Laboratory Instruments For Concrete Testing Cement Testing

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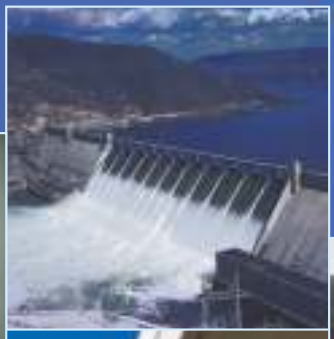

MISSION

The mission of EIE is to provide user friendly , advanced and reliable instrumentation to our esteemed customers backed by efficient services and further to uplift the standard of quality by applying creative innovations and modern techniques, thereby satisfying the consumers' needs to increase their efficiency in measurement and testing. EIE engrosses itself to work for the universal benefits of its employees, customers and suppliers.

VISION

EIE envisages itself as an emerging organization standing ahead of the competition through its noble act of manufacturing and marketing the high précised laboratory equipments. EIE aspires to evolve as a work place of sensitive and efficient individuals dedicated to serve the nation and Indian industry with constant improvement driven by innovation, integrity and inspiration.

VALUES

EIE believes to

- Render gentle services to customer.
- Establish a win win relationship with vendors.
- Empower its employees with knowledge, environment and faith.

EIE Instruments Pvt. Ltd., Ahmedabad, INDIA

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Concrete Mixer - TM-57

Introduction

A concrete mixer is a device that homogeneously combines cement, aggregate such as sand or gravel, and water to form concrete. The mixer uses a revolving drum to mix the components. Uniform and thoroughly mixed batches can be produced in field or Laboratory. Inevitable for mix design formulation.

General Description and Specifications

The Concrete Mixers are available in two versions. For Laboratory or field use. The field models are hand operated. This portable concrete mixer has rubber tyred wheels and a towing tongue so that it can be towed and moved around by hand. Its rotation is powered by single phase electric motor or by hand . The lever allows the concrete to be tipped into a wheel barrow or mixing pan. The driving shaft is mounted on sealed ball bearing. The counter balanced drum swivels and tilt 360° for easy and complete discharge.

Drum Capacity :	3 cubic feet approx
Drum Material :	Cast iron or mild steel
Mixer Capacity :	2 cubic feet approx
Drum Rotation :	20-22
Motor Power :	0.5 HP single phase AC supply/ hand operation

Optional Accessories

Wheel Barrow, Mixing Pan, Concrete Scoop.

Pan Mixer - TM-57(B)

Introduction

Designed for mixing small quantities of concrete used in preparation of concrete cubes for testing in Laboratories. The purpose of the mixer is to smear mechanically the aggregate surface with cement paste uniformly and produce a mix of uniform consistency. This in turn gives consistent quality of cube specimens when casted in the moulds.

Salient Features

- Portable & compact.
- Adjustable Blades.
- Simple to clean and maintain.

General Description and Specifications

The concrete mixer developed in transportable on wheels. The design of the mixing developed is ensure uniform and efficient mixing of cement and aggregate in dry & wet conditions. The design also facilitates lifting of mixing drum with the help of steering wheel. The arrangement helps the operator to access the pan contents conveniently and emptying the mixture after completion of the operation. The drum is driven through a Heavy Duty Gear Box. Positive rotating motion of the drum is ensured by unique design of the ribbed base. The lid with mixing paddles clears off the top of the drum to provide maximum access to the operator. Electric supply motor, 2 HP, 440 V, 3 phase, AC. Pan size 24" dia X 14" depth. Total volume 65 ltrs. approx.

Optional Accessories

Wheel Barrow, Mixing Pan, concrete Scoop.

Compression Testing Machine - TM-42

(Motorised) (Electrical cum Hand Operated)

IS : 516

Introduction

This test is used to determine the compressive strength of a concrete cube, which has usually been made from fresh concrete cast in a standard test mould. The value of compressive strength can then be used to assess whether the batch that the concrete cube represents meets the required compressive strength. Following cube manufacture and curing, which should both be closely controlled, the cube is crushed at a stated constant speed until it can sustain no further increase in load. The strength is then derived by calculation using the maximum load and cube dimensions.

The machine embodies an hydraulic system designed to meet the requirements of Indian standards Specification 516-1959 for compression tests on concrete cubes up to 20 cm X 20 cm X 20 cm. and also concrete cylinders up to 30 cm height. Using special platens and fixture, Brick testing and flexural testing can also be carried out on the same machine.

Salient features

- Hard chrome plated piston with new type of long life oil seal.
- Four Pillar Model - superior in design, reliability and accuracy
- Practically no welded parts, all joints reinforced with heavy nut/bolt to withstand occasional over loading and to ensure center loading.
- Rounded Corners add to elegance and safeguard against injury
- Hardened and grinded platens with guide lines for placing sample for testing
- Accurately calibrated dial gauge

General Description and Specifications

Loading Unit

The hydraulic jack of rated capacity is fixed to the base. The upper platen has got a self-aligning action and is attached to a screw, which passes through the crosshead plate, and can be raised or lowered for initial clearance adjustment. The lower platen rests on the jack ram and is positioned with the help of a centering pin. Loading is accomplished by upward movement of lower platen. A dust cover is provided on the jack to prevent any dust from going into the cylinder. A spacer with a centering locating pin is provided to test small specimens. The lower and upper platens of the machine are hardened ground and polished. Guidelines are marked on the lower platen to keep the specimen coaxial with the hydraulic jack.

Pumping Unit

The motorized pumping unit which is housed in an elegant console is of double plunger type and is driven by three phase 440 volts 50 cycles electric motor. The pumping unit is a separate unit connected to the jack by means of a flexible high pressure connecting tube. A junction box is suitably fixed to connect the motor to the mains through a push button starter. The Pumping unit is fitted with hand wheel control valve, which enables the rate of application of load to be varied. The Machine is also equipped with facility for hand pumping in case of power failure

Pressure Gauge

The pumping unit is fitted with a 20cm dia hydraulic pressure gauge with 200 divisions, A max red pointer is provided to facilitate taking readings after failure of the specimen. The pressure gauge is fixed at an Angle, for easy readability. The Pressure Gauge is accurately calibrated against MASTER `A` CLASS PROVING RING having traceability to National standards.

Safety Features

The electric pumping unit is fixed with a micro-switch to switch off the motor automatically as the load on the machine approaches the rated capacity. Relays are incorporated in the pumping unit so that in case of break down of power supply the motor will stop and would not restart unless the starting switch is operated.

Capacities Available

- A 100 KN with Single Gauge
- B 250 KN with Single Gauge
- C 500 KN with Single, or Double Gauge

- D 1000 KN with Single, Double or Tripple Gauge (250/500/1000 KN)
- E 1500kn with Single, Double or Tripple Gauge (500/1000/1500 KN)
- F 2000 Kn with Single, Double or Tripple Gauge (500/1000/2000 KN)
- G 3000 Kn with Single, Double or Tripple Gauge (1000/2000 /3000 KN)

Optional Accessories

- Spare Oil Seal
- Brick Testing Attachment

This test measures the compressive strength of bricks to be used in construction for load bearing walls. Specimens are first sampled from batches in a standard manner. The bearing faces are then either made perfectly flat by capping with sulphur or soft wooden spacers are used to take up surface defects, this will avoid any point loading. If frogs are present (indentations in the face) then these are filled with standard mortar. The maximum load sustained by the bricks before failure is then measured and the compressive strength calculated.

Flexural Test Attachment

The test method essentially involves applying a load at the centre of a beam of concrete supported at its ends. The load required to break the specimen is then recorded.

- Cube Moulds of Various Sizes
- Accelerated Curing Tank
- Hydraulic Oil (tin of 5 Ltrs)

Relevant Standard IS : 516

Compression Testing Machine Digital - TM-42 H

IS : 516

Introduction

The digital compression testing machine has been designed to meet the need for a simple, economic and reliable means to test concrete for its compressive strength. The design expressive of simplicity, both of construction and operation, makes the machine easy to use and maintain. The unit is compact, making it useful for site and laboratory applications. The digital machines are provided rate of loading.

Features

- High stability four column load frame.
- Each frame tested for stability and alignment to avoid tension failure during a test and to ensure centre loading.
- Standard Platens for 3 X 6"/ 4 X 8" and 6 X 12" cylinders included.
- A precise large diameter spherical upper platen for optimum results.
- Variety of optional accessories for cubes, blocks, bricks and flexure test available.
- Motorized hydraulic power pack or pumping unit with rapid approach and automatic over load protection.
- Comes standard with safety guards on all four sides.

The Complete unit comprises a Loading Unit which is of four pillar model construction having a cross-head with a spherical seated platen. The lower platen is attached to the top of the piston. The Loading capacity is of 2000 KN, Cubes up to 200 mm & Cylinders up to 150 mm Dia X 300 mm Height can be tested using the appropriate spacers.

Pumping Unit with choice of compact power pack attached closely to the loading unit or separate hydraulic pumping unit, attached to the loading unit by high pressure hydraulic flexible hose pipe. The pump facilitates rapid approach of the platens for daylight closure and also

Proving Rings for Calibration - TM-135

provides comprehensive control over the application of load. A control valve provides fine control over the loading rate for accurate pacing.

Maximum load is held and retained for approx. 15 min, unless cancelled, using the panel mounted reset switch. Pace rate set for running the test can be maintained manually.

Model with digital Readout and pace rate controller

Type of Pumping	Electrical
Loading Range	2000 KN
Least Count	1 KN
Max. Clearance Between platen	370 mm
Max. Clearance Between side platen	340 mm
Platen Size	220 mm dia.
Piston Stroke	215.00 mm

Optional Fittings

- Digital load indicator with Rs. 232 interface for connection to windows XP based computer system.
- Digital Load indicator with printer interface.
- Battery back up for digital load indicator in case of power failure.
- Additional pressure gauge as `stand by` load indicator for emergency use in case of power failure
- Spare oil seal.
- Flexural test attachment (to be ordered at the time of purchase of machine.) Can be accommodated later on, only if request received at the time of placement of order.
- Brick test attachment.
- Block testing attachment.
- Spacers to accommodate small size cubes and cylinders.
- Hydraulic oil.
- Ram extracting tool.

Relevant Standard IS : 516

IS : 4169-1967

Introduction

The Proving Ring is recognized wherever highly accurate force measurement calibrations are preformed as the premier standard. These are used for periodical calibration of all force measuring Instruments. A precision micrometer measures the deflection, or change of diameter of the ring under load. At this point, a reading is taken. This procedure is repeated throughout the calibration.

General Description

It has been proven that a steel ring made of correct steel alloy and properly manufactured will perform as a nearly perfect elastic member. To properly utilize this characteristic, We machine proving rings from special alloy steel forgings. The external bosses, as well as the internal to which the deflection measuring apparatus is attached, are machined as an integral part of the ring. This costly but essential method of making the ring is the only known way to assure long term reliability.

The sensitivity of the micrometer is equivalent to 0.002 of mm. The micrometer mechanism is carefully machined and assembled to deliver extreme and lasting accuracy. It is supplied with suitable hardened and ground loading pads to compensate for a minute thread wear.

After assembly, the proving rings are calibrated against known standards, either at the National Physical Laboratory or against the Proving ring calibrated by NPL.

Supplied Complete in polished wooden storing Cabinet.

Available in wide range of Capacities from 1 KN to 2000 KN

Relevant Standard IS : 4169-1967

Compression Testing Machine (Hand Operated) - TM-39

IS : 516

Introduction

This machine is quite useful on field laboratories or mobile testing laboratories or vans which frequently change site or location. It is particularly useful where constant and consistent electric power is not available. The load is applied manually and observed on a pressure gauge. The pressure gauge has maximum load indicator which stand still even after the specimen under test crushes and has to be set to zero manually.

Salient Features

- High stability.
- Self-aligning platen assembly.
- Gauges are calibrated in kilo newton against certified proving ring.
- Suitable for testing cubes of various sizes.
- Using special platens, bricks also can be tested.
- Hard chrome plated piston with new type of long life oil seal.
- Four pillar model - superior in design, reliability and accuracy.
- Practically no welded parts, all joints reinforced with heavy nut/bolt to withstand occasional over loading and to ensure center loading.
- Rounded Corners add to elegance and safeguard against injury.
- Hardened and grinded platens with guide lines for placing sample for Testing.

Optional Accessories (At extra cost)

- Spare oil seal.
- Brick testing attachment.
- Hydraulic oil (Tin of 5 Ltrs).

Relevant Standard IS : 516

Flexural Testing Machine - TM-74

IS : 516

Although generally not such an important property of concrete than compressive strength, tensile strength values are often important to know when the concrete used is free of reinforcement and may be subjected to some tensile force. The test method essentially involves applying a load at the centre of a beam of concrete supported at its ends. The load required to break the specimen is then recorded.

General Description and Specification

The machine consists of a motorized load frame. The lower platen has two rollers, the distance between which is adjustable. For 150 mm x 150 mm x 700 mm beam, the centre distance between the rollers is 600 mm, while it is 400 mm for beams of size 100 mm x 100 mm x 500 mm. The upper platen has also a pair of rollers whose distance is adjustable. It is 200 mm centre to centre, for 150 mm x 150 mm x 700 mm size beam and 133 mm for 100 mm x 100 mm x 500 mm size beam. Total capacity of the

machine is 100 KN. 150mm dia pressure gauge of 0-100 KN x 1 KN least count to indicate load is fixed on the load frame. A separate electrically cum hand operated pumping unit housed in a cabinet is supplied. On/Off switch and a slow/fast lever to control rate of loading are fitted on the front panel of the pumping unit. A facility for hand operation is provided. A micro switch and relay fitted inside the pressure gauge protect the unit from over loading.

Hand operated version consists of a load frame. A small hand pumping unit is attached to the load frame. Since this is a hand operated light weight machine. It is useful for field laboratory also.

As per IS: 516, BS: 1881, ASTM C78

Optional Accessories

- Spare oil seal
- Hydraulic oil (tin of 5 ltrs)
- Beam mould 10 X 10 X 50 cm
- Beam mould 15 X 15 X 60 cm
- Beam mould 15 X 15 X 70 cm
- Beam mould 15 X 15 X 75 cm
- Trowel
- Concrete scoop
- Digital load Indicator in place of pressure gauge

Relevant Standard IS : 516

Concrete Test Hammer

Introduction

Concrete test hammers are used to determine the surface hardness of concrete and are one of the most widely used instruments in the field of non destructive testing of concrete. It is the quickest, simplest and least expensive method to obtain an estimate of the quality and strength of the concrete.

General Description

This simple to use gauge consists of a spring loaded plunger which, when released, strikes the surface with fixed and constant impact energy. During the rebound stroke, the mass moves a pointer that indicates the maximum point of return and at the same time indicates a reference value called Rebound Number. This number, converted by the correlations available on the hammer, gives the compression resistance value in respect of the impact angle.

Salient Features

- Impact Energy 2.207 Nm
- Supplied with abrasive stone to prepare test surface
- Aluminium body
- Rebound value indicated on test hammer
- Rebound value chart on body, for quick calculation of compressive strength
- Curve selection on chart dependant on testing angle

Technical Specifications

Impact Energy	: 2.207 Nm
Accuracy	: Better than +/- 2 Rebound Number When tested on Calibration Anvil at 80
Resolution	: 2 Rebound Number(s)
Range	: 10 to 100 Rebound Number

The concrete test hammer, often called a rebound hammer, is supplied with plastic carrying case, grinding stone, calibration certificate (at extra cost) and instructions.

Relevant Standards : ASTM C805 EN 12504-2 BS 1881:202 DIN 1048 ISO 8045

Concrete Test Hammer

Digital Concrete Test Hammer

The digital and more advanced version is equipped with an electronic transducer which converts the rebound values into a reading on the digital display. It displays a range of statistics and there is a facility to download to a PC. The software and digital display are integrated into the design of the hammer.

Salient Feaures

- Light and easy to use
- High resolution and accuracy
- Possibility to store, display and download data to PC
- Setting of test parameters and factors (age, shape, correction factors)
- Rapid and simple calibration procedure
- Selection of testing angle
- Selection of unit (N/mm2, MPa, PSI, kgf/cm2)
- Automatic conversion of rebound index to equivalent compression strength
- Selection between 7 different correlation curves between rebound index and compressive strength, 2 pre-set and 5 user definable
- Statistical evaluation of test results (mean value, standard deviation, concrete strength estimation)
- Supplied with abrasive stone to prepare test surface
- Storage of up to 5000 results
- RS 232 output to PC
- Rechargeable internal battery

Technical Specifications:

Impact Energy : 2.207 Nm
Accuracy : Better than ± 2 Rebound Number(s) When tested on Calibration Anvil at 80.
Resolution : 0.1 Rebound Number.
Range : 10 to 70 MPa.
Unit Selection : N/mm2; MPa; kg/cm2; PSI/Autonomy (Continuous Use) >5 Hours.
Shipping List : Hammer, battery charger, serial cable for PC, abrasive stone, instruction manual, calibration certificate (at extra cost) and carry case.

Concrete Penetrometer - TM-126

ASTM C-403

Introduction

This test is used to determine the elapsed time between batching of a concrete sample and when it is deemed by standard methods to have set. The method involves measuring the penetration resistance of a test sample, which has had coarse particles removed at periodic intervals. It is particularly useful, in determining the effect on setting time of admixtures in the concrete, where these may have been introduced specifically to increase the setting time.

General Description and Specifications

It consists of cylindrical spring housing with a plunger attached to the top of the spring. Penetration needle is attached to the other end of the spring housing. The plunger is graduated in 1 kg divisions, to a maximum capacity of 60kg, which can be read with respect to the top end of the spring housing. A set of six needle points with areas of 645, 323, 161, 65, 32 and 16mm^2 are provided. Supplied complete in a wooden carrying case.

Pocket Penetometer

Consists of a needle having face area 3/10 sq. cm. and graduated at a distance of 25mm. The needles point is an integral part of barrel which houses a calibrated spring. The spring is confined in a sleeve. The resistance offered by the concrete mortar is shown on the direct reading scale with a marker ring which holds its position when released. Scale range is 0-50 kg/cm^2 when the penetration resistance reaches a value of 35kg/cm^2 the concrete is assumed initially set. Supplied complete in a leather carrying case.

Relevant Standard As per ASTM C-403

Vibrating Table - TM-198

Relevant Standard IS : 2514

Introduction

The Vibrating Table produces better concrete Moulds and cylinders by removing entrapped air. It distribute concrete evenly inside the moulds and nearly eliminate the problems of bug holes and air bubbles.

General Description And Specifications

The Vibrating table is entirely constructed of thick steel. The table top is made of thick mild steel plate and has stops along its edges to prevent moulds from walking off the table during operation. A cross arm adjustable on a vertical rod at the centre of the table is provided to hold the moulds while operating the table. The variable pitch pulley arrangement permits the variation of frequency between maximum of 3600 vibrations down to 2600 vibrations per minute. A speed regulation handle is provided for increasing or decreasing the frequency. The vibrator is mounted on cushioned steel vibrating deck. A switch is provided for starting the motor. Operation on 440 V, three phase, A.C. supply.

Table Top Size Available

- 50 X 50 CMS
- 60 X 60 CMS
- 75 X 75 CMS
- 100 X 100 CMS

Relevant Standard IS : 2514

Needle Vibrator - TM-123

Introduction

In the process of compaction, efforts are only directed to reduce voids in the compacted concrete. The vibrators produce vibrations which when transmitted to plastic concrete make it to flow and affect compaction. The air bubbles are forced out of concrete due to vibrations.

The needle vibrator, also known as immersion or poker vibrator have a power unit and long flexible tube at the end of which a vibrating head is attached. Wherever compaction is to be done, the vibrating head is inserted in the concrete.

General Description and Specifications

The laboratory needle vibrator having 350mm long X 25mm dia needle is used in vibrating concrete test cylinders and beams in the field or laboratory. It is also widely used in making laboratory specimens, in making concrete products, in experimental works, and in small scale construction project. It has 1 meter long flexible shaft and is powered by 1 HP single phase electric motor.

The needle vibrator for compaction of mass concrete has 40 or 60mm dia needle with 6 meter long flexible shaft and powered by 3 HP electric motor for operation on 440 Volts, 3 phase, 50 cycles, A.C. supply. Optionally, the vibrator can also be fitted with petrol/kerosene or diesel engine for field use.

Optional Accessories

Spare needle with shaft.

Cube Moulds - TM-110

IS : 10080

Introduction

Cubes of fresh concrete are made to test a variety of properties on the eventually cured and hardened concrete. Fresh concrete is subjected to a standard compaction regime in the cube mould and is then normally initially cured under specific laboratory conditions. The moulds are manufactured, subject to tight dimensional, hardness, square ness and surface finish requirements

General Description and Specifications

Complete with base plate. The faces of the mould are machined flat to +/- 0.02mm accuracy and finished to within +/- 0.2mm of specified dimensions. Material for construction of moulds is Cast Iron or mild steel. The moulds are stout enough to prevent distortion and facilitate the removal of the moulded specimen without damage. The Moulds are so machined that when they are assembled ready for use, the dimensions and internal faces are accurate within the specified limits. Internal faces of the moulds are smooth

The base plate is attached to the mould by cleats .The parts of the mould, when assembled, are positively and rigidly held together during filling, subsequent handling and vibration where applicable. As per IS : 10080.

Size Available

- 50mm/ 100mm/ 150mm.

Optional Accessories

- Spanner for demoulding and moulding.
- Tamping rod with sauqre face.

Cube Mould 7.06 cms (For cement mortar)

As per IS : 10086-1982, The cube mould is so constructed so as to facilitate separation into two parts. The mass of the mould together with the base plate will be 2.8 +/- 0.2 kg. Material for construction of these moulds is mild steel.

Beam Moulds

For casting concrete specimens for flexural tests. The mould is made of 4 plates assembled together. Each mould with base plate, made of mild steel. Faced are machined flat to +/-0.2mm and finished in size to 0.2mm. As per IS: 516.

Accelerated Curing Tank

IS : 9013

Introduction

The strength of concrete is generally estimated after 28 days by crushing field test cubes or cylinders made from the representative concrete used for the structure. The utility of ascertaining strength after 28 days is often questioned since by this time considerable concrete would have been placed and work may have progressed. It is then rather too late for remedial measures. It is therefore of tremendous advantage to predict 28 days strength within a few hours of casting the concrete so that, we have a good idea about the strength of the concrete.

The rate of gain of strength of concrete depends on the reaction rate of cement and additions with water (Hydration). In common with all chemical reactions, the rate of reaction depends on reaction of temp. Higher reaction temperature gives higher rate of reaction e.g. the

concrete gains strength more rapidly when its temp. is higher. Accelerated curing is the process by which the temperature of the concrete is raised artificially by applying external heat to speed up the rate of gain in strength.

The test method covers procedures for curing test specimens of concrete stored under conditions intended to accelerate the development of strength. The procedures are: **Procedure A**-warm water method, **Procedure B**-Boiling water method.

General Description and Specifications

Accelerated curing tank having capacity to accommodate 6/12/18 Concrete Cubes of 150mm size with a facility for accelerated curing by Boiling water method up to temperature range : 100 +/- 2^0 C as per IS : 9013. Also it will have capacity for curing by warm water method at temperature 55 +/- 2^0 C.

Tank will consist of a rectangular double walled metal cabinet, inside lined with stainless steel, outer powder coated. Easily replaceable high wattage heaters are mounted in side the chamber. A slow speed stirrer is provided to circulate water inside the chamber to maintain the uniform temperature of water. A strong stainless steel perforated platform is provided for keeping the cubes and also have a lid with lifting handle to cover the chamber.

The temperature is indicated and controlled by a Digital auto tuning PID Temp. Controller with soak timer to control the duration of heating and then to shut down the system without manual attendance. The front panel will have power supply indicating lamp, control action indication lamp and one main switch. Suitable for operation on 220 V, 50 Hz single phase, AC supply or 440 V 50 Hz, three phase AC supply, for bigger size of curing tank.

Optional Accessories

- Rubber hand Gloves.
- Spare Heaters. Low water level cut off device to safeguard heaters against low water level burn out.
- In built refrigeration system for curing at 27^0 C.

Also Available

- Accelerated Curing Autoclave : By Steam Pressure.
- Accelerated Curing Drier : By Dry Heat.

Slump Test Apparatus - TM-165

IS : 1199, IS :7320

Introduction

The oldest, most widely used test for determining workability. This test is used to determine the workability of fresh concrete, which would normally be undertaken at the point of delivery to ensure the concrete, is of adequate consistency for placement. The test is applicable to concrete of medium workability.

The device is a hollow cone-shaped mould. The mould is filled in three layers of each volume. Each layer is rodded with a 16mm steel rod 25 times. The mould is then lifted away and the change in the height of the concrete is measured against the mould. The slump test is a measure of the resistance of concrete to flow under it own weight.

General Description and Specifications

The apparatus comprise of a slump cone with handles made of mild steel sheet, a chrome plated steel tamping rod of 16 mm diameter X 600 mm long, rounded off at one end, with a scale marked on it and a steel base plate with a carrying handle.

The mould for the test specimen will be in the form of frustum of a cone having the following internal dimensions as follows.

Dimensions	cm.
Bottom diameter	20
Top diameter	10
Height	30

The Cone is constructed of metal of at least 1.6 mm thickness and the top and bottom are open and at right angles to the axis of the cone. The mould have a smooth internal surface and provided with suitable foot pieces to a base plate and also handles to facilitate lifting it from the moulded concrete test specimen in a vertical direction as required by the test. The base plate is provided with cleats & swivel handle.

Optional Accessory

- Concrete Scoop.
- Funnel For Pouring Concrete In Cone.
- Straight Edge.

Related Standard : IS: 1199, IS:7320

Concrete Permeability Test Apparatus - TM-139

IS : 3085

Introduction

A concrete structure is considered to be of adequate durability if it performs in accordance with its intended level of functionality and serviceability over an expected or predicted life cycle. Concrete durability depends largely on the ease (or difficulty) with which fluids (water) in the form of liquid or gas can migrate through the hardened concrete mass. Concrete is a porous material. Therefore, moisture movement can occur by flow, diffusion, or sorption. We are concerned with all three, but generally the overall potential for moisture in concrete by these three modes is referred to as its permeability.

General Description and Specifications

The set up consist of permeability cell, water reservoir and pressure lines, with glass bottles.

Permeability Cell

Consists of a metal cylinder with a ledge at the bottom for retaining the specimen, a flange at the top, removable cover plate and a funnel. A rubber gasket is seated in matching grooves, between the cell and the cover plate, to render the joint water tight. Internal working size of the cell will be 100mm dia X 100mm high.

Water Reservoir

Consists of a length of metal pipe, 50 to 100 mm in diameter and about 500 mm long. The reservoir fitted with a graduated side arm gauge-glass for admitting water and compressed air and a cock for drainage, bleeding and connection to the permeability cell.

Pressure Lines

Heavy duty armored rubber hose with end fittings. Complete with glass bottles but without compressor. For specimen size 100 X 100 mm,

Concrete permeability tester for three specimens of 100mm dia X 100mm height or 150mm dia X 150mm height or 150mm cube also available.

Optional Accessories

Air Compressor

Relevant Standard IS : 3085

Flow Table - TM-79

IS : 5512

Introduction

The consistency and workability of concrete is a very important factor and is strictly connected to the water/cement ratio, to the effect of admixtures and finally to the strength and quality of concrete. Suitable for concrete mixes of high and very high workability. To perform this test, a sample is placed on a metal surface which is then raised and dropped through a known height.

General Description and Specifications

As Per Is: 5512. For cement mortar and lime

The flow table consists of a brass or Mild Steel table top 250 + 2.5mm dia mounted on a rigid stand. The table top is reinforced with equally disposed ribs and allowed to drop through 12mm by a ground and hardened cam, Complete with mould 100mm base dia, 70mm top dia and 50mm high. The cam shaft is rotated at the rate of 100 RPM by an electric motor. Suitable for operation on 230 Volts 50 cycles. Single Phase, A.C.Supply. Manually operated flow table also available.

As Per Is:1199 for Concrete The Flow Table consists of a brass or Mild steel table top of 76.2 cms(30")dia, finely machine from a solid brass casting or Mild steel Plate. The stand is fabricated out of cast iron/mild steel and is of study construction. The ground and hardened steel cam is designed to drop the table by 12.5mm. Complete with flow mould with handles with one tamping rod 0-60 cms long X 16cm. electrically operated to raise and drop the table top. approx. 15 times in 15 seconds. Suitable for operation on 230 volts, 50 cycles, A.C. Supply. Manually operated flow table also available.

Optional Accessories

- Concrete Scoop

Relevant Standard IS : 5512

Concrete Thermometer

Introduction

Temperature of concrete at the time of placement is important to control and to avoid many possible difficulties. In hot climates, it is important to measure the temperature of the fresh concrete to ensure it is not too hot, which could cause flash setting and rapidly reducing work ability. Measurements are generally taken at the point of placement.

General Description and Specifications

The Concrete Thermometers are available in following types.

1) Mercury in Glass type or Alcohol in Glass type. Yellow Back, German glass. Temperature range : -10^{0}C to 50^{0}C. Least count 1^{0}C/0.5^{0}C/0.1^{0}C.
2) Dial type. With 30 cm long stem. Temperature range : -10^{0}C to 50^{0}C. Least count 1^{0}C.
3) Digital type. Complete with 20 or 30 cm long stainless steel sensor. Temperature range: -50^{0}C to 50^{0}C. Resolution 0.1^{0}C.

Ve-be Consistometer - TM-197

IS : 1199

Introduction

The Vebe consistometer measures the remolding ability of concrete under vibration. The test results reflect the amount of energy required to remold a quantity of concrete under given vibration conditions. The Vebe consistometer is applicable to concrete with slumps less than 2 inches.

The apparatus, consists of a metal cylindrical container mounted on a vibrating table, which produces a sinusoidal vibration, a slump cone is placed in the center of the cylinder and filled in the same manner as in the standard slump test. After the slump cone is removed, a clear plastic disk is set atop the fresh concrete. The Vebe table is started and the time for the concrete to remold from the slump cone shape to the shape of the outer cylindrical container is recorded as a measure of consistency. The sliding clear plastic disc facilitates the determination of the end of the test.

General Description and Specifications

Consists of a vibrating table, size 380mm long and 260mm wide, resting upon elastic support at a height of about 305 mm above the floor, complete with start/stop switch cord and plug. A holder is fixed to the base into which a swivel arm is telescoped with funnel and guide sleeve. The swivel arm is also detachable form vibrating Table. A graduated rod is fixed on a swivel arm and at its end a plastic disc is screwed. The divisions of scale on the rod record the slump of the concrete in millimeters. Supplied complete with a sheet metal. Container with lifting handles which can easily be fixed to the vibrating table. A slump cone open at both ends with lifting handles and a Tamping rod of size 16mm dia and 600mm long, rounded at one end. As Per IS : 1199

Optional Accessories

- Concrete scoop.
- Stop watch.

Relevant Standard IS : 1199

Compaction Factor Apparatus - TM-55

IS : 1199

Introduction

The compaction factor is defined as the ratio of the mass of the concrete compacted in the compaction factor apparatus to the mass of the fully compacted concrete. It involves dropping a volume of concrete from one hopper to another and measuring the volume of concrete in the final hopper to that of a fully compacted volume. The results of the compaction factor test can be correlated to slump, although the relationship is not linear. This test is difficult to run in the field and is not practical for large aggregates (over 1 inch) Compared to the slump test, the apparatus is bulky and a balance is required to perform measurements.

General Description and Specifications

The apparatus, consist of a rigid frame that supports two conical hoppers vertically aligned above each other and mounted above a cylinder. The top hopper is slightly larger than the bottom hopper, while the cylinder is smaller in volume than both hoppers. To perform the test, the top hopper is filled with concrete but not compacted. The door on the bottom of the top hopper is opened and the concrete is allowed to drop into the lower hopper. Once all of the concrete has fallen from the top hopper, the door on the lower hopper is opened to allow the concrete to fall to the bottom cylinder. The excess concrete is carefully struck off the top of the cylinder and the mass of the concrete in the cylinder is recorded. This mass is compared to the mass of fully compacted concrete in the same cylinder achieved with hand rodding or vibration. Complete with trowel and tamping bar 0-60 cms long X 16mm dia.

Optional Accessories

- Concrete scoop
- Straight edge
- Weighing balance

Related standard: IS : 1199

Air Entrainment Meter - TM-13

IS : 1199

Introduction

Air content of fresh concrete is normally measured, by the use of a special air meter, to assess whether the concrete contains the required amount of air. This would be measured when air's entrapment or entrainment is required by the concrete design. The method uses the principle of replacing the air in a known volume of concrete with water, the volume of which can then be measured.

General Description and Specifications

The apparatus consists of a pressure tight flanged cylindrical measuring bowl of specified volume in accordance with size of aggregate to be tested. The bowl is fitted with a removable flanged conical cover assembly with the help of a airtight sealing gasket. The conical cover has an air valve and a pet cock for bleeding off the water. A transparent cylindrical stand pipe, which is graduated in air content, is fixed to the conical cover assembly.

Pressure is applied to the specimen with the help of pressure bulb and the pressure is recorded on the pressure gauge which is mounted on the stand pipe. The whole assembly is mounted on a flat base.

Standard Accessories

- Calibration cylinder with spring clamp
- Trowel
- Tamping rod
- Straight edge
- Rubber mallet and measure. 1 No. each

Related Standard: IS : 1199

Bulk Density Cylinderical Measures - TM-19

IS: 1199, IS: 10079, BS: 1881

Introduction

This test covers determination of the density of freshly mixed concrete and gives formulas for calculating the yield, cement content, and air content of the concrete. Yield is defined as the volume of concrete produced from a mixture of known quantities of the component materials.

Bulk density is determined by filling a container of known volume and mass of concrete required to fill the container divided by the volume .

General Description and Specification

Made from thick walled mild steel or cast aluminum. Stout and rigid to retain form and precision machined for true measurements. Complete with handles for easy carriage. It comprises of set of two measures 20 litres & 10 litres.

Relevant standards : IS: 1199, IS: 10079, BS: 1881

Concrete Core Drilling Machine - TM-51

Introduction

Often, existing concrete structures will need to be examined and tested to ensure the concrete remains of adequate strength and durability. This test is used to determine the compressive strength of a concrete core, which has usually been extracted from an existing structure. The value of compressive strength can then be used in conjunction with other measured properties to assess the condition of the concrete.

Extraction of concrete cores, achieved by rotary drilling using a diamond tipped hollow barrel, serve as a means of taking a sample of concrete which can then be used to determine various physical properties, but most commonly compressive strength.

Cores can generally be extracted from wherever access allows, and would include floor slabs, walls and columns. 10cm diameter cores, generally afford the minimum diameter required for a representative sample and require less reinstatement than larger diameter cores. 15cm diameter cores will generally give more representative samples than smaller diameters but require more reinstatement.

General Description and Specifications

The Machine is provided with hand operated rapid screw feed through a lever drive with built in ball bearing. The drill spindle is floating on tapered roller bearings. Water swivel is totally enclosed and mounted on the drill spindle. The drill drive shaft is mounted on two ball bearings in the drill head. The drill is provided with water tank to deliver the water to the cutting operation. The drill is mounted on a sub base which is further mounted on trolley. The trolley is mounted on Scooter tyre wheels and leveling screws to facilitate easy shifting and setting. The drill has an end towing attachment.

Available in two versions, Electrically Operated or Engine Operated for field operation. The Electrically Operated machine is fitted with 3 HP 3 Phase AC Motor while for field use, Engine powered models have petrol/kerosene run, air cooled 4 strokes single cylinder engine developing 3 to 4 HP at 3000 RPM. The drive from engine to drill head is through V belt and socket speed reducer with a standard reduction 8 : 1 and totally enclosed in belt guard and sealed. The engine starts with petrol and later on run on kerosene oil. The engine is with ISI certification Mark. The Engine Operated Models are fitted a water tank for on site application. Depending upon the application and preference of user, in option to Petrol/Kerosene driven Engines, Diesel powered Engines developing power of 5 or 7 HP can also be supplied at extra cost.

Optional Accessories

The following accessories are not part of the standard supply and are supplied at an extra cost.

Diamond impregnated Core Drill Bit of 75/100/150 mm dia., with barrel.

Full 360 operation for coring at any angle.

Surcharge weights to keep the machine stable and vibration free during operation.

Core Extractor for easy removal of the core sample from the hole.

Cement Autoclave - TM-14

IS : 4031

Introduction

After it has set, cement must not undergo any appreciable expansion, which could disrupt a mortar or concrete. This property of soundness is tested by subjecting the set cement to boiling in water or to high-pressure steam. Unsoundness can arise from the presence in the cement of too much free magnesia or hard-burned free lime.

This method covers determination of the autoclave expansion of Portland cement by means of a test of neat cement paste specimens, 25.4 X 25.4 X 285.8 mm, which are moist cured for 24 hours +/- 1-1/2 hours and then exposed to action of steam under specified pressure for 3 hours. The rate at which pressure is increased in the beginning the test and released in the test are specified. Linear expansion is measured by micrometer comparator.

Salient Features

- Rust proof stainless steel pressure vessel.
- Specially designed Steam Safety Valve, pressure control switch and Temp. control switch - Triple Safety precautions for operator safety.
- Accurately Calibrated Pressure Gauge.
- Guaranteed timings and performance as per IS 4031.

General Description and Specifications

The Autoclave is double walled. Inner boiler chamber of stainless steel cylinder, with concealed yet easily replaceable heaters surrounding the vessel for quick heating. The boiler lid is of thick stainless steel and can be bolted to the chamber by heavy hexagonal nuts. The silicon gasket, seated in a groove, makes the unit leak proof even at high pressure. The boiler is mounted in between the strong angle iron frame and covered with CRC sheet attractively powder coated. The outer cover can also be of Stainless steel at an extra cost. The gap in between the walls is filled with thermal insulation to prevent heat loss and energy. The control system consist of sensitive pressure regulator, pressure gauge, safety valve, temperature control switch, power ON-OFF switch and pilot lights to indicate status of the electric heating units and control switches.

Inside chamber dimensions	:	10.5 cm dia x 40.5cm height.
Rating	:	3000 watts
Pressure range	:	21 kg/cm^2
Least count	:	0.4 kg/cm^2
Temp. range	:	215^0 C
Power supply	:	230 Volts AC Single Phase 15 Amp.

Standard Accessories

- Special rack to hold specimens above water level in the autoclave and in vertical position.
- Pressure gauge with calibration report with national traceability.
- Silicon rubber Gasket.
- Spanner.

Accessories at Extra Cost

- Length comparator with dial micrometer 0.002 mm X5 mm.
- Shrinkage bar moulds 25.4 X 25.4 X 285.8 mm single/double/tripple compartment with smooth reference points.
- Shrinkage bar moulds 25.4 x 25.4 x 254 mm (single/two/triple gang).
- PID Auto tuning digital temp. indicator cum controller with or without PC interface for data logging.
- PID Auto tuning digital pressure indicator cum controller with or without PC interface for data logging.
- Spare heater set.
- Spare silicon gasket.
- Spare pressure gauge.
- Spare safety valve.

Relevant standards : IS: 4031

Bomb Calorimeter

Bomb Calorimeter with differential type digital thermometer accuracy 0.01 deg.C with built in timer, connected to electronic firing unit for simultaneous operation as per IS 1360 part II : 1970. The system will consist of the following and instruction manual and ISI Booklet.

1. Bomb with works certificate - 01
2. Calorimeter vessel with bomb support & insulating base - 01
3. Water Jacket - 01
4. Combined lid for calorimeter vessel & water jacket - 01
5. Compact Stirrer - 01 set
6. Connecting lead for calorimeter bomb - 01 set
7. Fine adjustment valve with built in pressure gauge - 01
8. Connecting tube to connect bomb, pressure gauge and fine regulating valve - 01
9. Safety Relief Valve fitted on gas filling tube adapter - 01
10. Pellet Press - 01
11. Spanner for Oxygen tube connection - 01
12. Ignition Wire - Nichrome - 01 Roll
13. Cotton Thread - 01 Roll
14. Stand for Bomb Lid - 01
15. Hook for Lifting Bomb - 01
16. Crucible SS - 01
17. Gas Release Valve - 01
18. Bomb Firing Unit - 01 Set
19. Gelatin Capsules - 01 Bottle
20. Differential Type Digital Thermometer with built in timer complete with sensor and instruction sheet - 01 Set

Length Comparator - TM-101

It is used to measure the drying shrinkage of autoclaved portland cement and potential expansive reactivity of Cement aggregate combinations in mortar bars during storage on self-drying.

The instrument consists of chanelled base over which two vertical pillars are fixed. An adjustable cross plate is at the top. A dial guage, reading to 0.002 mm x 5 mm or 0.01 X 10 mm is fixed to the top. The plunger end of the dial Gauge can be located up on a 6.5 mm. dia ball or other reference point cemented in the specimen. On the base there is a similar recessed seating in which can be placed a second ball or reference point in the specimen.

Complete with a stainless steel standardiation bar with insulated grip and with 6.5 mm dia ball mounted in the ends.

Vicat Needle Apparatus - TM-202

IS : 5513-1976

Introduction

Used to determine the amount of water required to produce a cement paste of standard consistency and the setting time. The time it takes for a cement to stiffen to a standard value after addition of water is commonly known as the set time. The test involves mixing cement with water and then measuring its resistance to penetration of a standard probe at varying intervals of time, until a certain value is reached.

General Description and Specifications

Consist of a metallic frame bearing a movable rod with cap at one end. The needles and plunger can be fixed centrally in to the rod by clamping screw. The movable rod carries an indicator which moves over a graduated scale attached to the frame. The scale is 40mm in length with the smallest division of 1mm. The dashpot facilitates the gentle lowering of the movable rod with needle.

The vicat mould is in the form of frustum of a cone having 70 mm in dia at the base, 60 mm at the top and 40 mm high or split type. A non porous base plate of glass or metal also provided. Complete with consistency plunger, initial and final setting needles in a nice jewellary case.

Relevant Standard: Is: 5513-1976

Optional accessories and spares

- Spare vicat mould cone type.
- Vicat mould split type.
- Spare set of needles.

Blain Air Permeability Test Apparatus - TM-22

IS : 4031

Introduction

The fineness of cement has a significant effect in its physical properties when used in concrete. Generally the finer the cement powder, the more rapid the concrete will set, as there is an increase in its surface area. The measure of fineness is usually undertaken by sieving, and the result assessed against the cement standard for compliance.

The Blaine air permeability apparatus is 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 Blaine apparatus draws a defined volume of air through a prepared bed of cement of defined porosity.

General Description and Specifications

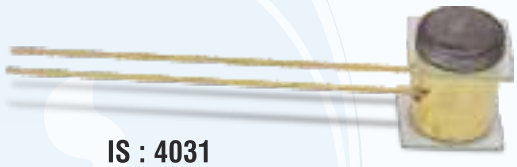
The apparatus comprises one each of Brass or stainless steel permeability cell 12.5mm,'U' tube manometer with stop cock mounted on a laminated wooden stand, perforated metal disc, plunger, Rubber Stopper, Rubber tube - 30cm long with rubber bulb.

At Extra Cost

- Balance with 0.001 gm resolution.
- Stop Watch with 0.5 second resolution.
- Manometer Liquid.
- Whatman Filter Paper.
- Filter Punch.

Relevant standards : IS: 4031

Le-chatelier Mould - TM-102



IS : 4031

Introduction

The main purpose of the soundness test is to assess the possible risk of late expansion due to hydration of uncombined calcium oxide and/or magnesium oxide. The test uses apparatus known as Le-chatlier apparatus, which magnifies any expansion during heating to a value that can be measured.

General Description and Specifications

The apparatus consist of a small split cylinder of spring brass or other non-corrodible metal of 0.5 mm thickness forming a mould 30 mm internal diameter and 30 mm high. On either side of the split, two indicators are brazed suitably with pointed ends made of 2 mm diameter brass wire in such a way that the distance of these ends to the centre of the cylinder is 165 mm. The split cylinder will be kept between two glass plates.

Relevant Standard IS : 4031

Heat of Hydration of Cement - TM-56

Introduction

The chemical reaction that takes place between cement when mixed with water is exothermic. The intensity of this reaction is measured in this test. The value of heat of hydration can be important where the cement maybe incorporated into concrete which will be poured in large volumes. In such cases there can be a considerable build up of heat as the reaction takes place, which, if excessive, could cause cracking in the structure. Heat of hydration of cement is expressed in calories per gram.

General Description and Specifications

The apparatus consists of an open mouthed thermos flask of definite dimensions with a cork lid, an insulated container for the flask, a digital thermometer with resolution of 0.01^{0}C, a constant speed stirrer(400-R.P.M.) and a funnel for introducing the sample. As Per IS 4031.

Waterbath for Soundness Test

Water bath capable of containing immersed Le-Chatelier moulds with specimens and of raising their temperature from 27' deg $\pm 2^0$ C to boiling in 27 $\pm$3 minutes.
Made of double walled, Outer made of Aluminium/G.I. powder coated inside made of stainless steel. Gap between the wall filled by glasswool to avoid heat losses. Heating is by means of kettle type heating elements with self ejection device in case of dry running. The heater is easily replaceable. The bath can accommodate six Le-chatlier moulds at a time in the manner prescribed in IS specifications. Complete with three core wire and 15 Amp. Three pin top.

Vibrating Machine - TM-199

(Mould Vibrator or Mortar Cube Vibrator)

IS : 4031

Introduction

Concrete moulds are easily cast by using a tamping bar or a vibrating table. However air tapped in cement mortar paste can not be thus removed while casting cement mortar moulds. Easy method is to impart greater vibration of lesser amplitude to the mould while casting. This is achieved in a vibrating machine. Vibration machine is used for the preparation of mortar cubes for the determination of compression strength of ordinary and rapid hardening Portland cement, low heat Portland cement, Portland blast furnace cement and high alumina cements.

General Description and Specifications

The machine consists of a vibrating frame assembly and an electric motor mounted on a sturdy base. The complete frame assembly consists of a vice to hold a 7.06cm cube mould and two studs threaded at top and a hopper to feed the sample in the mould. This assembly is supported on four springs and has an in built rotating shaft which rotates eccentrically and thus imparts vibrations to the entire frame. A balance weight is an integral bottom part of the frame. The centre of gravity of the assembly is brought to the centre of the eccentric shaft or within a distance of 25mm mould. The frequency of vibration is 12000 ± 400 vibration per minute. Supplied complete with on 7.06cm cube mould with loose base plate, a time switch 0-5mins x 1min.

At extra cost

- Certificate of vibration from a standard laboratory.
- Poking rod
- Digital timer
- Digital RPM Meter

Spares: Set of springs, Belt and Belt guard.

Relevant standards : IS: 4031

Tachometer

- Used for checking of Vibrating Machine
- Microcontroller based design.
- RPM measurement from 1 RPM upto 99,999 RPM.
- Non-Contact Sensing through reflected light beam
- LCD Display.
- Input sensing indication through LED.
- Memory facility to retain measured value
- 6V Battery operated.
- Portable Lightweight Strong and Elegant ABS Enclosure.

Accuracy	:	± 1 RPM upto 5000 RPM and ± 0.05% over 5000 RPM
Resolution	:	0.1 RPM upto 5999 RPM and 1 RPM over 6000 RPM
Sensing		
Distance	:	2" to 6" (Max 12" Depending on Ambient Light)
Display	:	0.3"5 Digit LCD Display.
Range up to	:	99999 RPM

Cement Mortar Permeability - TM-138

IS : 1727, IS : 2645

Introduction

Consist of a specimen container ring of 100 mm diameter and 50 mm high, held between a bottom plate and a water cell. The water cell of 100 mm diameter brass cylinder and the top and bottom plates of brass or any other non-corroding metal. Each cell with collar is clamped in between a base plate and a top plate with the help of tension rods and nuts. The cell assembly is mounted on the stand.The top plate is provided with an inlet and overlet for air release and the base plate is provided with an outlet. Complete with a pressure chamber fitted with a pressure regulator & pressure gauge 0-7 kg/cm2 indicating the test pressure. With single cell without air compressor and foot pump.

Options Available

1. Three cell model with foot pump.
2. Six cell model with air compressor.
3. Twelve cell model with air compressor.

Related Standard IS : 1727, IS : 2645

Le-chatlier Flask

Made of good quality glass conforming to IS : 4031 (part XIII) for measurement of specific gravity of hydraulic cements. Bulb capacity approx. 250 ml. neck graduation from 0 to 1 ml and 18 to 24 ml. in 0.1 ml

Waterbath for Le-Chatlier Flask

- Micro processor based digital temperature controller system.
- Capable of maintaining temperature within + 0.1^{0}C
- Drainage System
- Stand for each Le-chatlier flask cap. 250ml (8 nos)
- It will be attached with cooling & heating arrangement system.
- It will be fully covered.
- Waterbath body will be insulated.
- Control panel will be at side of the bath.
- Water circulation/stirrer will be provided to maintain uniform temperature of water.
- Transparent (toughened glass) sheet will be provided in front and back position.

The waterbath in general will fulfill the requirements of IS:4031 (Part 11) Method of Physical tests for hydraulic cement (Determination of Density),
Supplied without Le-chatlier Flasks.

Muffle Furnace - EIE 1502

Introduction

This test is used to determine the percentage loss of material in a cement specimen when subjected to high temperature. It is used as a measure of deleterious material in the cement, the level of which is normally controlled in cement manufacturing standards.

Salient and Features

- Heavy Gauge CRC sheet or Stainless Steel casing.
- Light weight, sturdy construction.
- Compact, dual display, Auto tune PID controller with soak timer.
- Completely automatic operation, once the Process Value is set and time is entered.
- Double insulation - permits faster heat-up, reduces energy consumption, low outer casing temp.
- Heating elements embedded from top and both sides which help in improving temperature uniformity.
- An outlet for escape of fumes provided as standard feature.

Construction

Exterior : Heavy Gauge CRC sheet or with Stainless steel 304 (GMP model) with appropriate ventilation.

Chamber : Muffle baked at 1500° C

Insulation : Light weight, Ceramic fibre wool of superior quality, highly resistive to temperature. Exterior having a ventilation/Louvers for Air insulation and Aesthetic look.

Finish : Hard powder coated in pleasant shade.

Description

Front Panel : Mains Switch, Indicating Lamps for Mains & Control, Micro Controller etc.

Heaters : Kanthal Heating Elements of superior quality.

Temp. Control : Universal Micro Controller, PID type, with advanced functions.

Temp. Range : Max. 1200° C/Working 1150° C.

Accuracy : ± 1% of range.

Display : Digital.

Sensor : "K" Type Cr / Al Thermo couple.

Power Supply : 230 Volts AC.

Optional Extra Coast

Exterior : Outer casing fabricated from Heavy Gauge Stainless Steel.

Buzzer : Audio indication in case of set value deviation beyond limit and or to Indicate completion of set time.

PC Attachment : RS 232 interface with software. Facilitates record and printouts of the temp. V/s time. (Supplied without computer and printer).

Door Switch : Switch Shuts off the furnace on opening the door. Safe for the operator.

Programmable : Multiple Ramp/Soak Programmable PID Temperature Controller.

Ancillaries : Platinum crucible / Silica-quartz crucible / crucible tong / platinum tipped tong.

Platinum Crucible

Crucibles in this series have nominal capacities ranging from 10 cc to 50 cc. These crucibles have broader diameter and the base, intended for furnace ignitions. All crucibles of this series are exactly similar in shape and dimensions conforming simple ratios. Unless specified, crucible in this range is always supplied in plain rim and with lid. The purity of Platinum used for the manufacture of these cracimes in 99.95% at least.

CC	Weight of Crucible	Weight of Reinforced Crucible	Weight of Lid.
15	11	13	4
20	16	18	4.5
25	20	23	5
30	25	28	5
35	29	32	6
40	33	36.5	7
50	42	46	8

•Platinum Tipped Tong. Stainless steel tongs are manufactured in the following.

Length of tong	Approx weight of tip in gram
8"	1.5
10"	1.5
12"	1.5
15"	6
18"	6
24"	8

Ball Mill - TM-024

Consist of a drum made of welded steel having an inside diameter of 300 x 300 mm depth or 450 mm dia x 450 mm depth. Supported on heavy duty bearings. A reduction gear driven by a motor rotates the ball mill at 28-30 PM. Supplied complete with 12-19mm dia steel balls and revolution Counter.

Mortar Mixer - TM-121

It is used for mixing cement pastes, mortars and pozzolanas. The mixer consists of an epicyclic type stainless steel paddle imparting both planatory and revolving motion. Mixer have two speeds. Mixer blade has low speed of 140 + 5 rpm and medium speed of 285 + 10 rpm,while it also has a planatory movement of 62 + 5 rpm in low range and planatory movement of 125 + 10 rpm in medium range. Stainless steel bowl fitted with handle, fitted with lid made of non-absorbing material and not attacked by cement, masonary cement, cement pozzolana mixture or lime pozzolana mixture. The scraper consists of semi rigid rubber blade attached to a handle about 150 mm long.The blade about 75 mm long, 50 mm wide and tapered to a thin adge. Suitable for operation on 230 Volts, single phase.

Related Standard IS : 4031, IS : 1727

Jaw Crusher - TM-087

The laboratory crusher is designed to speed up the crushing of aggregate, ores, minerals, coal, coke, chemicals and other similar materials. It is compact and of rugged construction for general laboratory or small pilot plant operations.

Two jaws of manganese steel are provided in the jaw crusher. The moveable jaw produces two blows for every revolution, thus reducing oversizing to a minimum. A combination of forward and downward and strokes with a rocking action exerts pressure on th coarse material to pass through the jaws. A hopper is provided at the top for feeding materials. The smooth jaws ensure a uniform product and easy cleaning is possible.

• Jaw size	: 100 X 150mm.
• Max Size of feed	: 50mm (approx) Product discharge.
• Size	: 6mm to 18mm (adjustable).
• Capacity	: 80kG/Hr(approx). (based on material).
• Operation on	: 440v, 3Ph, 50Hz, A.C. complete with a 3H.P. Motor, a starter 'v' belt pulley drive and mounting.

Bigger sizes available.

Pulverizer - TM-143

Laboratoty pulverizer is a disc type grinder, designed to grind virtually any material to produce a fine mesh sample in one operation. It is a self contained grinder, with a rotary disc, having a planatory movement in a vertical plane. This feature gives added life to the moving parts and produces a sample of uniform finenes. Grinding is done between two discs, one of which is stationary and the other revolving eccentrically at high speed. The discs are made from heat treated mechanite metal. With the help of a convinient hand wheel, the siz of the final product can be adjusted. This can be done, even while the machine is in operation. A self locking device holds the hinged grinding chamber in place and affords easy and quick access to it, for removal of ground samples & for cleaning. The Pulverizer has a capacity of reducing about half a kilogram of Quartz type sample to 100 mesh in about minute. The Pulverizer is supplied complete with a 3 H.P. Motor, a starter, "V" Belt pulley drive and mounting wired for 440 Volts, 3 phase A.C. 50 Hz. Disc Diameter : 175 mm. Maximum feed Size : 6 mm Yield : 250 gms/min size of finished product. : 100 mesh to 150 mesh.

Humidity Oven - EIE-106

(With Refrigeration)

For curing of cement mortar moulds at 27°C and 90% Humidity. The same chamber can also be used For 27° C and 50% RH conditioning.

Construction

Double wall construction interior fabricated of stainless Steel (S.S.304). Exterior of corrosion resistant galvnised sheet, finished in powder coated epoxy paint. Full size glass inner door to inspect samples without affecting The chamber temp. Outer double walled metal door with magnetic gasket and lock. Unit mounted on castor wheels for easy movement.

Insulation

70mm Polyurethene insulation (PUF) to ensure better insulation and less leakage of temperature or 10% RH from Inner body to the surroundings.

Air Circulation

Temperature is maintained by a quiet running blower circulation air through out the chamber. Forced air circulated vertically down and re circulated through out the chamber for uniform temperature and humidity.

Humidity

Humidity created by steam injection method. The boiler tank is fitted in the back side of the chamber for better servicing, electro magnetic switch for controlling the wet heater from burning off If water level is not adequate. Float valve provided to control water level in the boiler tank.

Heating & Cooling System : Long lasting S. S. tubular heaters used as heating element. The stainless steel fins provided to ensure better heat transfer. Hermetically sealed compressor CFC free compressor (134 A Gas) coupled with evaporation coil and condensor.

Trays : Removable made of heavy S.S. rod.

Control : Microprocessor based temp and direct RH digital PID controller. Humidity directly measured in % RH by electronic sensor.

Temp. Range : The temp. of the cabinet can be controlled at 27° C with accuracy of ± 2° C.

Humidity Range : The relative humidity in the cabinet can be maintained between 90% to 95% continuously. The humidity can be set at any point between 40% To 95% with accuracy of ± 5% or better.

Capacity Cu. ft	Volume ltrs.	Internal Size	External Size	No. of Shelves
2	52	40x33x40	55x66x 86	2 (1.4 ft 2each)
4	120	45x45x60	65x85x130	2 (1.5 ft 2each)
8	200	60x60x60	75x106x119	2 (1.6 ft 2each)
12	324	60x60x90	75x106x129	3 (2.0 ft 2each)
16	450	60x60x125	75x106x187	4 (2.1 ft 2each)
28	800	80x80x125	95x126x187	5 (2.8 ft 2each)
34	1000	80x80x155	95x126x217	5 (3.2 ft 2each)

The trays of the Humidity Cabinet will be manufactured from strong stainless steel rods - strong enough to with stand heavy load of moulds which should be equally distributed among trays. Trays made from S. S. rods will be stronger and will facilitate better air circulation. The distance between trays will be 15-20 Cms.

Optional Fittings at Extra Cost

A. i) Digital controller with printer interface to connect Epson Dot Matrix Line Printer. Print interval programmable, Can print date, Time, Temp. and Humidity.

Ii) -do- but with standard PC software and connectivity.

B. Data logger : 4 Point temp. + 4 point humidity data logger with sensors placed at specific points in chamber with printer interface and memory of 5000 readings per channel.

Room Conversion for Physical Test of Cement

Design, supply and commissioning pf Process Control Instruments to convert an existing cemented room in to temperature and Humidity Controlled Chamber. Room size to be mentioned by the customer. The entire control system will be computerized. Virtually while sitting on the Computer, The Humidity and Temp. Set points can be programmed and monitored through the Computer and automatic recording of the temp. and Humidity at the set time intervals with day and date can be stored in the Computer infinitely. The print outs of the records can be taken as we are taking normally.

The job essentially consist of three Parts.

A. Designing.
B. Supply of process control instruments.
C. Commissioning to achieve required control parameters Installation of suitable capacity of Air Conditioners will be out of our scope.

The process control system will Include the following.

1. Heat convectors with forced Air Circulation arrangement.
2. Humidifier to create Humidity (steam Injection System).
3. De-humidifier to control excess humidity.
4. Temp. and humidity indicator cum controller with PC Interface and data logging.

We will ensure that, the room temp. and Humidity are within 25-27^{0}C and 65-70% RH respectively. We will supply the necessary equipments as detailed above and will Commission the same at your place. All related civil work, plumbing jobs and electrical wiring up to the Control Panel will be out of our scope. AC with voltage stabilizer & PC will be provided by the purchaser.

Round Hot Plate - EIE-901

Salient Features

- Body made of CRC sheet - powder coated or S.S.304
- Top plate of Heavy cast Iron or S. steel(S.S.304)
- Unique design of Hot plate with Grooves concealed heaters
- Sealed heaters in Grooves ensuring long life.
- Uniform heating throughout the Hot Plate

Rectangular Hot Plate - EIE-902

- Max. surface temp. 400^{0}C
- Temp. control by Energy regulator or Optionally by DIGITAL Temp. indicator cum controller
- Fully air ventilated lower body for minimum heat even when the top plate is fully heated
- 3 stage heat control switch for selection of LOW MEDIUM OR HIGH heat (RECTANGULAR MODEL ONLY)

Top Plate Size

20 cm dia	
30 cm dia	
25	30
25	40
30	50
45	60

Supplied complete with pilot indicating lamps for MAINS and HEATER operation, power plug and 2 meter long cord wire to work on 220/230 AC, Single phase.

Humidifier - EIE-2602

Introduction

Humidity is defined as the amount of moisture in the air. In the winter, relative humidity is often much lower than 45 percent and in the monsoon it is very much higher. A humidifier is an Instrument that increases relative Humidity (moisture) in a single room. In operation, a rotating disc flings water at a diffuser, which breaks the water into fine droplets that float into air.

General Description

EIE Humidifier is basically an atomizing humidifier of splash plate disc type. Produces super fine particles does become part of the atmosphere, reaching every corner of the room, resulting cool mist, which does not condense when obstructed and remains suspended in the air, thus achieving humidity up to 95% RH in enclosed areas. This unit is capable of atomizing up to 3 ltr of water in an hour at full evaporation in the direst possible ambient conditions. Supplied complete with Electric mechanical time switch of 0-120 minutes to control the humildification timings.

- Double sealed ball bearings
- Less power consumption
- Noiseless, Vibration free
- Absolutely maintenance free
- Stainless Steel Construction
- Light in weight
- Continuous operation
- 5 Liters capacity.
- Centrifugal motor, sealed type, 2880 rpm, 1/10th H P with SS Shaft
- Watts : 60, volts : 220/230.

Humidistat (Optional)

Option 1 : A controller that controls relative humidity. A humidistat can be used to control either humidifying or dehumidifying process by the regulation of centrifugal motor.

Option 2 : A electronic Digital humidity indicator cum controller which includes a capacitance type sensing element and a relay amplifier. The sensing element consists of alternate metal conductors on a small flat plate. An increase or decrease of the relative humidity causes a decrease or increase in the electrical resistance between the two sets of conductors and the change in resistance is measured by the relay amplifier and thereby operation of centrifugal motor is controlled.

Water Still

Advantages:

- Can be wall mounted or placed on table.
- Easily openable boiling chamber & condenser for daily cleaning.

Construction/Standard Feature:

- Fully stainless steel.
- Single kettle heater with excessive heat, connector ejection device.
- Water still is supplied as ready to use with silicone tubing for distillate output + condenser to boiling chamber, PVC tubing for waste water + raw water, with tap adapter and a hose clip, flow rate meter plus hoffman clip for raw water flow monitoring and mounting screws for water still and flow meter.
- Capacity 4 ltr/hr with special water level control & thermostatic cut off.

Hot Air Oven

(Three Side Heating Elements)

(EIE-101)
With Microcontroller

(EIE-101)
Thermostatic Model

Application

EIE HOT AIR OVENS are aesthetically designed and precisely fabricated to suit various applications in various fields of Medical, Agricultural, Industrial, Research and Educational Institutes for day to day heating, drying, sterilizing etc.

Salient Features

- Outer chamber CRC - powder coated
- Inner chamber of S.S.304 - mirror polished
- 65mm high density Glasswool insulation o– all sides for minimum heat loss
- With heating elements on three sides, ensuring uniform temp. distribution throughout
- Sealed and enclosed heaters to working chamber for minimum heat loss
- Temp. range 50°C to 250°C
- Thermostatic Temp. control OR Auto tune PID Digital indicator cum controller (Optional)
- Control accurcy +/- 5°C or better Thermostatic
- Control accuracy +/- 1°C or better DIGITAL
- 80/20 nichrome heating elements, ensuring long lasting and continuous heating
- Special heavy duty Stainless steel lock and door hinges with spring and roller mechanism
- Stainless steel crimped wire mesh Shelves to withstand heavy load and minimum resistance to air circulation for better heat distribution
- Provision to add more shelves, as per requirement of test - Shelves adjustable to place test samples or Glasswares of varying dimensions
- Built in `L` shaped mercury in Glass, YELLOW BACK, German Capillary thermometer, fitted on top at front facia
- Adjustable air ventilation at top
- Operation on 220/230V AC single phase

Technical Details of Different Sizes Ovens

Sr. No.	Working Chamber (D X W X H) Size (Cms)	Over all Dimensions (Cms) (D X W X H) Thermostatic Model	Over all Dimensions (Cms) (D X W X H) Digital Model	Ratings (kw)	Shelves	Approx. Weight (Inner SS, Outer MS, Thermostatic)	Approx. Weight (Inner SS, Outer MS, Digital)
1.	30 X 30 X 30	45 X 47 X 55	52 X 45 X 64	1.0	1	35 kg	45 kg
2.	35 X 35 X 35	50 X 52 X 63	57 X 50 X 72	1.0	1	41 kg	52 kg
3.	45 X 45 X 45	60 X 62 X 73	67 X 60 X 82	1.5	2	61 kg	72 kg
4.	45 X 45 X 60	60 X 62 X 88	67 X 60 X 97	2.0	2	68 kg	78 kg
5.	60 X 60 X 60	75 X 77 X 88	82 X 75 X 97	2.5	3	90 kg	110 kg
6.	60 X 60 X 90	75 X 77 X 118	82 X 75 X 125	3.0	3	130 kg	148 kg

Complete with pilot indicating lamps, 2 mtr. cord wire and power plug.

B.O.D. Incubator - EIE-202

Application

EIE B.O.D. Incubator is multi-purpose Low Temperature Incubator, designed with state-of-the-art technology to meet requirements for incubation of Bio chemical oxygen demand on water and sewage, study of enzymatic digestion process for studying tissue culture, Cell cloning, Microbiology, Bio Chemistry, Agrycultural, Medical, Pharmaceutical field etc.

Construction

Volume	: 4, 6, 10, 12, Cu. Ft.
Interior	: Polished Stainless Steel.
Exterior	: Heavy Gauge-Galavanised Iron.
Chamber	: Tripple Walled.
Mobility	: On Caster Wheels.
Insulation	: Superior Thermofiber board/PUF Insulation.
Inner Door	: Full View Glass with metal. frame.
Outer Door	: With lock and key/Moulded PVC Magnetic Gasket.
Shelves	: Sturdy, Elegent-Precisely fabricated to give minium resistance to air circulation.
Finish	: Finished with attractive and durable powder coated paint in pleasant shade.

Description

Circulation	: Forced Air by suction blower with Tourbo F.H.P. Motor.
Front Panel	: Mains Rocker Switch, Cooling Rocker Switch, Micro Temp. Controller, Vol Meter, Ampere Meter, Fuse etc.
Illumination	: With Opening of the door.

Temperature

Controller	: Micro controller with dual display.
Readability	: 0.1^{0}C.
Sensor	: PT 100.
Display	: Digital LED.
Accuracy	: ± 0.5^{0}C. or better.
Range	: 5^{0}C. to 50^{0}C.

Heating

Heaters	: Tubular finned type air heater.

Refrigeration

Compressor : Hermetically sealed of Kirloskar make equipment.

Special Attachments (Optional)

- Lighting system by three fluroscent tubes placed vertically along with back wall.
- Cyclic programmable timer, 0-24 hours for regulating the hour of light and darkness.
- Suitable Voltage Stabiliser.
- Calibration Certificate with traceability.

Working Size

Volume (Cu.Ft.)	3	6	10	12
Height (cm.)	45	70	90	90
Width (cm.)	45	50	55	90
Depth (cm.)	45	50	55	60

C.O.D. Digestion Apparatus

Digital COD Digestor is suitable fo COD method for monitoring wastewater influent and effluent, industrial process water, and more. This instrument is used by Pollution Control Labs. Outer cabinet made of mild steel duly coated. Double wall construction with insulation for minimum heat losses increases the efficiency of the system. Aluminium Block with holes (Dimension 40mm Dia x 80mm Depth) is used to hold COD tubes. Aluminium Block is heated to maintain temperature up to 180 deg.C. Solid state Digital Temperature Controller, appropriate heater & insulation selection assure uniformity in all the samples. Selectable timer up to 120min. with alarm is provided to set the digestion period (Refluxing). After digestion, analyse the sample with either colorimetric or titrimetric method.

- Temp. Range : Above ambient to 180^{0}C or higher
- Resolution : 1^{0}C
- Display : Digital 12mm Red LED
- Control : Digital Electronic Temp. Contoller
- Heater Rating : 750 Watts.
- Sensor : PT-100
- Timer : Selectable 15, 30, 45, 60, 90 or 120 min with alarm.
- Hole Size : 40mm Dia x 80mm Depth
- Glass Tube : 38mm. Dia
- Sample Volume : 20ml. Each.

Available for b/12/15 or 20 COD Tubes

Optional :

- Spare COD Tube
- Spare Air condenser
- COD Tube Stand
- Air Condenser Stand
- S. S. Bath

Curing Compound Moulds

The moulde is as per ASTM-C-156-1980. The mould is made of stainless steel and it is water tight. The mould is rigidly constructed to prevent distortion and it is throughly clean. The interior faces of the mould is plane surface. The mould has 150mm X 300mm at the top, 143 x 295 mm at bottom, and 50 mm depth measured on the inside. The mould is flat rim at the top on all sides approximately 6mm in width. A wooden float with a dimension of 75 mm X 280 mm X 20 mm thick is also be provided. The poking rod supplied with mould is made of non-absorptant, non-abrasive, non-brittle rubber compound material. The poking rod is 150mm long and have cross sectional dimensions of 25mm X 12 mm with tamping face the form of a blunt torpedo.

Gloss Meter/Reflectance Meter

Salient Features

- Instrument is ideal for measuring Whiteness & Brightness.
- Same instrument can be use to measure Whiteness & Brightness by Changing filters only.
- Standard MgCO3 block supplied with the instrument.
- Simple to operate.
- Instrument conforms to the basic requirement of I.S. : 101.

Tensile Testing Machines

Electro (Mechanical Models)

EIE Tensile Testing Machines are manufactured under strict quality control. Each individual component and accessory is thoroughly inspected before assembly.

The machines are best suited for testing various products such as Elastomers, Polymers, Plastics, Paper, Plywood, Lather, Fabric, Aluminum/Copper conductors, Metal wires/flats and a host of other materials in confirmatory to testing standards laid down as per BIS, ISO, DIN, ASTM or BSS.

The machines are electrically operated and are provided with safety devices. The movement of the lower grip/fixture is through a threaded spindle.

Various type of grip and fixtures are available depending upon the type of material to be tested. Traverse speed in the range of 25mm/min to 500mm/min are available through drive pulleys. Special traverse speeds can be offered on request.

EIE Tensile Testing Machines are guaranteed to an accuracy of $\pm$1% from 10% of the load range selected to full load.

Electronic Models

EIE make Electronic Tensile testing Machines are manufactured under strict quality control to meet Indian as well as most of the International standard like ASTM, DIN, BIS etc.

These machines are equipped with a Precision Load Cell, Rotary Encoder and state of the art MICROCONTROLLER based Instrumentation to give digital display of LOAD and Grip displacement.

It also can be supplied with a suitable Electronic Extensometer to measure actual Elogation of the test Specimen for getting details as Proof Strength, Young's modulous etc.

It is supported with a dedicated software to get all results when hooked up with PC.

These machines are equipped with variety of optional accessories to test samples like Cloth, Leather, Wires, Rubber, Synthetic materials and many other types.

Test results are within $\pm$ 1% from 2% of Machine capacity.

All machines are supplied with one set of Holding Grips. This is to be asked by user as per their requirement. Any other types of Holding Grips/Fixtures and be supplied on request, at extra price.

M/cs upto 2.5 kN capacity are supplied with any two speeds in 1:2 ratio within the min. and max. limits mentioned in specification table.

Grips/Accessories

Depending upon the type of materials to be tested proper grips/accessories have to be selected. A choice of grips for different materials is listed overleaf. These have to be ordered along with the machine depending upon the materials and type of test. Dumbbell Cutting Press and dies for rubber and similar material can also be offered on special request.

Aggregate Crushing Value Apparatus TM-017

Riffle Sample Devider TM-146

Bulk Density Cylindrical Measure TM-019

Density Basket TM-070

Aggregate Impact Testing Machine TM-015

Los Angels Abrasion Testing Machine TM-103

CONCRETE

The concrete is the strength in imagination. It is the unique and ultimate example of calculation in mixing. Selection and mixing of right ingredients in right quantity results in to practical miracle.

The race of the human history has surpassed all its inventions after the discovery of cement and research in concrete. The grey colored fine powder and its mix has witnessed the all human struggle and success in wining over landscape, sacred rivers, appalling oceans and stubborn mountains. The bridges and dams over rivers and jetties on shore of oceans are power packed victory over nature. Skyscrapers are perfect significance of tiny men's titanic jump.

The research in cement and concrete still has a plenty of opportunities and success stories to say in the coming age.

To continue with exciting history of struggle and success , EIE is pleased to offer its wide range of instrumentation for cement and concrete testing for infrastructure projects, Engineering colleges and Research institutions. Our 25 years of field experience in versatile project labs has explained the needs and necessities of our valued customers. We have widened our horizon to cover almost each and every instruments of modern laboratory in this catalogue with detailed description. Kindly go through the same for your requirements and let us know your valued suggestions.

For,

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