder and properly defined as hydraulic cement. This paste is generally used as a binder with solid inert materials such as sand, gravel and small rocks to produce the mortar and to prepare different types of concrete.

The most important use of cement is the production of concrete and mortar, which are the combination of cement and an aggregate to form a strong building material that is durable in the face of normal environmental effects.



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## BLAINE AIR PERMEABILITY APPARATUS

STANDARDS: EN 196-6, ASTM C204, ASSHTO T153

Used to determine the fineness of Portland cement in terms of the specific surface expressed as total surface area in square centimeters per gram of cement.

Supplied complete with a U-Tube Glass Manometer with valve which is fitted to the steel stand, Stainless steel Test Cell with Perforated Disc and Plunger, 250 ml Manometric Liquid, Rubber Aspirator Bulb, 100 pieces Filter Paper Discs and 100 mm Plastic Funnel.

Calibration Sand should be ordered separately.

### Technical Specifications:

| Product Code | Product Name                      | Dimensions (cm) | Weight (kg) |
|--------------|-----------------------------------|-----------------|-------------|
| HR-CE8000    | Blaine Air Permeability Apparatus | 30x20x55        | 7           |

### Spare Parts & Accessories:

| Product Code | Product Name                          |
|--------------|---------------------------------------|
| HR-CE8000/1  | U-Tube Glass Manometer                |
| HR-CE8000/2  | Cell with Perforated Disc and Plunger |
| HR-CE8000/3  | Manometric Liquid, 250 ml             |
| HR-CE8000/4  | Rubber Aspirator Bulb                 |
| HR-CE8000/5  | Filter Paper, Pack of 100             |
| HR-CE8000/6  | Filter Paper, Pack of 1000            |
| HR-CE8010/7  | Calibration Sand, 2 x 100 ml          |
| HR-G0314     | Plastic Funnel, 100 mm                |



## DIGITAL SEMI-AUTOMATIC BLAINE AIR PERMEABILITY APPARATUS

STANDARDS: EN 196-6, ASTM C204, ASSHTO T153

Used to determine the fineness of Portland cement in terms of the specific surface expressed as total surface area in square centimeters per gram of cement.

The Digital Semi-Automatic Blaine Permeability Apparatus has 3 sensors. Can be monitored the test easily thanks to LED screen which works with this 3 sensors.

The device is controlled using a button.

Supplied complete with a U-Tube Glass Manometer, Stainless steel Test Cell with Perforated Disc and Plunger, 250 ml Manometric Liquid and 500 pieces Filter Paper Discs.

Calibration Sand should be ordered separately.

### Technical Specifications:

| Product Code | Product Name   | Dimensions (cm) | Weight (kg) |
|--------------|--|-----------------|-------------|
| HR-CE8005    | Digital Semi-Automatic Blaine Air Permeability Apparatus | 25x25x35        | 15          |

### Spare Parts & Accessories:

| Product Code | Product Name                          |
|--------------|---------------------------------------|
| HR-CE8005/1  | U-Tube Glass Manometer                |
| HR-CE8005/2  | Cell with Perforated Disc and Plunger |
| HR-CE8005/3  | Manometric Liquid, 250 ml             |
| HR-CE8005/4  | Filter Paper, Pack of 500             |
| HR-CE8010/7  | Calibration Sand, 2 x 100 ml          |



## AUTOMATIC BLAINE AIR PERMEABILITY APPARATUS

STANDARDS: EN 196-6, ASTM C204, ASSHTO T153

The Automatic Blaine Air Permeability Apparatus is used to determine particle size of powder materials such as portland cement and lime in terms of their specific surface according to the Blaine technique.

The microprocessor-controlled Automatic Blaine Air Permeability Apparatus is with a manometer column operates with 1 or 2 cells.

After enter the specifications of sample to control unit, the device makes the test automatically and post the results to printer.

The device has an interface for a generally commercially available printer.

Supplied complete with U-Tube Glass Manometer, 1 bottle of Filling Oil, 500 pieces Filter Paper Discs, 100 pieces Dust Filter Paper Discs and a tamper.

Calibration Sand should be ordered separately.



HR-CE8010

### Technical Specifications:

| Product Code | Product Name                                | Dimensions (cm) | Weight (kg) | Power Supply          |
|--------------|---|-----------------|-------------|-----------------------|
| HR-CE8010    | Automatic Blaine Air Permeability Apparatus | 50x40x45        | 15          | 220 V, 50-60 Hz, 1 ph |

### Spare Parts & Accessories:

| Product Code | Product Name                   |
|--------------|--------------------------------|
| HR-CE8010/1  | U-Tube Glass Manometer         |
| HR-CE8010/2  | Stainless Steel Cell           |
| HR-CE8010/3  | Filling Oil, 1 bottle          |
| HR-CE8010/4  | Filter Paper, Pack of 500      |
| HR-CE8010/5  | Dust Filter Paper, Pack of 100 |
| HR-CE8010/6  | Tamper                         |
| HR-CE8010/7  | Calibration Sand, 2 x 100 ml   |

## BULK & PACKAGED CEMENT SAMPLER

STANDARDS: EN 196-7, ASTM C183, ASSHTO T127

Bulk Cement Sampler is used to sample cement in bulk storages or shipment. Brass made, it consists of two concentric tubes with slots. Inside tube volume is 3 liters approx.

Packaged Cement Tube Sampler is used to sample cement homogeneously from cement bags.



HR-CE2000

### Technical Specifications:

| Product Code | Product Name                 | Dimensions (mm) | Weight (kg) |
|--------------|------------------------------|-----------------|-------------|
| HR-CE2000    | Bulk Cement Sampler          | 40x1500         | 5           |
| HR-CE2005    | Packaged Cement Tube Sampler | 32x1050         | 3           |



HR-CE2005

## HİRA TESTING EQUIPMENT

### BULK DENSITY OF CEMENT

STANDARDS: ASTM C191, ASTM C110

Bulk Density of Cement Apparatus is used for the measurement of the apparent density (bulk density) of powders and non-cohesive materials.

It consists of Sieve Funnel with Tripod, 1 liter capacity Unit Weight Measure, Medium Rigid Spatula, 40 cm Straight Edge and Medium Round Aluminium Scoop.

The discharge hole of the funnel has 8 mm dia.

#### Technical Specifications:

| Product Code | Product Name                     | Dimensions (cm) | Weight (kg) |
|--------------|----------------------------------|-----------------|-------------|
| HR-CE2100    | Bulk Density of Cement Apparatus | 35x52           | 6           |

#### Spare Parts & Accessories:

| Product Code | Product Name                 |
|--------------|------------------------------|
| HR-CE2100/1  | Sieve Funnel with Tripod     |
| HR-A0714     | Unit Weight Measure, 1 liter |
| HR-G0706     | Rigid Spatula, Medium        |
| HR-S6675     | Straight edge. 40 cm         |
| HR-G0621     | Round Aluminum Scoop, Medium |



HR-CE2100

### AIR CONTENT METER

STANDARDS: EN 459-2, EN 413-2, EN 1015-7

These apparatus have been designed to determine the air content in cement mortar, cement paste, and lime mortar.

Made from cast aluminum. The test pot 1 lt capacity and the upper part are air-tight sealed by means of two quick action spring clamps.

The whole is connected to a dial gauge directly indicating the air entrainment in percentage, with range 0 - 50%.

A built-in operated air pump is also included.

The push-buttons TEST and CORRECTION are arranged to perform the test in a simple and quick system.

#### Technical Specifications:

| Product Code | Product Name      | Dimensions (cm) | Weight (kg) |
|--------------|-------------------|-----------------|-------------|
| HR-CE9020    | Air Content Meter | Ø20x32          | 3,5         |



HR-CE9020

### BULK DENSITY OF LIME

STANDARDS: EN 459-2, DIN 1060

Bulk Density of Lime Apparatus allows a sample to fall from a known height into a volumetric container.

Consisting of a hopper, 1 liter cylindrical container and spring loaded trap.

#### Technical Specifications:

| Product Code | Product Name                   | Dimensions (cm) | Weight (kg) |
|--------------|--------------------------------|-----------------|-------------|
| HR-CE2125    | Bulk Density of Lime Apparatus | 15x15x40        | 5           |



HR-CE2125

## DROPPING BALL APPARATUS

STANDARDS: BS 4551-1, 6463-4

Used to measure the consistency of cement mortars, Dropping Ball Apparatus allows 25 mm diameter acrylic ball to fall freely from a standard height of 250 mm into a specimen of mortar contained into a brass ring mould, and the surface of which has been carefully prepared.

The depth of the ball penetration into the mortar gives the specimen consistency.

The instrument comprises a Dropping Device mounted on a Stand, Acrylic Ball, Ø 100 x 25 mm Mould.

The base of the stand is machined. Chromed finishing.

Ball Penetration Measuring Device should be ordered separately. It formed by a tripod on which a dial gauge 30 x 0,01 mm is mounted. A device to adjust the height of the dial in relation to the tripod is also included. Chromed finishing.

### Technical Specifications:

| Product Code | Product Name            | Weight (kg) |
|--------------|-------------------------|-------------|
| HR-CE2150    | Dropping Ball Apparatus | 8           |

### Spare Parts & Accessories:

| Product Code | Product Name                      | Weight (kg) |
|--------------|-----------------------------------|-------------|
| HR-CE2150/1  | Stand                             | ---         |
| HR-CE2150/2  | Acrylic Ball                      | ---         |
| HR-CE2150/3  | Mould, Ø100 x 25 mm               | ---         |
| HR-CE2150/4  | Ball Penetration Measuring Device | 1           |

HR-CE2150



## FLOW CONE SET

STANDARDS: EN 445

Used for viscosity and fluidity determinations of mortars, muds, grouts, fluid materials, etc.

The apparatus comprises a metal stand supporting the stainless steel cone having inside dimensions of Ø150 mm inside upper dia. x 280 mm height. When fit with the 10 mm nozzle the total height is 350 mm.

The Flow Cone Set is supplied complete with Cone, Stand Fitting Bush, Ø 150 mm, 1.5 mm opening Sieve, 1 Lt Plastic Beaker and Ø10 mm Nozzle.

It can also be fit with other Ø8, Ø9, Ø11 and Ø13 mm nozzles should be ordered separately.

### Technical Specifications:

| Product Code | Product Name  | Dimensions (mm) | Weight (kg) |
|--------------|---------------|-----------------|-------------|
| HR-CE9030    | Flow Cone Set | 250x250x600     | 10          |

### Spare Parts & Accessories:

| Product Code | Product Name           | Dimensions (mm) | Weight (kg) |
|--------------|------------------------|-----------------|-------------|
| HR-CE9030/1  | Flow Cone Apparatus    | ---             | ---         |
| HR-CE9030/2  | Stand and Fitting Bush | ---             | ---         |
| HR-CE9030/3  | Sieve, 1.5 mm opening  | Ø 150           | ---         |
| HR-CE9030/4  | Ø 8 mm Nozzle          | Ø 8             | ---         |
| HR-CE9030/5  | Ø 9 mm Nozzle          | Ø 9             | ---         |
| HR-CE9030/6  | Ø 10 mm Nozzle         | Ø 10            | ---         |
| HR-CE9030/7  | Ø 11 mm Nozzle         | Ø 11            | ---         |
| HR-CE9030/8  | Ø 13 mm Nozzle         | Ø 13            | ---         |
| HR-G0280     | Plastic Beaker, 1 Lt   | 100x100x135     | 0,2         |

HR-CE9030

HR-CE9030/4  
HR-CE9030/5  
HR-CE9030/7  
HR-CE9030/8



## MUD BALANCE

The mud balance provides a simple, practical method for the accurate determination of mud density.

The item's durable construction makes it ideal for field use.

Its high-impact plastic case protects the balance during transport while providing a secure base for the balance during use.

The mud balance meets all the requirements of the API standard procedures for testing water base drilling fluids, oil base drilling fluids and oil well cements.

The constant volume cup is affixed to one end of the graduate arm and the counter-weight on the opposite end.

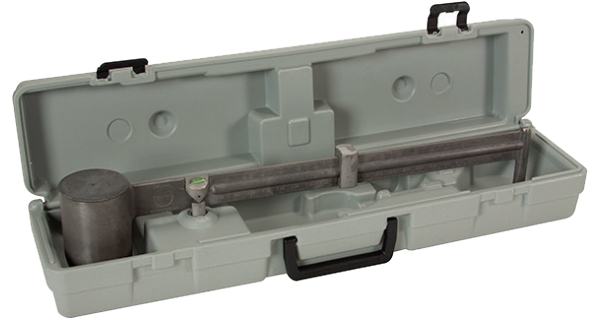
The balance consists of a base and graduated arm with cup, lid, knife edge, rider, built-in spirit level and counter-weight, carrying case.

### Technical Specifications:

| Product Code | Product Name | Dimensions (mm) | Weight (kg) |
|--------------|--------------|-----------------|-------------|
| HR-CE9050    | Mud Balance  | 550x110x100     | 1           |

### Spare Parts & Accessories:

| Product Code | Product Name  | Dimensions (mm) | Weight (kg) |
|--------------|---------------|-----------------|-------------|
| HR-CE9050/1  | Carrying Case | 550x110x100     | 1           |



HR-CE9050

## MARSH FUNNEL VISCOMETER SET

STANDARDS: ISO 2431

Utilized for viscosity determination on drilling muds and fluid materials.

Orifice opening 4,7 mm Half part of the funnel mouth is foreseen of sieving cloth 2 mm mesh.

Plastic break-resistant made.

Supplied complete with 1 lt Plastic Measuring Cup.



HR-CE9040

### Technical Specifications:

| Product Code | Product Name                | Top Dia. (mm) | Nozzle Length (mm) | Int. Dia. (mm) | Total Length (mm) | Weight (kg) |
|--------------|-----------------------------|---------------|--------------------|----------------|-------------------|-------------|
| HR-CE9040    | Marsh Funnel Viscometer Set | 150           | 50                 | 5              | 355               | 0,75        |

### Spare Parts & Accessories:

| Product Code | Product Name                | Top Dia. (mm) | Nozzle Length (mm) | Int. Dia. (mm) | Total Length (mm) | Weight (kg) |
|--------------|-----------------------------|---------------|--------------------|----------------|-------------------|-------------|
| HR-CE9040/1  | Marsh Funnel Viscometer     | 150           | 50                 | 5              | 355               | 0,5         |
| HR-CE9040/2  | Plastic Measuring Cup, 1 lt | ---           | ---                | ---            | ---               | 0,25        |

## VICAT TEST SET

STANDARDS: EN 196-3, 480-2, ASTM C187, C191, AASHTO T129, T131

Used for determination of setting time and consistency of cement by Vicat Method.

The EN Test set consist of a Vicat Frame, EN Vicat Mould, Initial and Final Needles, Consistency Plunger, Glass Plate and Glass Thermometer.

The ASTM Test set consist of a Vicat Frame, ASTM Vicat Mould, ASTM Needle, Consistency Plunger, Glass Plate and Glass Thermometer.

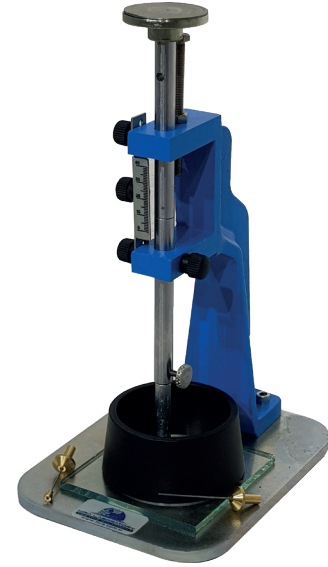
700 g Additional Weight should be ordered separately.

### Technical Specifications:

| Product Code | Product Name         | Dimensions (cm) | Weight (kg) |
|--------------|----------------------|-----------------|-------------|
| HR-CE9100    | Vicat Test Set, EN   | 16x20x32        | 3,5         |
| HR-CE9105    | Vicat Test Set, ASTM | 16x20x32        | 3,5         |

### Spare Parts & Accessories:

| Product Code | Product Name                  | Dimensions (mm) | Weight (kg) |
|--------------|-------------------------------|-----------------|-------------|
| HR-CE9100/1  | Vicat Frame                   | 160x200x320     | 2,5         |
| HR-CE9100/2  | Vicat Mould, EN               | Ø 70/80 x 40    | 0,3         |
| HR-CE9100/3  | Initial Needle, EN            | Ø 1,13          | 0,1         |
| HR-CE9100/4  | Final Needle, EN              | Ø 1,13          | 0,1         |
| HR-CE9100/5  | Consistency Plunger           | Ø 10x50         | 0,1         |
| HR-CE9100/6  | Glass Plate                   | Ø 120           | 0,1         |
| HR-CE9100/7  | Additional Weight, EN         | ---             | 0,700       |
| HR-G0391     | Glass Thermometer, max. 110°C | 30x30x300       | 0,1         |
| HR-CE9105/1  | Vicat Mould, ASTM             | Ø 60/70 x 40    | 0,3         |
| HR-CE9105/2  | Vicat Needle, ASTM            | Ø 1             | 0,1         |



HR-CE9100

## AUTOMATIC VICAT TEST SET

STANDARDS: EN 196-3, 13279-2, 480-2; ASTM C191, C187

Automatic Vicat Apparatus is used for determination of setting time and consistency of cement/mortar/gypsum by Vicat Method.

The Automatic Vicat Apparatus can be programmed up to 4 different test types and can be stored over 50 tests. These test values can be printed from the PC port or transferred to the computer.

It automatically records measurements up to 50 tests and stops automatically.

The penetration measure is read by a sensor with 0,1 mm resolution.

The Automatic Vicat Apparatus has RS 232 serial port for PC connection and Display for data input and graphic/test report.

It has Automatic Needle Cleaning Device and Consistency Plunger.

The EN Test set consist of Automatic Vicat Device, EN Vicat Mould, Initial Needle and Software.

The ASTM Test set consist of Automatic Vicat Device, ASTM Vicat Mould, ASTM Needle and Software.

Thermostatic Bath is available as an optional and should be ordered separately.

Conical penetration needle Ø8x50 mm and 100 g Probe to make gypsum tests following EN, DIN Specifications should be ordered separately.

Other accessories should be ordered separately.



# HİRA TESTING EQUIPMENT

## Technical Specifications:

| Product Code | Product Name                   | Dimensions (cm) | Weight (kg) | Power Supply         |
|--------------|--------------------------------|-----------------|-------------|----------------------|
| HR-CE9120    | Automatic Vicat Test Set, EN   | 36x62x58        | 42          | 220 V, 50-60 Hz, 1ph |
| HR-CE9123    | Automatic Vicat Test Set, ASTM | 36x62x58        | 42          | 220 V, 50-60 Hz, 1ph |

## Spare Parts & Accessories:

| Product Code | Product Name               | Dimensions (mm) | Weight (kg) |
|--------------|----------------------------|-----------------|-------------|
| HR-CE9120/1  | Automatic Vicat Apparatus  | 360x620x580     | 40          |
| HR-CE9120/2  | Vicat Mould, EN            | Ø 70/80 x 40    | 0,3         |
| HR-CE9120/3  | Initial Needle, EN         | Ø 1,13          | 0,1         |
| HR-CE9120/4  | Final Needle, EN           | Ø 1,13          | 0,1         |
| HR-CE9120/5  | Consistency Plunger        | Ø 10x50         | 0,1         |
| HR-CE9120/6  | Glass Plate                | Ø 120           | 0,1         |
| HR-CE9120/7  | Additional Weight, EN      | ---             | 0,700       |
| HR-CE9120/8  | Needle Cleaning Device     | ---             | ---         |
| HR-CE9123/1  | Vicat Mould, ASTM          | Ø 60/70 x 40    | 0,3         |
| HR-CE9123/2  | Vicat Needle, ASTM         | Ø 1             | 0,1         |
| HR-CE9120/9  | Software                   | ---             | ---         |
| HR-CE9120/10 | Thermostatic Bath          | ---             | ---         |
| HR-CE9120/11 | Conical Penetration Needle | Ø 8x50          | ---         |
| HR-CE9120/12 | Probe                      | ---             | 0,1         |



HR-CE9120

## GILLMORE APPARATUS

STANDARDS: ASTM C91, C141, C266, AASHTO T154

Gillmore Apparatus is used to determine the setting time of cement.

Vertical support shaft has a device to maintain the horizontal arms in alignment. Support assembly is adjustable in position. The two steel weights needles are calibrated to meet specifications. Needle points made from stainless steel. The Initial Setting Needle has Ø 2,12 mm and weight of 113 g, while the Final Setting Needle has Ø 1,06 mm and weight of 453,6 g.

## Technical Specifications:

| Product Code | Product Name       | Dimensions (cm) | Weight (kg) |
|--------------|--------------------|-----------------|-------------|
| HR-CE2175    | Gillmore Apparatus | 30x10x30        | 3           |

## Spare Parts & Accessories:

| Product Code | Product Name           | Dia. (mm) | Weight (g) |
|--------------|------------------------|-----------|------------|
| HR-CE2175/1  | Initial Setting Needle | 2,12      | 113        |
| HR-CE2175/2  | Final Setting Needle   | 1,06      | 453,6      |



HR-CE2175

## FLOW CHANNEL TEST APPARATUS (FUNNEL GROOVE)

STANDARDS: EN 13395-2, UNI 8997

Used to determine the consistency of the expansion premixed cement mortars for anchorages, mixed with water, classified of super-fluid type.

## Technical Specifications:

| Product Code | Product Name  | Weight (kg) |
|--------------|---------------|-------------|
| HR-CE2200    | Funnel Groove | 20          |



HR-CE2200

## LE CHATELIER FLASK

STANDARDS: EN 196-6, 450-1, 15617-1, ASTM C110, C128, C188, C989, AASHTO T133

Used to determine the relative density (specific gravity) of hydraulic cement, ground granulated blast-furnace slag and fly ash for concrete, filler aggregates and lime.

The glass flask has a 250ml capacity.

The neck is graduated from 0 to 1 ml and from 18 to 24 ml with divisions of 0,1 ml.

### Technical Specifications:

| Product Code | Product Name       | Dimensions (cm) | Weight (kg) |
|--------------|--------------------|-----------------|-------------|
| HR-CE9125    | Le Chatelier Flask | 10x10x30        | 0,5         |

## LE CHATELIER TEST SET

STANDARDS: EN 196-3, 450-1, 459-2; EN ISO 9597

The soundness of cements and limes is determined using the expansion test with Le Chatelier moulds according to the relevant standard.

The mould consists of a spring tensioned split cylinder  $\varnothing 30 \times 30$  mm with two indicator stems which measure 150 mm from the points to the center line of the cylinder and O ring.

The Le Chatelier Test Set is supplied with 3 pieces Le Chatelier Moulds, 6 pieces 50x50 mm Glass Plates, 300 gr Weight, 3 pieces 100 gr Weight, 70 gr Tamping Rod, Steel Ruler and Carrying Case.

### Spare Parts & Accessories:

| Product Code | Product Name                     | Dimensions (mm)  | Weight (g) |
|--------------|----------------------------------|------------------|------------|
| HR-CE9135/1  | Glass Plate                      | 50x50            | 50         |
| HR-CE9135/2  | 300 gr Weight                    | ---              | 300        |
| HR-CE9135/3  | 100 gr Weight                    | ---              | 100        |
| HR-CE9135/4  | Tamping Rod                      | $\varnothing 17$ | 70         |
| HR-CE9135/6  | Extensibility of mould apparatus | ---              | ---        |
| HR-G0476     | Steel Ruler                      | 300              | 10         |
| HR-CE9135/5  | Carrying Case                    | 340x290x80       | 500        |

### Technical Specifications:

| Product Code | Product Name          | Dimensions (mm)            | Weight (g) |
|--------------|-----------------------|----------------------------|------------|
| HR-CE9130    | Le Chatelier Mould    | $\varnothing 30 \times 30$ | 30         |
| HR-CE9135    | Le Chatelier Test Set | 340x290x80                 | 2000       |

## PAT TEST (SOUNDNESS OF HYDRATED LIME AND GYPSUM PLASTERS)

STANDARDS: EN 459-1, BS 1191, BS 890

Utilized for the determination of the soundness of hydrated lime, gypsum and building plasters.

Consisting of a Brass Ring Mould,  $\varnothing 100 \times 5$  mm.

The mould has an inside taper of  $5^\circ$ .

Supplied complete with Glass Base Plate. To carry out one test, three moulds are required.

### Technical Specifications:

| Product Code | Product Name       |
|--------------|--------------------|
| HR-CE2225    | Pat Test Apparatus |

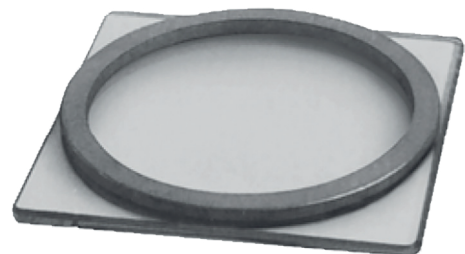
### Spare Parts & Accessories:

| Product Code | Product Name     |
|--------------|------------------|
| HR-CE2225/1  | Brass Ring Mould |
| HR-CE2225/2  | Glass Base Plate |

HR-CE9125



HR-CE9135



HR-CE2225

# HİRA TESTING EQUIPMENT

## LENGTH CHANGE (SHRINKAGE AND EXPANSION)

STANDARDS: EN 12808-4, EN 1367-4, EN 12617-4, ASTM C151, C490

Used to measure the length variations of mortar specimens after autoclave soundness tests.

It also measures the linear shrinkage/expansion of specimens having different dimensions.

The set consists of Length Measuring Frame, Steel Mould according to the related standard, Steel Inserts for mould and Reference Rod. The set is available in three models; with 0,01 mm Analogue Dial Gauge, with 0.01 mm Digital Dial Gauge and with 0.001 mm Digital Dial Gauge.

40x40x160 mm Three Gang Mould, complete with steel inserts, used for the determination of linear shrinkage of cement mortar. Made from hardness steel.

25x25x285 mm Two Gang Prism Mould, complete with steel inserts, used for the determination of linear shrinkage of cement mortar.

Length Comparator; the top beam is adjustable to suit the specimen's length.

Analog Dial Indicator; 10 x 0,01 mm division.

Digital Dial Indicator has two alternatives as 12.7 x 0,01 mm or 12.7 x 0,001 mm resolution.

### Technical Specifications:

| Product Code | Product Name   |
|--------------|--|
| HR-CE0905/AS | Analog Drying Shrinkage Set with HR-CE9000/T & HR-G0875  |
| HR-CE0915/DS | Digital Drying Shrinkage Set with HR-CE9000/T & HR-G0877 |
| HR-CE0905/DS | Digital Drying Shrinkage Set with HR-CE9000/T & HR-G0879 |
| HR-CE0910/AS | Analog Drying Shrinkage Set with HR-CE9010 & HR-G0875    |
| HR-CE0920/DS | Digital Drying Shrinkage Set with HR-CE9010 & HR-G0877   |
| HR-CE0910/DS | Digital Drying Shrinkage Set with HR-CE9010 & HR-G0879   |

### Spare Parts & Accessories:

| Product Code | Product Name                              | Dimensions (mm) | Weight (kg) |
|--------------|---|-----------------|-------------|
| HR-CE9000/T  | Three Gang Mould, 40x40x160 mm            | 300x190x70      | 12          |
| HR-CE9000/1  | Steel Insert for HR-CE9000/T (Pack of 10) | ---             | ---         |
| HR-CE9000/2  | Reference Rod, 160 mm                     | 160             | ---         |
| HR-CE9010    | Two Gang Prism Mould, 25x25x285 mm        | 90x340x40       | 4           |
| HR-CE9010/1  | Steel Insert for HR-CE9010 (Pack of 10)   | ---             | ---         |
| HR-CE9010/2  | Reference Rod, 305 mm                     | 305             | ---         |
| HR-A0905     | Length Comparator                         | 180x180x450     | 6           |
| HR-G0875     | Analog Dial Indicator, 10 x 0,01 mm       | ---             | ---         |
| HR-G0877     | Digital Dial Indicator, 12.7 x 0,01 mm    | ---             | ---         |
| HR-G0879     | Digital Dial Indicator, 12.7 x 0,001 mm   | ---             | ---         |



HR-A0905 with HR-G0877



HR-A0905 with HR-G0875



HR-CE9010



HR-CE9000/T



HR-CE9010/2



HR-CE9010/1

## LE CHATELIER WATER BATH

STANDARDS: EN 196-3, 450-1, 459-2, EN ISO 9597

Constructed with stainless steel inside chamber and exterior case in painted steel sheet, it can hold up to 12 Le Chatelier moulds in the removable rack, supplied with the bath.

The bath reaches the boiling point in approx. 30 minutes.

Now an original device keeps the bath temperature at the boiling point, by avoiding the water evaporation and assuring that Le Chatelier moulds remain covered by the water during all the test execution.

For use with Le Chatelier moulds for the determination of the soundness of cement paste.

Complete with a removable rack to hold up to 12 Le Chatelier moulds.

An adjustable digital controller for the immersion heater regulates the water temperature from ambient to boiling point.

Le Chatelier Moulds are should be ordered separately.



HR-CE9150

### Technical Specifications:

| Product Code | Product Name            | Dimensions (cm) | Weight (kg) | Power Supply          |
|--------------|-------------------------|-----------------|-------------|-----------------------|
| HR-CE9150    | Le Chatelier Water Bath | 25x50x30        | 10          | 220 V, 50-60 Hz, 1 ph |

## PLUNGER PENETRATION APPARATUS

STANDARDS: EN 459-2, EN 413-2, EN 1015-4

Used to determine the consistency of fresh mortar, lime and masonry cement.

Consisting of a steel base with recess to house the test cup and the vertical column holding the penetration plunger assembly. The height of drop is 100 mm and the weight of plunger assembly is 90 g.

Supplied complete with Ø8 x 7 cm Test Cup and Tamper.

### Technical Specifications:

| Product Code | Product Name                  | Dimensions (cm) | Weight (kg) |
|--------------|-------------------------------|-----------------|-------------|
| HR-CE9230    | Plunger Penetration Apparatus | 20x20x70        | 8           |

### Spare Parts & Accessories:

| Product Code | Product Name | Dimensions (cm) | Weight (kg) |
|--------------|--------------|-----------------|-------------|
| HR-CE9230/1  | Test cup     | Ø 8 x 7         | ---         |
| HR-CE9230/2  | Tamper       | ---             | ---         |



HR-CE9230

# HİRA TESTING EQUIPMENT

## CALCIMETER

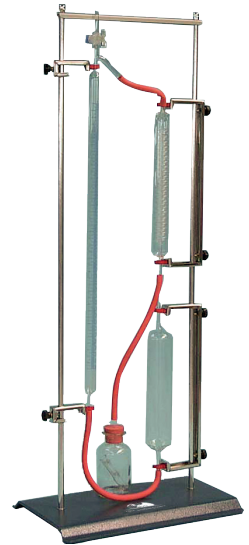
Calcimeter is used to determine the Carbonate content  $\text{CaCO}_3$  in Limestone and Lime Marl.

It consists of a glass container in which the reaction between the calcium carbonate present in the product and a solution of hydrochloric acid takes place. The gaseous product is collected and measured by a device connected to the container.

As the volume of the produced gas ( $\text{CO}_2$ ) is in relation to the  $\text{CaCO}_2$  amount contained in the material, it is possible to calculate the percentage of  $\text{CaCO}_3$ .

### Technical Specifications:

| Product Code | Product Name | Dimensions (cm) | Weight (kg) |
|--------------|--------------|-----------------|-------------|
| HR-CE2250    | Calcimeter   | 30x20x110       | 12          |



HR-CE2250

## CEMENT FLOW TABLES

STANDARDS: EN 459-2, 1015-3, ASTM C230

Used for determining consistency of mortar, lime and cement specimens.

Manual and motorized two models are available.

The hand operated model is fitted with a hand wheel.

The motor operated model is driven by a motor speed reducer through a mechanical coupling at the rate of 1 revolution per second. The number of drops is preset on a counter and the machine stops automatically at the end of the cycle.

EN Model, the table is manufactured from stainless steel and  $\varnothing 300$  mm.

The cone made of brass has dimensions of 100mm base dia. x 70mm top dia. x 60mm high.

ASTM Model; the table is manufactured from stainless steel and  $\varnothing 254$  mm.

The cone made of brass has dimensions of 100 mm base dia. X 70 mm top dia. X 50 mm height.

Both models are supplied complete with flow mould and tamper.

### Technical Specifications:

| Product Code   | Product Name                      | Operated  | Table dia. (mm)   | Drop Height (mm) | Dimensions (mm) | Weight (kg) | Power Supply       |
|----------------|-----------------------------------|-----------|-------------------|------------------|-----------------|-------------|--------------------|
| HR-CE9200      | Cement Flow Table, EN             | Hand      | $\varnothing 300$ | 10               | 260x260x27      | 13          | ---                |
| HR-CE9205      | Cement Flow Table, ASTM           | Hand      | $\varnothing 254$ | 12,7             | 260x260x27      | 13          | ---                |
| HR-CE9215      | Motorized Cement Flow Table, EN   | Motorized | $\varnothing 300$ | 10               | 470x360x350     | 36          | 220 V, 50 Hz, 1 ph |
| HR-CE9215/60Hz | Motorized Cement Flow Table, EN   | Motorized | $\varnothing 300$ | 10               | 470x360x350     | 36          | 220 V, 60 Hz, 1 ph |
| HR-CE9220      | Motorized Cement Flow Table, ASTM | Motorized | $\varnothing 254$ | 12,7             | 470x360x350     | 36          | 220 V, 50 Hz, 1 ph |
| HR-CE9220/60Hz | Motorized Cement Flow Table, ASTM | Motorized | $\varnothing 254$ | 12,7             | 470x360x350     | 36          | 220 V, 60 Hz, 1 ph |

### Spare Parts & Accessories:

| Product Code | Product Name            | Dimensions (mm)             |
|--------------|-------------------------|-----------------------------|
| HR-CE9200/1  | Cement Flow Mould, EN   | 100x70x60                   |
| HR-CE9200/2  | Tamper, 250 gr, EN      | $\varnothing 40 \times 200$ |
| HR-CE9205/1  | Cement Flow Mould, ASTM | 100x70x50                   |
| HR-CE9205/2  | Tamper, Hardwood, ASTM  | 13x25x150                   |



HR-CE9215

## MANUEL MORTAR MIXER

STANDARDS: EN 196-1, EN 196-3, EN 413-2, EN 459-2, EN 480-1, 1015-2, 12617-4, EN ISO 679, ASTM C187, C305, AASHTO T129, T131, T162

The mixer has been designed to mix mortars and cement pastes primarily to the requirements of standards.

The user can choose speeds easily by using switch fitted to the machine. The mixing time can be adjusted from the digital timer on the front control panel.

2 speeds are defined on the device. The user can choose speed 1 (the paddle revolves at a rate of 140 rpm with a planetary motion of 62 rpm) and speed 2 (the paddle revolves at a rate of 285 rpm with a planetary motion of 125 rpm) and prepare the cement sample according to the standards.

The mixer is supplied complete with 5lt capacity bowl and the beater.

### Technical Specifications:

| Product Code | Product Name        | Dimensions (cm) | Weight (kg) | Power Supply          |
|--------------|---------------------|-----------------|-------------|-----------------------|
| HR-CE9250    | Manuel Mortar Mixer | 35x50x55        | 45          | 220 V, 50-60 Hz, 1 ph |

### Spare Parts & Accessories:

| Product Code | Product Name |
|--------------|--------------|
| HR-CE9250/1  | Bowl, 5 lt   |
| HR-CE9250/2  | Beater       |



HR-CE9250/1



HR-CE9250/2



HR-CE9250

## AUTOMATIC MORTAR MIXER

STANDARDS: EN 196-1, EN 196-3, EN 413-2, EN 459-2, EN 480-1, 1015-2, 12617-4, EN ISO 679, ASTM C187, C305, AASHTO T129, T131, T162

The mixer has been designed to mix mortars and cement pastes primarily to the requirements of standards.

The mixing paddle has a planetary motion and is driven by a motor with a microprocessor based speed and preset programs to meet all listed EN and ASTM standards, custom designed programs or manual mode.

The mode button is used for the fast selection of different programs.

The mixing paddle revolves at a rate of 140 rpm with a planetary motion of 62 rpm in low speed. In high speed, the paddle revolves at the rate of 285 rpm with a planetary motion of 125 rpm.

An automatic sand dispenser is supplied with the machine and the sand is automatically discharged.

Custom design allows 6 programs to be set by the operator, where the motor speed, sand dispenser position and duration of the mix can be set.

The Automatic Programmable Mortar Mixer is supplied complete with 5lt capacity bowl and the beater.

### Technical Specifications:

| Product Code | Product Name           | Dimensions (cm) | Weight (kg) | Power Supply          |
|--------------|------------------------|-----------------|-------------|-----------------------|
| HR-CE9255    | Automatic Mortar Mixer | 35x50x75        | 55          | 220 V, 50-60 Hz, 1 ph |

### Spare Parts & Accessories:

| Product Code | Product Name |
|--------------|--------------|
| HR-CE9250/1  | Bowl, 5 lt   |
| HR-CE9250/2  | Beater       |



HR-CE9255

# HİRA TESTING EQUIPMENT

## CEN REFERENCE SAND

STANDARDS: EN 196-1

CEN Standard sand is a natural sand, which is siliceous particularly its finest fractions.

It is clean, the particles are generally isometric and rounded in shape. It is dried, screened and prepared in a modern workshop which offers every guarantee in terms of quality and consistency.

The sand is packaged in bags each containing 1350±5 g.

Reference sand size is 0,08±2 mm.



HR-CE9285

Technical Specifications:

| Product Code | Product Name       | Dimensions (mm) | Weight (gr) |
|--------------|--------------------|-----------------|-------------|
| HR-CE9285    | CEN Reference Sand | 270x130x30      | 1350        |

Technical Specifications:

| Square mesh Size (mm) | Cumulative Retained (%) |
|-----------------------|-------------------------|
| 0,08                  | 99 ± 1                  |
| 0,16                  | 87 ± 5                  |
| 0,5                   | 67 ± 5                  |
| 1                     | 33 ± 5                  |
| 1,6                   | 7 ± 5                   |
| 2                     | 0                       |

## CEMENT MOULDS

STANDARDS: EN 196-1, ASTM C109, BS 4550

Used to produce the mortar specimens for compression and flexural tests.

Made from hardness steel, it conforms to the above mentioned Specifications.

All dimensions and specifications comply with the related standards.

Feed Hopper is used for filling 40x40x160 mm cement moulds. Made from cast aluminum.



HR-CE9000

Technical Specifications:

| Product Code | Product Name                       | Dimensions (mm) | Weight (kg) |
|--------------|------------------------------------|-----------------|-------------|
| HR-CE9000    | Three Gang Mould, 40x40x160 mm     | 300x190x70      | 7           |
| HR-CE9400    | Three Gang Cube Mould, 50x50x50 mm | 110x230x60      | 3           |
| HR-CE9500    | Cube Mould, 70.7 mm                | 100x130x90      | 3,5         |
| HR-CE9010    | Two Gang Prism Mould, 25x25x285 mm | 90x340x40       | 4           |



HR-CE9400

Spare Parts & Accessories:

| Product Code | Product Name                             | Dimensions (mm) | Weight (kg) |
|--------------|--|-----------------|-------------|
| HR-CE9000/1  | Steel Insert for HR-CE9000. (Pack of 10) | ---             | ---         |
| HR-CE9000/2  | Reference Rod, 160 mm                    | 160             | ---         |
| HR-CE9300    | Feed Hopper for HR-CE9000                | 210x200x40      | 2           |
| HR-CE9010/1  | Steel Insert for HR-CE9010 (Pack of 10)  | ---             | ---         |
| HR-CE9010/2  | Reference Rod, 305 mm                    | 305             | ---         |

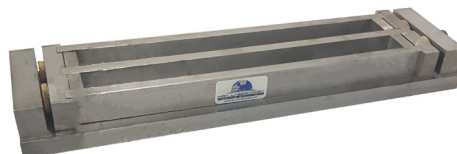


HR-CE9500

HR-CE9010/2



HR-CE9010/1



HR-CE9010

HR-CE9300



## JOLTING TABLE APPARATUS

STANDARDS: EN 196-1, EN ISO 679

Used to compact cement mortar prisms 40x40x160 mm in the three gang mould containing cement specimens.

The apparatus, consists of a table holding the mould, seated on a rotating cam driven at 60 r.p.m.

The drop height is 15 mm.

The machine is equipped with a digital counter which provides automatic shut off at end of preset drop numbers.

Rapid mould lock and release system allows easy and quick operation.

The supporting frame of the machine has been designed to ensure precise dimensions, table flatness, correct centering of the three gang mould on the table.

The motor and gearbox assembly is enclosed in a protective housing, which promotes user safety (the moving parts are inaccessible) and long life for the gearbox.



HR-CE9275

### Technical Specifications:

| Product Code   | Product Name            | Dimensions (cm) | Weight (kg) | Power Supply       |
|----------------|-------------------------|-----------------|-------------|--------------------|
| HR-CE9275      | Jolting Table Apparatus | 35x105x50       | 55          | 220 V, 50 Hz, 1 ph |
| HR-CE9275/60Hz | Jolting Table Apparatus | 35x105x50       | 55          | 220 V, 60 Hz, 1 ph |

## VIBRATING MACHINE

STANDARDS: BS 4550

Vibrating Machine for 70.7 mm Cube Moulds is used for the preparation and compaction of 70.7 mm mortar cube specimens.

The mould is mounted on a vibration platform with eccentric mechanism which allows each sample to be vibrated at 12000 cycles per minute.

The machine is supplied complete with Control Panel with Timer.

70.7 mm Cube Mould should be ordered separately.



HR-CE2275

### Technical Specifications:

| Product Code   | Product Name      | Eccentric Shaft Rotation | Dimensions (cm) | Weight (kg) | Power Supply      |
|----------------|-------------------|--------------------------|-----------------|-------------|-------------------|
| HR-CE2275      | Vibrating Machine | 12000 r.p.m              | 45x65x85        | 100         | 220 V, 50 Hz, 1ph |
| HR-CE2275/60Hz | Vibrating Machine | 12000 r.p.m              | 45x65x85        | 100         | 220 V, 60 Hz, 1ph |



## HİRA TESTING EQUIPMENT

### CURING CABINETS

STANDARDS: EN 196-1, ISO 679

Curing Cabinet is used for curing of cement, concrete cubes or other mortar specimens.

It can be used for curing cement specimens within the mould or after removing from the mould.

The curing cabinet provides  $20 \pm 1^\circ\text{C}$  temperature and over 95% RH humidity for cement specimens.

Internal chamber and racks are made of stainless steel. The temperature is maintained at  $20 \pm 1^\circ\text{C}$  by a immersion heater and refrigerator unit which are supplied complete with cabinet. The cabinet is equipped with a digital control unit which controls and monitors the temperature.

The humidity is maintained from 95% to saturation by water nebulizers and is also monitored on the digital control unit.

Two models are available. Single Programmed Model has Numeric Display and Step Controlled (10 programs) has LCD Touch Screen.



HR-CE9300

#### Technical Specifications:

| Product Code | Product Name                                 | Capacity (lt) | Power Supply          |
|--------------|--|---------------|-----------------------|
| HR-CE7000    | Curing Cabinet Single Programmed             | 120           | 220 V, 50-60 Hz, 1 ph |
| HR-CE7000/P  | Curing Cabinet Step Controlled (10 programs) | 120           | 220 V, 50-60 Hz, 1 ph |
| HR-CE7010    | Curing Cabinet Single Programmed             | 250           | 220 V, 50-60 Hz, 1 ph |
| HR-CE7010/P  | Curing Cabinet Step Controlled (10 programs) | 250           | 220 V, 50-60 Hz, 1 ph |
| HR-CE7020    | Curing Cabinet Single Programmed             | 500           | 220 V, 50-60 Hz, 1 ph |
| HR-CE7020/P  | Curing Cabinet Step Controlled (10 programs) | 500           | 220 V, 50-60 Hz, 1 ph |
| HR-CE7030    | Curing Cabinet Single Programmed             | 750           | 220 V, 50-60 Hz, 1 ph |
| HR-CE7030/P  | Curing Cabinet Step Controlled (10 programs) | 750           | 220 V, 50-60 Hz, 1 ph |
| HR-CE7040    | Curing Cabinet Single Programmed             | 1000          | 220 V, 50-60 Hz, 1 ph |
| HR-CE7040/P  | Curing Cabinet Step Controlled (10 programs) | 1000          | 220 V, 50-60 Hz, 1 ph |

### CEMENT COMPRESSION / FLEXURAL TEST MACHINE

STANDARDS: EN 196-1, 459-2, 1015-11, 13454-2, EN ISO 679, ASTM C109, C348, C349, BS 3892-1, 4551-1

The Automatic Cement Compression and Flexure Machine have been designed for testing the flexure of the mortar prisms 40x40x160 mm and the compression on the 40x40mm pieces of prisms after the flexure test or 50x50 mm and 70,7 mm mortar cubes.

These machines also meet the requirements of CE norms for safety and health of the operator.

Compression and flexure jigs, distance pieces, and also removable transparent front-rear safety doors (should be factory installed) should be ordered separately.

The Automatic Cement Compression and Flexure Testing Machines allow less experienced operators to perform the tests.



HR-CE1500

The only required operations are;

- Setting test parameters, including pace rate
- Choosing the compression or flexure frame by using valve.
- Choosing Capacity of the frame (to call calibration values of the required load cell)
- Use load cell switch frame or compression side (up/down)
- Pressing the START button on the control unit.
- The machine automatically starts the rapid approach; switches the test speed after 1% of the load capacity of the machine and stops once the specimen failure.

### **The Automatic Cement Compression and Flexural Testing Machines consist of;**

- Very rigid two column single or double chamber Load Frames,
- Automatic Hydraulic Power Pack,
- Digital data acquisition & control system.

### **Cement Compression & Flexural Load Frames**

15 kN and 250 kN high quality load cells are used on frames to provide high accuracy in load measuring. Both frames are fitted with round platens with Ø165 mm and these should be used together with suitable flexure and compression jigs.

### **Distance Pieces**

Due to the modular design of the frames any sample with suitable size, load and pace rate can be test on both chambers by decreasing the distance between platens.

### **Upper Platens**

Manufactured from high quality steel which is hardened (more than HRC 53), smoothed and finished.

The roughness value for the surface texture of machine and auxiliary platens are 3,2 µm. the movable design.

### **Loading Cylinder Assembly & Limit Switch**

All frames have a single acting up stroking ram. The diameter of piston changes with regard to the capacity.

The maximum ram stroke is 50 mm, a limit switch is fitted to prevent over travel of the ram which cuts the power to the pump.

There is a low friction coaxial PTFE seal between the cylinder and the piston fitted to the cylinder.

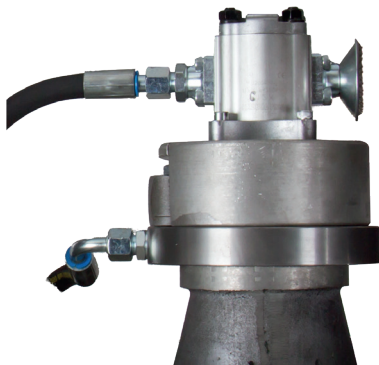
### **HYDRAULIC POWER PACK AND DIGITAL DATA ACQUISITION & CONTROL SYSTEM**

### **Hydraulic Power Pack**

Automatic Hydraulic Power Pack, dual stage, controlled by digital readout and control unit is designed to supply the required oil to the load frames for loading.

Controller unit has a simple and compact configuration.

Very silent power pack can load the specimen between 0,05 to 2.4 kN/sec with an accuracy of ±5%. A Rapid approach pump is supplied as standard. Safety valve (maximum pressure valve) is used to avoid machine overloading.

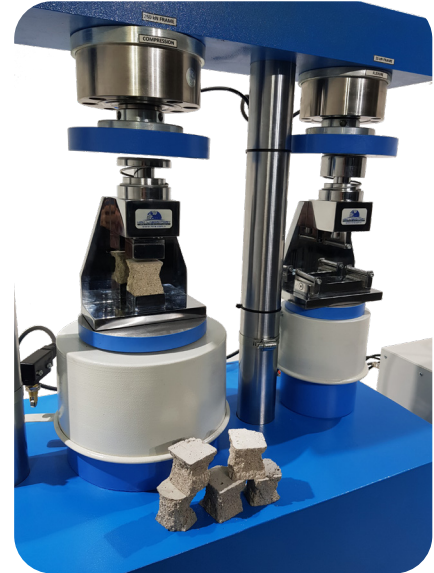


### **Dual Stage Pump**

The dual stage pump is formed by two groups;

1. Low pressure gear pump
2. High pressure radial piston pump

On the dual stage pump, a high delivery, low pressure gear pump is used for rapid approach, while a low delivery, high pressure radial piston pump is used for test execution. The rapid approach facility shortens the time interval from piston start until the upper platen touches to the specimen. This excellent feature helps to save a lot of time when a large number of specimens are going to be tested.



**HR-CE4000**

## HİRA TESTING EQUIPMENT

### Motor

The motor which drives the dual pumps in an AC motor and it is controlled by motor inverter. The variation in the oil flow is executed with the variation of the rotation speed of the motor.

Maximum capacity is 400 bar.



### Distribution Block

A distribution block is used to control the oil flow direction supplied by the dual stage pump, the following parts are fitted to the distribution block; Solenoid valve, Safety valve (max. pressure valve), Transducer, Low pressure gear pump and High pressure radial piston pump.



### Oil Tank

The tank includes enough oil to fill the mechanism which pushes the ram during the test. The level and oil temperature can be seen on the indicator fitted to the tank. It has 25 L capacity. Hydraulic motor oil, number 46, must be used.

### Digital Readout and Control Unit

The unit is designed to control the machine and processing of data from load-cells and pressure transducers which are fitted to the machine.

All the operations of the unit is controlled from the front panel consisting of a LCD display and function keys.

The unit has easy to use menu options.

Digital graphic display unit loading rate of the time of Testing and load values can be monitored.

Digital graphic display is able to draw real-time "Load vs. Time", or "Stress vs. Time" graphics.



HR-CE4002

### Software

Sample, company, laboratory and test values can be entered in the programme.

Load-time graphic, test reports and sample reports can be taken.

### Main Features

- Pace rate control from 0,05 kN/sec to 2,4 kN/sec depending on piston size.
- Can control 2 frames
- Can make test with load control.
- Real time display of test graph.
- Analog channels for different frame load cells
- 10 data per second sample rate for each channel
- RS-232 serial port connecting for computer interface
- LCD display
- Multi-language support (English and Turkish)
- 2 different unit system selection; SI and metric
- Real-time clock and date
- Free of charge PC software for the test control and printout the test report.

## Technical Specifications:

| CEMENT COMPRESSION / FLEXURAL TEST MACHINE                            |             |           |             |
|---|-------------|-----------|-------------|
| Model   | HR-CE2500   | HR-CE1500 |             |
| Test Type   | Compression | Flexure   | Compression |
| Capacity (kN)   | 250         | 15        | 250         |
| Class 1 Measuring Range (kN)  | 2.5 to 250  | 0.5 to 15 | 2.5 to 250  |
| The roughness value for texture of loading and auxiliary platens (µm) | ≤3.2        | ≤3.2      | ≤3.2        |
| Lower Platen Dimensions (mm)  | 165         | 165       | 165         |
| Upper Platen Dimensions (mm)  | 165         | 165       | 165         |
| Maximum Vertical Clearance Between Platens (mm)                       | 250         | 250       | 250         |
| Piston Diameter (mm)  | 160         | 80        | 160         |
| Maximum Piston Movement (mm)  | 50          | 50        | 50          |
| Horizontal Clearance (mm)   | 300         | 200       | 300         |
| Power (W)   | 750         | 750       |             |
| Oil Capacity (lt)   | 25          | 25        |             |
| Maximum Working Pressure (bar)  | 125 bar     | 30 bar    | 125 bar     |

## Safety Features

- Maximum pressure valves to avoid machine overloading
- Piston travel limit switch
- Emergency stop button
- Software controlled maximum load value

HR-CE1527



HR-CE1525



## Technical Specifications:

| Product Code | Product Name   | Dimensions (cm) | Weight (kg) | Power Supply          |
|--------------|--|-----------------|-------------|-----------------------|
| HR-CE1500    | 15/250 kN Automatic Cement Flexure/Compression Testing Machine | 100x50x150      | 350         | 220 V, 50-60 Hz, 1 ph |
| HR-CE2500    | 250 kN Automatic Cement Compression Testing Machine            | 85x50x150       | 300         | 220 V, 50-60 Hz, 1 ph |

## Spare Parts & Accessories:

| Product Code | Product Name  | Dimensions (cm) | Weight (kg) | Power Supply          |
|--------------|---|-----------------|-------------|-----------------------|
| HR-CE1500/1  | 15/250 kN Cement Flexure/Compression Testing Frame                      | 64x50x150       | 250         | ---                   |
| HR-CE2500/1  | 250 kN Cement Compression Testing Frame                                 | 50x50x150       | 200         | ---                   |
| HR-CE1525    | Flexure Jig Assembly to test 40x40x160 mm mortar prisms                 | 15x15x18        | 11          | ---                   |
| HR-CE1526    | Compression Jig Assembly to test 50 mm (2") mortar cubes                | 15x15x18        | 12          | ---                   |
| HR-CE1527    | Compression Jig Assembly to test portions of 40x40x160 mm mortar prisms | 15x15x18        | 12          | ---                   |
| HR-CE1528    | Compression Jig Assembly BS, to test 70,7 mm mortar cubes               | 15x13x19        | 9           | ---                   |
| HR-CE4000    | Hydraulic Power Pack and Digital Data Acquisition & Control System      | 36x38x91        | 100         | 220 V, 50-60 Hz, 1 ph |
| HR-CE4001    | Hydraulic Power Pack  | 36x38x91        | 98          | 220 V, 50-60 Hz, 1 ph |
| HR-CE4002    | Digital Data Acquisition & Control System                               | ---             | ---         | 220 V, 50-60 Hz, 1 ph |
| HR-CE4003    | Software  | ---             | ---         | ---                   |
| HR-CE4200    | Distance Piece  | ∅ 15 x 1,5      | ---         | ---                   |
| HR-CE4201    | Distance Piece  | ∅ 15 x 3        | ---         | ---                   |
| HR-CE4202    | Distance Piece  | ∅ 15 x 5        | ---         | ---                   |
| HR-CE4203    | Distance Piece  | ∅ 15 x 9        | ---         | ---                   |
| HR-G0975     | Computer & Printer  | ---             | ---         | 220 V, 50-60 Hz, 1 ph |
| HR-G0975/1   | Usb to com port Converter   | ---             | ---         | ---                   |
| HR-G0979     | Thermal Printer   | ---             | ---         | ---                   |