

# Concrete and Cement Testing

Concrete is the product of mixing aggregate, cement and water. When it is fresh it can be poured and formed into many shapes and structures. When hardened it is a strong and durable building component.

The setting of concrete is not a drying process. It is an irreversible chemical reaction between the cement and the water, called hydration. After the initial set, when it is no longer liquid, concrete gradually gains strength over time. Considerable attention and knowledge are required to produce quality concrete, as differing mix proportions and cement types will achieve different strengths in differing time spans.

Concrete strength is measured by crushing concrete cubes to failure and recording this strength. VJ Tech designs and manufactures a range of machines to perform destructive strength testing and equipment for non-destructive testing methods. This section also contains equipment used to test the constituent parts of the concrete mix.

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# Compression and Flexural Testing

## Digital Concrete Compression Machines

VJ Tech compression machines are manufactured to strict quality control systems and standards to ensure compliance with both BS and ASTM standards.

All frames are of heavy duty welded steel construction and supplied as standard with a rapid approach pump and set of distance pieces for testing up to 150mm cubes. The machine, together with the digital readout unit is works calibrated and supplied with certificates. The integral load pacer, together with a large LCD error band display, enables the operator to maintain accurate pace control.

Analogue machines with gauge readouts are available on request. Please contact VJ Tech with your requirements.

### Features:

- Complies with BS1881, EN 12390
- Rapid approach pump as standard
- Distance pieces as standard (up to 150mm cube)
- Upper and lower platens are tested for hardness, flatness and surface texture
- Self-aligning ball seating
- Large graphics LCD display (75 x 125mm)
- Pace control using built-in speed control pot (digital machine only)
- User configurable change over point and maximum load
- Vertical clearance to allow both cubes and cylinders

- Memory storage for up to 150 test results
- RS232 serial port for computer or printer

### Automatic machine features:

- Unattended operation
- User programmable failure conditions
- User programmable rapid approach start/stop conditions
- Automatic control of load at selected pace rate

### Standard and BS Distance Pieces

Distance pieces are designed to reduce the clearance of the upper platen to the top surface of the specimen. All distance pieces are 220mm diameter in accordance with the BS1881 specification requirement. BS distance pieces are supplied with a traceable works certificate.

The VJ Tech range of concrete compression machines may also be used for strength testing rock samples in Hoek Cells. Please refer to page 58.



Digital Concrete Machine



Automatic Concrete Machine



## ORDERING INFORMATION

Capacity:	BS1881, EN 12390		ASTM C4, ASTM C39	
	Digital	Automatic	Digital	Automatic
1500kN	<b>VJT6000-15M</b>	<b>VJT6000-15A</b>	<b>VJT6015</b>	<b>VJT6015A</b>
2000kN	<b>VJT6000-2M</b>	<b>VJT6000-2A</b>	<b>VJT6020</b>	<b>VJT6020A</b>
3000kN	<b>VJT6000-3M</b>	<b>VJT6000-3A</b>	<b>VJT6030</b>	<b>VJT6030A</b>
4000kN	<b>VJT6000-4M</b>	<b>VJT6000-4A</b>	<b>VJT6040</b>	<b>VJT6040A</b>
5000kN	<b>VJT6000-5M</b>	<b>VJT6000-5A</b>	<b>VJT6050</b>	<b>VJT6050A</b>

## SPECIFICATIONS

Capacity:	1500kN	2000kN	3000kN	4000kN	5000kN
Low Range:	0 - 400 x 0.1kN				0 - 600 x 0.1 kN
High Range:	400 - 1500 x 1 kN	400 - 2000 x 1 kN	400 - 3000 x 1 kN	400 - 4000 x 1 kN	400 - 5000 x 1 kN
Flexural Range:	0 - 100 x 0.01 kN				
Maximum vertical clearance:	320mm				
Maximum horizontal clearance:	280mm				
Ram Travel:	50mm				
Power:	240V 50Hz 1ph	240V 50Hz 1ph	240V 50Hz 1ph	240V 50Hz 1ph	240V 50Hz 1ph
Weight:	500kg	1000kg	1700kg	2500kg	3400kg

## ACCESSORIES

Distance Piece Thickness	Standard Distance Piece	BS Distance Piece
20mm	<b>VJT6020-20</b>	<b>VJT6000-20</b>
30mm	<b>VJT6020-30</b>	<b>VJT6000-30</b>
50mm	<b>VJT6020-50</b>	<b>VJT6000-50</b>
60mm	<b>VJT6020-60</b>	<b>VJT6000-60</b>
80mm	<b>VJT6020-80</b>	<b>VJT6000-80</b>
100mm	<b>VJT6020-100</b>	<b>VJT6000-100</b>
Auxiliary Platens		
<b>VJT6000-150AP</b>	BS1881 Auxiliary Platen 150mm square x 25mm thick, supplied with works certificate	
<b>VJT6000-100AP</b>	BS1881 Auxiliary Platen 100mm square x 25mm thick, supplied with works certificate	

## AutoCUBE

VJ Tech is proud to offer a fully automated cube testing system that complies with BS 1881 and EN 12390.

The AutoCUBE system measures and weighs the cube, locates it between the testing platens, applies the load until failure occurs, records all test data and even disposes of the debris before the next cube follows the same fully automated process.

### The system includes:

- Conveyor belt cube transporter
- Cube measuring system (LVDT)
- Cube weighing system (load cell)
- Control panel with digital display and keypad
- Hydraulically operated load frame

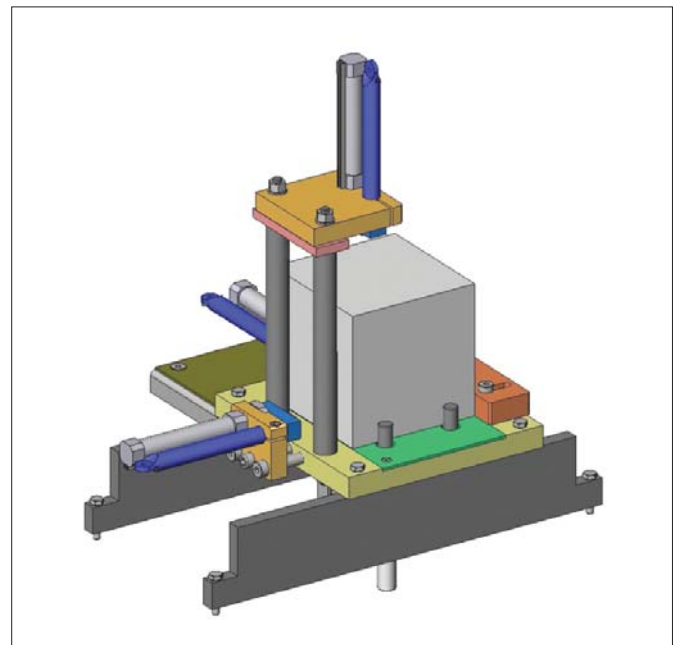
### Features:

- Multiple cubes can be tested without supervision – the only limitation is the length of the conveyor system
- Cube is measured on 3 sides (x, y and z axis)
- Sample measurements and weight recorded into memory
- Unlimited storage of data using ConcreteX Windows based software
- Tests both 100mm and 150mm cubes
- Complies with BS 1881
- Audible alarm to warn of system stoppage
- Emergency stop button
- Upper and lower platens are tested for hardness, flatness and surface texture
- Self-aligning ball seating
- User programmable failure conditions
- User programmable rapid approach start/stop conditions
- Automatic control of load at selected pace rate

### SPECIFICATIONS

Load frame options:	1000kN, 2000kN, 3000kN, 4000kN or 5000kN
Sample size:	100mm and 150mm cubes
Load Cell range:	0 - 8kg
Cube measuring method:	LVDT transducer; range 0 - 150mm, resolution 0.1mm

The AutoCUBE system is designed and built around the particular requirements of a customer or project. Please contact VJ Tech for a detailed proposal.



Automatic Cube Weighing and Measuring System

## 100kN Flexural Frame

Flexural testing of concrete is usually carried out at lower loads as the flexural strength is generally only about 10% of the compressive strength of the same mix. VJ Tech offers a frame that can be used in conjunction with either a manual, digital or automatic compression machine. When used as a stand-alone unit, hydraulic pressure can be supplied by our separate console unit. The frame will accept samples of 150 x 150 x 750mm and 100 x 100 x 500mm, and test them with loads of up to 100kN.

The frame is supplied complete with a works calibration certificate.

### Features:

- Conforms to BS 1881
- Can be used with an existing concrete compression machine

### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6115</b>	100kN Flexural Frame supplied with a set of 4 roller bearers
Vertical clearance with bearer:	160mm
Horizontal clearance:	360mm
Ram travel:	100mm
Roller Bearer dimensions:	38mm diameter x 160mm long
Dimensions (L x W x H):	810 x 66 x 935mm
Weight:	260kg
<b>VJT6000-CONSOLE</b>	Automatic console unit for compression and flexural machines with digital display and keypad

## DHR2000 Digital Readout and Control Unit

The DHR2000 is specifically designed to control concrete compression machines and flexural frames and to provide display of load and pace rate. The unit incorporates a 16 key membrane keypad and a large LCD graphics display to facilitate data entry. The DHR2000 provides a pace rate display which monitors the loading rate whilst the specimen is under manual load control. Up to 150 test results can be stored and an RS232 interface is included for connection to a computer or printer.

Stable, accurate 350 and 700 bar capacity pressure transducers are available to achieve the relevant BS and ASTM standards. These can be easily calibrated using the DHR2000 keypad and display. For full transducer specifications please refer to page 21.

### Features:

- Password protected transducer calibration
- Transducer linearisation using ten points
- Compression low range of 0 - 400.0kN (default setting)  
Low range can be altered by user
- Compression high range of 400 - 2000/3000kN
- Flexure range of 0 - 100.00kN
- Stress and density display
- Load peak hold
- User configurable change over point and maximum load
- Audible overload warning
- Memory storage for up to 150 test results
- RS232 interface for computer or printer



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT2600</b>	DHR2000 Digital Readout and Control Unit
Power supply:	110/240V 50/60Hz 1ph
Dimensions (L x W x H):	300 x 340 x 180mm
Weight:	6kg

### ACCESSORIES

<b>VJT0319</b>	350 bar Pressure Transducer
<b>VJT0320</b>	700 bar Pressure Transducer

## ConcreteX

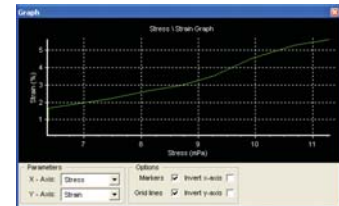
ConcreteX is a software system designed to work in conjunction with VJ Tech's digital concrete compression machine controllers. The software can be used with the DHR2000 digital readout and control unit or the AutoCON range of automatic concrete compression machines, for automatic logging and retrieval of test results.

### Features:

- Seamless integration with both the DHR digital readout and control unit and the AutoCON range of compression machines
- Following test parameters can be viewed in real-time:
  - Displacement (mm)
  - Height (mm)
  - Load (kN)
  - Stress (MPa)
  - Strain (%)

Line#	Time (min:sec)	Load (kN)	Displacement (mm)	Height (mm)	Stress (MPa)	Strain (%)
1	00:00:00	0.0	0.44	99.56	0.00	0.44
2	00:00:05	70.1	2.89	97.31	7.01	2.89
3	00:00:10	133.9	3.84	96.16	13.39	3.84
4	00:00:15	161.9	4.22	95.76	16.19	4.22
5	00:00:20	-47.6	-0.03	100.02	-4.76	-0.03
6	00:00:25	-47.6	-0.02	100.02	-4.76	-0.02
7	00:00:30	-47.6	-0.02	100.02	-4.76	-0.02
8	00:00:35	-48.3	-0.03	100.02	-4.83	-0.03
9	00:00:40	-48.3	-0.03	100.02	-4.83	-0.03
10	00:00:45	-47.6	-0.03	100.02	-4.76	-0.03
11	00:00:50	-48.3	-0.02	100.02	-4.83	-0.02
12	00:00:55	-47.6	-0.02	100.02	-4.76	-0.02

- Reports can be exported into Microsoft Excel or text file format



- XY plot available of any two parameters (i.e. stress against strain)

- Automatic logging of test data and reports

Sample Report ID 00012		Logged Data									
Date (dd/mm/yyyy)	Time (h:m:s)	No.	Time (Mins)	Load (kN)	Disp. (mm)	Height (mm)	Stress (MPa)	Strain (%)			
01/01/1998	01:25	1	0:00	0.0	0.44	99.56	0.00	0.44			
Reference:		2	0:08	70.1	2.89	97.31	7.01	2.89			
Duration (Mins):	24:37	3	0:17	133.9	3.84	96.16	13.39	3.84			
Base (kN):	20.0	4	0:25	161.9	4.22	95.76	16.19	4.22			
Tare (kN):	0.0	5	0:33	-47.6	-0.03	100.02	-4.76	-0.03			
Pace Rate (kN):	10.0	6	0:42	-47.6	-0.02	100.02	-4.76	-0.02			
Load at fail (kN):	428.6	7	0:50	-47.6	-0.02	100.02	-4.76	-0.02			
Stress at fail (MPa):	44.0	8	0:58	-48.3	-0.03	100.02	-4.83	-0.03			
Failure Percentage:	20	9	0:67	-48.3	-0.03	100.02	-4.83	-0.03			
Result:	Aborted	10	0:75	-47.6	-0.03	100.02	-4.76	-0.03			
Sample Type:	Standard Cube	11	0:83	-48.3	-0.02	100.02	-4.83	-0.02			
Width (mm):	100.0	12	0:92	-47.6	-0.02	100.02	-4.76	-0.02			
Depth (mm):	100.0	13	1:00	-48.3	-0.03	100.02	-4.83	-0.03			
Height (mm):	100.0	14	1:08	-47.6	-0.02	100.02	-4.76	-0.02			
Weight (mm):	100.0	15	1:17	-47.6	-0.02	100.02	-4.76	-0.02			
Weight (mm):	0	16	1:25	-47.6	-0.02	100.02	-4.76	-0.02			
Density (kg/m <sup>3</sup> ):	0.0										
Surface Area (mm <sup>2</sup> ):	10000.0										

- Fully compatible with Windows 2000 and XP

### Minimum Computer Specification

- Pentium 4 computer with Windows 2000/XP
- 1 serial port (DHR /AutoCON)
- 1 parallel port (Security key)

### ORDERING INFORMATION

**VJT-WINCOX**

ConcreteX Software supplied on CD-ROM

## Fresh Concrete Pan Mixers

Our pan mixers are available in two sizes; 14 or 56 litre capacity. The 14 litre mixer may be bench or stand mounted. The 56 litre model has two different pan options; either a removable pan or a tipping pan. A trolley is available for use with the removable pan. All models are designed both for use in the laboratory or outside and are suitable for a wide range of materials from dry, semi-dry to viscous.

### Features:

- Complete with mixing pan
- Robust steel construction
- Safety guarding to head/pan and motor/engine/gearbox

### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6060</b>	Pan Mixer; 27/14 litre capacity
Capacity:	27 litre capacity, 14 litre recommended mix capacity
Power supply:	240V 50 Hz 1 ph (other voltages available, please enquire)
Dimensions (L x W x H):	690 x 580 x 680mm, Pan size: 410mm diameter x 210mm deep
Weight:	68kg

### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6061</b>	Pan Mixer; 105/56 litre capacity with removable pan
<b>VJT6062</b>	Pan Mixer; 105/56 litre capacity with tipping pan
Capacity:	105 litre capacity, 56 litre recommended mix capacity
Motor:	240V 50Hz 1 ph (other voltages available, please enquire)
Dimensions (L x W x H):	110 x 970 x 1150mm, Pan size: 635mm diameter x 330mm deep
Weight:	230kg

### ACCESSORIES

<b>VJT6063</b>	Pan Carrying Handle for 14 litre mixer
<b>VJT6064</b>	Stand for 14 litre mixer
<b>VJT6065</b>	Trolley for 56 litre removable pan



## Slump Cone Set

The slump cone test is a method of gauging the workability of fresh concrete that is used both in the laboratory and on-site. The test works by using the force of gravity on the wet sample. The more water the mix contains the more the sample will succumb to the force of gravity, resulting in a higher slump value. The set consists of a galvanised aluminium slump cone, scoop, base plate, 500mm steel rule and tamping rod.

### ORDERING INFORMATION

<b>VJT6057</b>	Slump Cone Set with cone, scoop, base plate, 500mm steel rule and tamping rod
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## Compacting Factor

to **BS 1881:103** and **BS 5075**

The Compacting Factor is the ratio of the weight of partially compacted fresh concrete to the weight of the concrete when fully compacted in the same mould. The test is particularly good for dry mixes for which the slump test is not as suitable.

The apparatus consists of two conical hoppers and a mould mounted vertically in line on a rigid steel frame. Each hopper has a hinged flap with a quick release mechanism to allow the fresh concrete to flow freely. The concrete is dropped through the hoppers into the mould. This partially compacts the concrete and the weight of concrete required to fill the mould is measured. This, expressed as a proportion of the weight of the fully compacted concrete required to fill the mould, is the compacting factor.

### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6056</b>	Compacting Factor Apparatus, complete with tamping rod
Dimensions (L x W x H):	500 x 400 x 1510mm
Weight:	55kg

## Air Entrainment Meters

There are several factors that affect the strength, durability and longevity of concrete. The amount of entrained air within the concrete mix is one of the major factors. Too much air within the hardened concrete results in lack of binding between cement particles and thus creates weak concrete. Too little air causes the expansion of freezing water to break and degrade the concrete. In either case, the concrete section must be replaced before reaching its normal life expectancy.

VJ Tech offers both Type A and Type B Air Entrainment Meters.

### Air Entrainment Meter Type A

to **BS 1881:106** and **ASTM C231**

Cast aluminium alloy air entrainment meter with a 5 litre capacity. This unit gives a direct readout of the percentage of air enclosed in freshly mixed concrete, using the air pressure principle.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6072</b>	Air Entrainment Meter Type A, complete with pressure gauge tamping rod and hand pump
Range:	Air Content 0 to 8% x 0.1% divisions
Dimensions:	250mm diameter x 700mm high
Weight:	13kg

### Air Entrainment Meter Type B

to **ASTM C231** and **AASHTO T152**

Type B air Entrainment Meter manufactured from cast aluminium. This 7 litre unit reads air content over the range of 0 to 12% and is supplied complete with pump and all necessary accessories for calibration and testing, in a metal carrying case.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6073</b>	Air Entrainment Meter Type B, complete with pressure gauge tamping rod and hand pump
Range:	Air Content 0 to 12% x 0.1% divisions
Dimensions:	230mm diameter x 521mm high
Weight:	8.6kg

## Moulds

Moulds are required in standard sizes for compression and flexural testing of samples. All moulds offered conform to the relevant standards which specify strict tolerances and a high quality internal finish.



### ACCESSORIES

<b>VJT6051</b>	Spanner for mould bolts (pair)
<b>VJT6052</b>	Wire Brush for cleaning moulds
<b>VJT6053</b>	Mould Oil, 25 litres
<b>VJT6054</b>	Tamping Rod 600mm long x 16mm diameter to ASTM specifications
<b>VJT6055</b>	Compacting Bar 380mm long x 25mm square to BS specifications

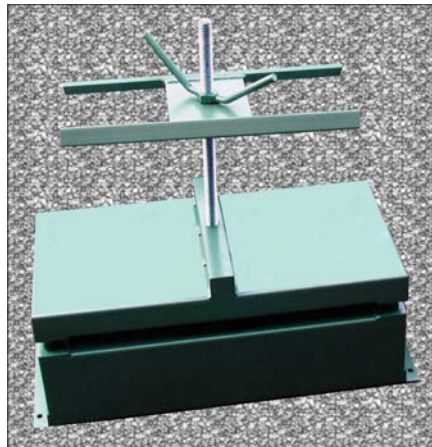
### ORDERING INFORMATION AND SPECIFICATIONS

Part number	Cube Moulds to BS 1881	Weight
<b>VJT6001</b>	100mm Cube Mould, 2 part with clamp attached base plate	8.8kg
<b>VJT6002</b>	150mm Cube Mould, 2 part with clamp attached base plate	15.7kg
<b>VJT6003</b>	200mm Cube Mould, 2 part with clamp attached base plate	33kg
<b>Beam Moulds to BS 1881</b>		
<b>VJT6004</b>	100 x 100 x 500mm Beam Mould with base plate	36kg
<b>VJT6005</b>	150 x 150 x 750mm Beam Mould with base plate	70kg
<b>Cylinder Moulds to BS 1881</b>		
<b>VJT6006</b>	100mm diameter x 200mm long Cylinder Mould with base plate	12kg
<b>VJT6007</b>	150mm diameter x 150mm long Cylinder Mould with base plate	14kg
<b>VJT6008</b>	150mm diameter x 300mm long Cylinder Mould with base plate	15kg

## Vibration

### Vibrating Tables

Vibrating tables are one of the methods used for the compaction of concrete specimens in laboratory. Manufactured from sheet steel with a plate steel top for durability; the tables are fitted with an electric vibration motor to operate at 3000 rpm. We offer two different sizes of table, to accommodate either two or four 150mm cube moulds. Both tables are supplied complete with mould clamping devices and anti-vibration mountings.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6074</b>	Vibrating Table for 2 x 150mm cube moulds, 220 - 240V 50Hz 1ph
<b>VJT6075</b>	Vibrating Table for 2 x 150mm cube moulds, 380 - 415V 50Hz 3ph
Dimensions (L x W x H):	610 x 305 x 326mm (not including clamping device)
Weight:	33kg
<b>VJT6076</b>	Vibrating Table for 4 x 150mm cube moulds, 220 - 240V 50Hz 1ph
<b>VJT6077</b>	Vibrating Table for 4 x 150mm cube moulds, 380 - 415V 50Hz 3ph
Dimensions (L x W x H):	610 x 610 x 326mm (not including clamping device)
Weight:	73kg

### Poker Vibrators

Two options are offered for poker vibrators, either operated from a 110V electrical supply or powered by a petrol motor. Please refer to the specifications listed below.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6078</b>	Poker Vibrator, electrical
Head size:	31mm diameter x 320mm long
Frequency:	12000 vpm
Connection:	10m flexible cable and plug, plus 5m handling hose between head and switch box
Power supply:	110V 50Hz 1ph
Weight:	7.7kg
<b>VJT6079</b>	Poker Vibrator, petrol motor
Head size:	26mm diameter x 335mm long
Frequency:	12000 vpm
Connection:	6m hand wound flexible shaft
Power supply:	5HP petrol motor operating at 3000rpm
Dimensions (L x W x H):	Petrol motor unit 500 x 440 x 560mm
Weight:	41kg including petrol motor unit

Pneumatic poker vibrators are available on request from VJ Tech

## Rapid Analysis Machine

The first Rapid Analysis Machine (RAM) was designed and built by the Cement & Concrete Association in the early 1970s. Since that time it has been used on hundreds of sites and has proved to be a quick and accurate method of testing the cement content of fresh concrete. Its use is covered by Testing concrete – BS 1881 : part 128 : 1997.

Water is pumped through an 8kg concrete sample at a carefully controlled rate to wash the cement-sized particles out of the concrete. 10% of the resulting slurry passes through a 150µm vibrating sieve into a steel conditioning vessel. Chemical agents are added to this slurry to make the cement particles cling together and sink quickly to the bottom of the constant volume vessel. After all the cement particles have settled, the excess water is siphoned off and a buzzer sounds to signal the end of the cycle. At the end of the test cycle, the constant volume vessel is removed and weighed. The cement content of the original concrete sample is determined from a calibration graph.

A solid-state sequence timer automatically controls the RAM operating cycle and the total time from loading the RAM to obtaining the cement content is less than 10 minutes.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6380</b>	Rapid Analysis Machine (RAM)
Water requirement:	80 litres per test
Sample weight:	8kg
Power supply:	110V 50Hz 1ph or 110V 60Hz 1ph
Dimensions (L x W x H):	660 x 780 x 1500mm
Weight:	145kg
<b>VJT6381</b>	Chemical Agent for RAM, sufficient for 75 tests
<b>VJT6385</b>	RAM Step-down Transformer, 240V 50Hz 1ph

## RAMoven

More emphasis is being placed on specifying and controlling the water content of a concrete mix, because of its influence on the strength and durability of the finished product. The RAMoven provides a direct, rapid and accurate method of measuring the water content of fresh concrete samples.

The oven itself is a powerful commercial microwave oven operating on a 220/240V power supply. The water content of the concrete is found by drying a sample of approximately 2.5kg until no further loss of weight is observed (typical drying time 15 minutes). The method has been shown to be very accurate over a wide range of concrete types and conditions.

Conventional drying ovens or domestic microwave ovens of lower power are not suitable since some water becomes chemically bound in the cement hydration process during their much longer drying times. The RAMoven is supplied with oven trays, glass-cloth wrappers (to prevent sample spitting), oven gloves and a full instruction manual. An electronic balance of 5kg capacity with a sensitivity of 0.1g is also required.

The RAMoven can be used in conjunction with the Rapid Analysis Machine (RAM) to determine the flyash, blast furnace slag or water content of a fresh concrete mix.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6390</b>	RAMoven 1700w commercial microwave oven with microprocessor controlled timer, and user kit
Power supply:	220/240V 50Hz 1ph
Dimensions (L x W x H):	662 x 592 x 518mm
Weight:	56kg

### ACCESSORIES AND SPARES

<b>VJT6391</b>	RAMoven User Kit consisting of: 4 heat-resistant glass trays suitable for 2.5 kg samples, 50 glass-fibre cloths (partly reusable) for sample wrapping and oven gloves
<b>VJT6392</b>	RAMoven Fibreglass Wraps (pack of 50)
<b>VJT6393</b>	RAMoven Slag Kit
<b>VJT6394</b>	RAMoven PFA Kit

## Hardened Concrete Curing Tanks

### Temperature Matched Curing Tank

When concrete is cast, heat liberated by the hydrating cement causes a rise in concrete temperature. The larger the mass of concrete, the greater will be the rise in temperature, with a consequent increase in the rate of strength development. Cubes stored alongside the mass concrete will also exhibit a rise in temperature, but to a much lesser degree. Hence, at any time during the early age of the concrete, the strength developed by the test cube will be less than that developed by the mass concrete, and so will provide an underestimation of the latter's strength.

The Temperature Matched Curing Tank ensures that the temperature experienced by the reference cubes matches that of the structure, and so the strength developed by the cubes will increase at the same rate as that of the mass concrete. Use of the equipment will result in cost savings as the more accurate estimation of strength development will allow earlier striking times on formwork or an earlier start to pre-stressing. This method of matched curing is covered by BS1881: Part 130.

#### The system comprises of:

- Curing tank for nine 100mm cubes complete with lid, stirrer and immersion heater
- Three platinum resistance temperature probes measure concrete, bath and air temperature
- Microprocessor based temperature controller and a three-pen chart recorder, with battery back-up

#### Features:

- Sensors housed in stainless steel probes
- 25 metre armoured sensor cables allow bath to be sited separately from controller
- Battery back-up for controller and recorder in event of power failure



#### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6375</b>	Temperature Matched Curing Tank complete with controller, chart recorder and three probes
Operating temperature:	Up to 80°C
Capacity:	10 x 150mm cubes, 19 x 100mm cubes or 6 - 8 cylinder moulds depending on size
Chart recorder range:	0 - 60°C
Power supply:	110V AC 20A 1ph
Dimensions (L x W x H):	Curing Tank 730 x 550 x 448mm, Control Unit 610 x 370 x 240mm
Weight:	48kg

### Large Curing Tank to BS 1881

Concrete cubes are cured in water to prevent moisture loss, in a tank that will maintain them at a stable temperature. The Large Curing Tank will accommodate up to 64 x 150mm cubes or 48 x 200mm cubes. The tank is fitted with submersible pump for water circulation and an immersion heater and thermostat to maintain the temperature.

Upper racks are available to separate the upper layer of moulds from the lower layer, aiding water circulation.

#### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6376</b>	Large Curing Tank complete with pump, heater, thermostat and lower rack
Operating temperature:	From ambient to +40°C
Power supply:	220 - 240V 1ph 50/60 Hz 2000W
Weight:	120kg (approx)
<b>VJT6377</b>	Upper rack for curing tank, holds up to 6 x 150mm cubes
<b>VJT6378</b>	Stand for large curing tank
<b>VJT6379</b>	Small Curing Tank with heater and thermostat 60 x 600 x 600mm

## Portable Core Drills

One method of determining the properties of the concrete in a structure is to remove test cores using a suitable drill and diamond core barrel. These cores are then tested for mechanical strength or for chemical composition.

### Portable Petrol Core Drill

This compact and portable core drilling machine is designed to cut up to 150mm diameter cores in concrete, asphalt and similar hard construction materials. The machine comprises a vertical support column, which carries the drill head/motor assembly. An integral water swivel is built into the drill head providing a 12mm connection to an external water supply via a 12mm flexible hose (not supplied). The motor assembly comprises a 1.5 hp, 2-stroke petrol engine with selectable speeds of 450 to 900rpm. A rack and pinion feed mechanism enables close control over drilling pressure and rapid return when drilling is completed. The complete assembly is easily portable at only 22kg and is supplied on a rigid metal base frame combined with a large rubber based plate and is suitable for vertical down drilling applications only.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6066</b>	Portable Petrol Core Drill complete with stand, motor and water swivel
Drilling range:	Up to 150mm diameter
Application:	Wet drilling - vertical down only
Motor:	1.5 hp 2-stroke petrol engine
Height:	1200mm
Weight:	22kg

### Portable Electric Core Drill

Used for taking up to 130mm diameter test cores in concrete and asphalt this sturdy torsion resistant drill stand come complete with a 3 speed 1600W motor; durable foothold base plate, carrying handle, motor carrying case, water supply unit, spanners and allen key. All that is required for operation is a 110V supply sufficient to run the 1600W motor; a water supply to refill the portable water supply unit on site and suitable core barrels with either a 1 1/4 inch UNC or a 1 1/2 inch BSP thread.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6067</b>	Portable Electric Core Drill complete with stand, motor and water supply unit
Drilling range:	20mm - 130mm diameter
Application:	Wet drilling - vertical down only
Motor:	1600W
Height:	960mm
Weight:	19kg

The following diamond core barrels are 450mm long and fitted with a 1 1/4 inch UNC thread.

### ACCESSORIES

<b>VJT6068</b>	Core Barrel to cut 50mm diameter samples (57mm hole diameter)
<b>VJT6069</b>	Core Barrel to cut 75mm diameter samples (82mm hole diameter)
<b>VJT6070</b>	Core Barrel to cut 100mm diameter samples (107mm hole diameter)
<b>VJT6071</b>	Core Barrel to cut 150mm diameter samples (159mm hole diameter)

## Rock and Masonry Saws

VJ Tech offers two masonry saws, which can be used to trim concrete samples. For full details please refer to page 59.

### ACCESSORIES

<b>VJT6728</b>	Diamond Blade for Concrete, 400mm diameter x 25.4mm bore
<b>VJT6729</b>	Diamond Blade for Concrete, 500mm diameter x 25.4mm bore

### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6724</b>	Saw Bench to cut up to 150mm deep, with electric motor and stand
Blade diameter:	400mm
Cut size:	150mm deep x 600mm long
Dimensions (L x W x H):	1380 x 660 x 1510mm
Weight:	115kg
<b>VJT6725</b>	Saw Bench to cut up to 195mm deep, with electric motor and stand
Blade diameter:	500mm
Cut size:	195mm deep x 500mm long
Dimensions (L x W x H):	1480 x 610 x 1530mm
Weight:	165kg

## Concrete Core Sample Grinder

Using the Concrete Core Sample Grinder, cores that have been cut out from mass concrete can be ground back in successive layers, the grinding dust being collected for subsequent chemical analysis.

The machine consists of a radial arm grinding head, which pivots about a horizontal axis, mounted on a solid steel support frame. The grinding head is fitted with a 110mm diameter diamond impregnated



cutting wheel, which rotates about a horizontal axis. A hand operated counter balanced lever moves the grinding head easily downward in a vertical plane.

The concrete specimen is mounted horizontally in V-blocks carried on a 2-way slide system. By advancing the horizontal slide, successive layers can be ground from the face of the core. An electronic depth gauge is used to indicate the current position of the grinding head relative to the outer face of the core. The grinding head is fitted with a vacuum operated dust extractor allowing the grindings to be collected in a sample holder for subsequent chemical analysis. A separate vacuum cleaner with suitable attachments is provided as part of the system.

### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6310</b>	Concrete Core Sample Grinder complete with grinding head, depth gauge and dust extractor
Cutting wheel diameter:	110mm
Cutting wheel speed:	10000rpm
Maximum depth of cut:	2mm
Vacuum cleaner:	9 litre capacity pick up tank cleaner, power: 1000W
Power supply:	110V 50Hz
Dimensions (L x W x H):	Grinder 580 x 550 x 500mm (footprint 230 x 380mm)
Weight:	Grinder 50kg, Vacuum 6kg

## Chaplin Abrasion Tester

The Chaplin Abrasion Tester gives a guide to the abrasion resistance of concrete floors. It can also be used to test the effectiveness of surface treatments used to protect or up-grade sub-standard floors.



The abrasion tester consists of three 75mm diameter hardened steel wheels mounted tangentially on a circular steel carrier plate. The wheels are fitted such that they are free to rotate but not castor. The carrier plate is connected to a single-phase electric motor, which runs at approximately 190rpm, mounted in a steel frame.

An electronic control box switches off the power to the electric motor after a pre-set number of revolutions. The depth of wear in the concrete floor, brought about by the abrasion of the wide hardened steel wheels, is used as a guide to the abrasion resistance of the concrete. The depth of wear in the concrete surface is measured with a battery operated, electronic LCD depth gauge.

During testing, the machine is covered by an acoustic baffle, which reduces the noise level. A safety cut-out switches off the electrical power if the baffle is lifted off the floor.

### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6300</b>	Chaplin Abrasion Tester complete with safety enclosure, control unit and electronic depth gauge
Control unit display:	6 digit 7.6mm high red LED
Counter/cut-out:	Pre-set to 2850 revolutions
Electronic depth gauge:	Tripod gauge with a user selectable resolution of 0.01mm or 0.0005 inch, battery operated, fitted with zero button
Power supply:	220/240v 50 Hz 1ph or 110/120v 60 Hz 1ph
Dimensions (L x W x H):	Abrasion Tester 345 x 345 x 345mm, Safety enclosure 500 x 500 x 750mm, Control unit 200 x 120 x 250mm
Weight:	80kg (total)

# Non-Destructive Testing

## Movement

### Mechanical Strain Gauges

The demountable mechanical strain gauge (DEMEC) was developed at the Cement and Concrete Association to enable strain measurements to be made at different parts of a structure using a single instrument.

The DEMEC consists of a mechanical or a digital dial gauge attached to an Invar bar. A fixed conical point is mounted at one end of the bar, and a moving conical point is mounted on a knife-edge pivot at the opposite end. The dial gauge measures the pivoting movement of the second conical point. A setting out bar is used to position pre-drilled stainless steel discs which are attached to the structure using a suitable adhesive.

Each time a reading has to be taken, the conical points of the gauge are inserted into the holes in the discs and the reading on the dial gauge noted. In this way, strain changes in the structure are converted into a change in the reading on the dial gauge. The gauge has been designed so that only minor temperature corrections are required for changes in ambient temperature, and an Invar reference bar is provided for this purpose.

Although originally designed for use on concrete structures, the gauge is just as useful on any type of structure. In the case of steel structures, the locating holes can be drilled directly into the steel if required.

Each instrument is supplied in a wooden case together with reference bar, setting out bar and user instructions.



### ORDERING INFORMATION AND SPECIFICATIONS

Gauge length	Mechanical Gauge		Digital Gauge	
	Part number	Microstrains	Part number	Microstrains
50mm	<b>VJT6340</b>	20	–	–
100mm	<b>VJT6341</b>	16	<b>VJT6341D</b>	8
150mm	<b>VJT6342</b>	10.7	<b>VJT6342D</b>	5.3
200mm	<b>VJT6343</b>	8	<b>VJT6343D</b>	4
250mm	<b>VJT6344</b>	6.4	<b>VJT6344D</b>	3.2
	<b>VJT6345</b>	Locating Studs, pack of 400 pre-drilled stainless steel discs		

One division on the mechanical dial gauge or one increment on the digital dial gauge represents microstrains.

### Digital Movement Gauge

The Digital Movement Gauge was originally developed at the BCA for measuring the movement at joints or cracks in a structure. While not as accurate as a DEMEC gauge, its direct reading digital output makes it much simpler to use. Its much larger range is more useful for joint or crack movements, and the accuracy is perfectly acceptable.

The instrument consists of a steel beam with a fixed locating point at one end. An accurately guided slide is mounted on the steel beam and is able to traverse its full length. A second locating point is fitted beneath the slide. The slide carries a digital readout head that registers its movement relative to an electronic scale built into the top surface of the beam.

The change in digital reading gives the relative movement between the two locating points.

In use, locating studs are attached to the structure at points either side of the crack or movement joint under investigation. The movement gauge is then inserted into the studs and the reading noted. At any time required, the movement gauge can be re-zeroed on the reference bar and additional readings taken.

### Digital readout functions:

- ON/OFF – Switches the readout on or off

- in/mm – Sets the measurement units
- ZERO/ABS – Allows the instrument to work in incremental (INC) mode, or absolute (ABS) mode
- ORIGIN – Sets absolute origin



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6350</b>	Digital Movement Gauge, supplied in wooden case
Travel:	100 mm
Sensitivity:	0.01 mm
Repeatability:	0.02 mm
<b>VJT6345</b>	Locating Studs, pack of 400 pre-drilled stainless steel discs

## Crack Detection Microscope

VJ Tech offers a high definition portable microscope for measuring cracks in concrete and other materials. The range of measurement is 0 to 4mm, with 0.2mm divisions and 0.02mm sub-divisions. Focusing is easy, using a knurled knob on the side of the instrument, and the eyepiece can be rotated through a full 360° to align with the direction of the crack. Illumination is provided by an integral adjustable light source. The whole unit is only 130mm high, easy to use and solidly built, making it an ideal portable instrument for on-site use.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6330</b>	Crack Detection Microscope, supplied complete with instructions and calibration certificate in a wooden case
Magnification:	x40
Range:	0 – 4mm
Divisions:	0.2mm and 0.02mm
Light source power:	1.5V battery (supplied)
Dimensions (L x W x H):	130 x 80 x 35mm (microscope only) 160 x 110 x 50mm (in case)
Weight:	650g (in case)



## Permeability

### Permeability Tester

Designed by the BCA, this equipment measures air permeability and relative humidity of cover concrete on site. A blind hole drilled or formed in the concrete is sealed with a special plug, and the resulting cavity pressurised with air. The permeability of the concrete is calculated from the time taken for the pressure to drop. If the capillary pores are partially blocked with moisture, the permeability is reduced. Therefore the relative humidity of the cavity is also measured.

### The Test

A blind hole, 20mm diameter x 35mm deep is cast, drilled or cut in the concrete with a diamond-tipped coring tool. A stainless steel insert is located into the hole and sealed, leaving a measurement cavity of known volume. The relative humidity of the cavity is measured by inserting a capacitive probe through the insert, and taking the reading after one minute. The probe is then removed. A pressure manifold, fitted with a pressure transducer and a Schraeder valve is attached to the insert and pressurised using a foot pump. The output from the pressure transducer is monitored on a battery-operated meter with digital display, and the time taken for the pressure to decay is monitored using a stopwatch. Saturated salt solutions are provided for correcting the relative humidity value measured in the cavity.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6320</b>	Concrete Permeability Tester complete with digital readout unit, pressure sensor, pressure manifold, humidity meter, electronic stopwatch, salt solutions and 5 re-usable stainless steel inserts and insertion tool, all supplied in carrying case
Pressure sensor:	2 bar silicon diaphragm
Pressure meter:	Battery-operated, direct-reading LCD display
Humidity meter:	Relative humidity/temperature meter with retractable probe
Pressure manifold:	Stainless steel
Dimensions (L x W x H):	515 x 375 x 125mm (in case)
Weight:	7.5kg
<b>VJT6325</b>	Spare Inserts

## Autoclam

Much of the trouble encountered with reinforced and pre-stressed concrete today is due to the ingress of harmful materials such as carbon dioxide, chlorides and sulphates. In gaseous form or as solid dissolved in water, they penetrate through the zone of concrete that is in contact with the environment where major damage is done.

The Autoclam Permeability System measures the air permeability, unsaturated water permeability and water absorption (sorptivity) of concrete, brick masonry and stone masonry, both in the laboratory and on site. It can assess the quality of building materials in terms of these properties, both soon after the construction and at any time during the service life of structures. Any defects of the building materials due to interactions with the exposure environment can be detected at any time and appropriate remedial measures taken before the structure starts deteriorating.

The instrument is totally portable and easy to use on site. Non-skilled personnel can carry out the tests. The tests can be carried out without leaving any mark on the test surface, useful while testing façades of structures. The total duration of each test is less than 30 minutes including setting up time. Up to 12 tests can be carried out using the battery pack available within the instrument or run continually during the day if an external power supply is available. The data from each test is stored in the controller of the instrument and can either be recorded manually or transferred to a PC for further analysis.

### Tests for:

#### •Air Permeability

Related to carbonation in concrete, sulphur dioxide and hydrogen sulphide penetration in building materials.

#### •Water Permeability

Important for freeze-thaw deterioration, salt scaling and chloride penetration of submerged structures.

#### •Water Absorption

Strongly related to the intake of water borne salts and other aggressive liquids by capillary suction in building materials.

### Range of testing:

- Gas Permeability tests can be carried out on most building materials for which the coefficient of permeability is less than 10 - 10m/s.
- Both the Water Permeability and Sorptivity (water absorption) tests can be carried out

on building materials for which the maximum rate of flow of water is 1 ml/minute. The resolution in these tests is 1 microlitre.



## ORDERING INFORMATION AND SPECIFICATIONS

### VJT6311

Autoclam Permeability System complete with Autoclam body, electronic controller, power and connection cables, DC power supply/charger unit, data transfer program on disc, syringe and tube, adhesive and carrying case

Dimensions (L x W x H): 500 x 360 x 220mm (in case)

Weight: 18kg

## Cover and Corrosion

### Cover Meter

In its simplest setting, the cover meter rapidly and accurately measures the depth of cover to reinforcement, with values displayed in large black characters on the LCD display. It is easy to use with menu driven screen prompts guide the user through the functions. Accuracy is within or better than BS 1881 as shown below.

Nominal Bar Diameter	Maximum Cover to BS	Maximum Detectable* depth
8mm	90mm	102mm
10mm	90mm	110mm
12mm	100mm	120mm
16mm	100mm	140mm
20mm	110mm	145mm
25mm	110mm	160mm
32mm	110mm	170mm
40mm	110mm	180mm
50mm	112mm	185mm



Measured cover is the depth to which the cover can be measured and displayed to BS accuracy. In 'Detect' mode, the cover meter can establish if bars are present at a depth greater than the measurement range. In this mode the numbers on the LCD display are not mm depth but signal strength. By moving the head across the concrete surface, the displayed numbers reduce if a bar is present beyond the measurement range. This mode is useful to confirm the presence of deep bars.

A separate mini-head is available for locating and measuring cover of closely positioned bars. Used with the cover meter it detects bars at 40mm centres at 32mm cover.

### Features:

- On-screen menu driven operation
- Pulse induction technique for stability and performance
- Automatic zeroing
- Embedded instrumentation computer
- Automatic sizing of single bars
- Settable 'low cover' audible alarm to enable rapid scanning

- Single handed operation
- Protective nylon case with shoulder strap and search head holster
- Simple 4-button operation
- Large graphic LCD - Large black 15mm x 8mm measurement characters
- Switchable loud audible signal
- Headphone socket
- Accuracy better than BS 1881:204
- Settable offset feature to allow for irregular/profiled surfaces

## ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6421</b>	Cover Meter complete with standard search head, interconnection lead, 2 spare wear plates and operating instructions in a protective nylon case
Power supply:	Operates on four MINI 500/LR6 batteries
Dimensions (L x W x H):	430 x 310 x 150mm (in carton)
Weight::	Instrument 1.7kg, packed for dispatch 3kg

## ACCESSORIES

<b>VJT6422</b>	Mini Search Head for cover meter
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### Combined Cover/Half-Cell Meter with Data Logging

This is a unique data logging cover meter with the additional facility to measure half-cell potential. Both are essential for conducting condition surveys of reinforced concrete structures. The base unit is a cover meter and an accessory kit is available to use it for half-cell potential measurements.

An optional deep search head is available which measures to over 250mm and detects to over 300mm subject to bar size. The optional mini-head is for locating and measuring cover of closely positioned bars, detecting bars at 40mm centres at 32mm cover:



#### Features:

- As per the Cover Meter with the additional following unique features

#### Unique features:

- Dual capability - Cover Meter and Digital Half-Cell operating modes
- Dual LCD displays
  - Exclusive display for measurement results
  - Separate graphic display for set-up and data viewing
- Solid black 18mm x 10mm character measurement display
- Dual inputs and controls for left or right hand operation
- All logged results can be re-viewed in windows of 8 x 8 values on the graphic display

#### Cover operation features:

- Logging non-volatile capacity 30,000 results within thirty pages, each 32 lines x 32 columns.
- Logged data date and time stamped. Results downloaded to PC or printer
- Software and guidance provided for data presentation
- Standard head measures and detects up to 150mm
- Accuracy better than BS1881:204

#### Half-Cell operation features:

- Unique refillable Silver/silver chloride mapping electrode
- Measurements automatically converted and displayed as equivalent Copper/copper sulfate potentials
- Conforms to ASTM 876
- Logging non-volatile capacity 30,000 results within thirty pages, each 32 lines x 32 columns.
- Results downloaded to PC or printer
- Software and guidance provided for data presentation

## ORDERING INFORMATION

<b>VJT6423</b>	Data Logging Cover Meter complete with standard search head, interconnection lead, 2 spare wear plates, RS232 PC lead and operating instructions in a protective nylon case
<b>VJT6424</b>	Half-Cell Accessory Kit to enable the use of the data logging cover meter for half-cell potential measurements. The kit comprises of a half-cell interface, mapping electrode with 100ml gel electrolyte refill and pipette, sponge tips, 10m reference lead with crocodile clip, extensible rod with bracket and lead and a nylon carry bag
<b>VJT6425</b>	Data Logging Cover Meter complete with Half-Cell Accessory Kit
<b>VJT6426</b>	Data Logging Meter complete with Half-Cell Accessory Kit but WITHOUT standard cover search head

## ACCESSORIES

**VJT6427** \*Deep Search Head for data logging cover meter

**VJT6428** \*Mini Search Head for data logging cover meter

\*Please note that cover cannot be logged with either of the above search heads. Logging is only possible when using the standard search head supplied with the instrument.

## Digital Half-Cell

The half-cell potential test is used for assessing the probability of corrosion activity in reinforced concrete. Corrosion of steel is an electrochemical process involving anodic (corroding) and cathodic (passive) areas of metal.

The Digital Half-Cell unit measures concrete surface electrical potentials, arising from corrosion of the embedded steel, relative to a standard reference electrode. When measured on a predetermined grid, the presence and location of corroding embedded steel can be identified. Such diagnosis identifies areas where corrosion is present or about to proceed long before any physical damage is visible.

### Features:

- Satisfies the requirements of BS 1881: Part 201 and ASTM C876
- Highly stable Silver/silver chloride refillable reference electrode
- Measurements automatically converted and displayed as Cu/CuSO<sub>4</sub> equivalent potentials
- Extensible probe holder for remote surveying such as bridge decks
- Rapid response and stabilisation
- Automatic on/off



## ORDERING INFORMATION AND SPECIFICATIONS

### VJT6460

Digital Half-Cell Kit consisting of potential meter, mapping electrode with 100ml gel electrolyte refill and pipette, sponge tips, 10m reference lead with crocodile clip, modified extensible rod with bracket and lead, nylon carry bag and user guide

Half-cell:	Detachable silver/silver chloride electrode
Input Impedance:	33M
Display:	3 1/4 digit plus sign via 12.5mm LCD
Range:	+1999mV
Resolution:	1mV
Interconnection:	Probe - meter lead, 10m reference lead
Power supply:	MN1604 alkaline battery giving typically 1000 hours use, with low battery indication
Dimensions (L x W x H):	430 x 310 x 150mm (in carton)
Weight:	3kg

## Digital Resistivity Array Meters

The time at which corrosion of steel may commence and the rate at which it may proceed is dependent upon properties of the cement paste and the permeability of the concrete. Since the electrical conductivity of concrete is an electrolytic process, which takes place by ionic movement in the aqueous pore solution of the cement matrix, it follows that a highly permeable concrete will have a high conductivity and low electrical resistance. Therefore, knowledge of the electrical resistance of a concrete can provide a measure of the possible rate of corrosion of steel embedded in it.

VJ Tech offers 2 units, with either a 2-point or a 4-point array head, for rapid measurements of concrete resistivity to assess the probable rate of corrosion in rebars.

### Features:

- Hand-held and battery powered with digital readout
- Compact, durable hand-held probe unit
- Readout directly in kilo-ohm centimetres (k cm)
- Low frequency alternating constant current technique used
- Thousands of measurement operations per battery
- Low battery indication on LCD
- Rebar continuity check facility

### 2-Probe Digital Resistivity Array Meter

The 2-probe array instrument is simple to use. The test requires two 6.5mm diameter holes drilled to a depth of 8mm using the template and drill bit provided. A small amount of conductive gel is injected into each hole and the 2-probe array inserted. When the action button on the instrument is pressed, the resistivity is immediately displayed.



## ORDERING INFORMATION AND SPECIFICATIONS

### VJT6450

2 Probe Digital Resistivity Array Meter complete with 2-probe array, leads, conductive gel, 6mm masonry bit and drilling template, carry case and user guide

Probe array:	2 probe array 5 cm spacing
Measuring technique:	Low frequency constant magnitude alternating current drive to probes
Display:	3 digit LCD display
Response/resolution:	Display resolution 0.1 k cm. Linear response full scale (120 k cm)
Battery:	Single NM 1604 battery giving approximately 100 hours active (button pressed) operating time
Probe holes:	Requires probe holes in concrete 8mm deep at 6.5mm diameter, filled with conductive gel
Dimensions (L x W x H):	430 x 310 x 150mm (in carton)
Weight:	3kg

## 4-Probe Digital Resistivity Array Meter

The 4-probe array instrument utilises a set of four probes in a 4-point Wenner array with superconductive foam tips to ensure full contact on irregular surfaces. A set of solid probes is also included. The probe array is placed in contact with the surface, using conductive gel, and an immediate display of resistivity is available on pressing the action button.

- Less than 1 minute per test
- Automatically recognises highly resistant surface conditions



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6455</b>	4 Probe Digital Resistivity Array Meter complete with 4-probe array, leads, conductive gel, spare foam probe tips, carry case and user guide
Probe array:	4 probe array 5 cm spacing
Measuring technique:	Low frequency constant magnitude alternating current drive to probes
Display:	3 digit LCD display
Response/resolution:	Display resolution 0.1 k cm linear response up to 99 k cm
Battery:	Single NM 1604 battery giving approximately 100 hours active (button pressed) operating time
Contact:	Surface contact or on surfaces having high contact resistance, in holes or grooves cut in the surface layer
Dimensions (L x W x H):	430 x 310 x 150mm (in carton)
Weight:	3kg

## Pulse Velocity and Resonant Frequency

### PUNDIT

The Pundit is used to carry out non-destructive integrity tests on concrete in conformance with BS 1881: Part 203 and ASTM C597. The unit sends a pulse of ultrasound through the material being tested and measures the time taken for it to pass through. By taking a series of readings, it is possible to detect the presence of cracks, voids and other imperfections.

It can be used with timber, ceramics, geological specimens, refractory materials, cast iron and many other materials. The control and readout unit can be used with a full range of transducers and accessories.

### The Pundit comprises of:

- PUNDIT control and readout unit
- Carrying case
- Mains lead
- Two 54kHz transducers
- Two 3.7 metre cables
- Calibration bar
- Ultrasound couplant
- Operating manual



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6505</b>	Pundit kit complete with control and readout unit, 2 x 54kHz transducers, 2 x 3.7m cables, carrying case, mains lead, calibration bar, couplant and operating instructions
Dimensions (L x W x H):	186 x 130 x 186mm (control and readout unit only)
Weight:	3kg (control and readout unit only), 7kg (complete)

### ACCESSORIES

<b>VJT6506</b>	Pundit Software with cable
<b>VJT6507</b>	RS232C Output for Pundit
<b>VJT6508</b>	Pair of Cables 30.4m terminated with BNC connectors
<b>VJT6509</b>	Pair of Cables 15.2m terminated with BNC connectors
<b>VJT6510</b>	24kHz Transducer, 50mm diameter x 99mm long (2 required)
<b>VJT6511</b>	37 kHz Transducer, 50mm diameter x 50mm long (2 required)

### VJT6505 SPECIFICATIONS

Transit Time Range:	0.1 to 9999µs in either units of 0.1µs or 1µs
Resolution:	0.1µs
Display:	4 digit 12mm high reflective LCD, flashing colon low battery indicator
Transmitter:	Energising pulse nominal 1.2kV or 500V, 1.5µs switch selected
Output:	Analogue pulse width equal to transit time available from BNC socket on rear panel
Receiver:	Input sensitivity - 250µV, Impedance - 470k
Operating temperature:	0°C to 40°C
Power supply:	Internal rechargeable NiCd battery, 12 hour capacity with built in constant current charger
Dimensions (L x W x H):	186 x 130 x 186mm (control and readout unit only)
Weight:	3kg (control and readout unit only), 7kg (complete)

## PUNDIT PLUS

The Pundit Plus takes advantage of the latest microprocessor technology, to meet today's increasing demands for accuracy, reliability and ease of use.

### Features:

- Ruggedly built for on-site reliability
- Simple, speedy operation
- Integral RS232 interface
- Auto memory store for readings
- Large LCD display
- Advanced measurement features:
  - Velocity
  - Transit time
  - Modulus of elasticity
- Can be used to investigate, concrete uniformity, cavities, cracks, fire/frost damage and strength



## ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6512</b>	Pundit Plus kit complete with control and readout unit, 2 x 54kHz transducers, 2 x 3.7m cables, carrying case, mains lead and power supply, couplant and operating instructions
Dimensions (L x W x H):	186 x 130 x 186mm (control and readout unit only)
Weight:	3kg (control and readout unit only), 7kg (complete)

## ACCESSORIES

<b>VJT6513</b>	Pundit Plus Software with cable
<b>VJT6514</b>	24 kHz Transducer Receiver; 50mm diameter x 99mm long (2 required)
<b>VJT6515</b>	37 kHz Transducer Receiver; 50mm diameter x 50mm long (2 required)

## VJT6512 SPECIFICATIONS

Transit Time	Range:	0.1 to 9999µs in either units of 0.1µs or 1µs
	Accuracy:	± 0.1µs
Velocity	Range:	1 to 9999, in either m/s or ft/s
	Accuracy:	± 1 m/s or ft/s
Elastic modulus	Range:	Up to 999.9, in GN/m <sup>2</sup>
	Accuracy:	± 0.1 GN/m <sup>2</sup>
Display:	128 x 128 dot backlit LCD	
RS232C Output	Baud Rate:	Fixed at 9600 baud
	Parity:	None
	Data Bits:	8
	Stop Bits:	1
Scope Output	Synchronisation:	3.5V positive, rise time 2µs
	Signal:	True facsimile of receiving transducer output for outputs of up to 0.4V
Transmitter:	Energising pulse nominal 1.2kV or 500V or 250V, 1.5(s duration)	
Operating temperature:	0°C to 40°C	
Power supply:	Internal rechargeable NiCd battery, 12 hour capacity with built in constant current charger	
Dimensions (L x W x H):	250 x 160 x 100mm (control and readout unit only)	
Weight:	2.3kg (control and readout unit only),	

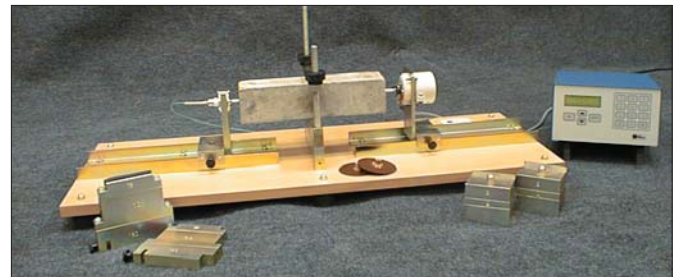
## Dynamic Modulus/Resonant Frequency System

The dynamic modulus tester automatically measures the fundamental frequencies of vibration of concrete prisms. By measuring the transverse, longitudinal and torsional frequencies, the concrete can be assessed by its elastic properties. The dynamic Poisson's ratio, dynamic modulus of rigidity and dynamic Young's Modulus of elasticity can be calculated and the ultrasonic pulse velocity can be estimated.

The system consists of a high stability frequency oscillator, which drives a vibrator in contact with one face of the concrete specimen. A receiver positioned at the opposite face of the specimen picks up the amplitude of the vibration. The point of application of the vibrator depends on the mode of vibration required, longitudinal, flexural or torsional. A mounting board for supporting the specimen is provided, fitted with different support points for the various vibration modes.

### Features:

- Complies with BS1881: Part 209 and ASTM C215
- Battery backed data storage
- Serial port for connection to a computer or printer
- Automatic mode for sweeping through a range of user selectable frequencies
- Manual mode for waveform analysis and further flexibility
- Sealed membrane switch panel



## VJT6430 SPECIFICATIONS

<b>VJT6430</b>	Dynamic Modulus/Resonant Frequency System complete with vibrator, accelerometer, mounting board and accessories for longitudinal, torsional and flexural resonance tests	
Oscillator	Frequency:	1Hz to 100kHz
	Resolution:	1 - 99.99Hz = 0.01Hz, 100 - 999.9Hz = 0.1Hz, 1000 - 9999Hz = 1Hz, >10kHz = 10Hz
	Output:	0 to 2V pk-pk into 3 load
Display:	Frequencies, voltages and option menus displayed on a 20 character x 4 line LCD display	
Keypad:	16 key sealed membrane	
Drivers:	Large mass specimens – 3 contact vibrator Small mass specimens – Electro-magnetic air gap driver	
Vibration Sensors:	Large mass specimens – Miniature crystal accelerometer	
	Small mass specimens – Electro-magnetic air gap receiver	
	Transverse mode – Surface mounting sensor	
Operating temperature:	0°C to 40°C	
Power supply:	220 - 240V 50/60Hz 1ph or 110 - 120V 50/60Hz 1ph (user selectable)	
Dimensions (L x W x H):	Meter – 291 x 260 x 150mm, Test Bench – 925 x 360 x 310mm	
Weight:	27kg	

## Cement Early-Age Shrinkage Measurement Rig

This test rig is designed to measure the shrinkage of Ordinary Portland Cement based materials in the earlier stages of hydration. It can also be used to measure shrinkage over extended periods if required. The test material is cast in a triangular section mould fitted with a movable stop end. A stainless steel insert is used to key the test material to the stop end of the mould. As soon as the test material has achieved sufficient stiffness, the clamping screws on the movable stop end are released. The shrinkage of the material is then measured directly by a dial gauge or an LSCT displacement transducer, which bears directly on the stop end.

Temperature effects on the normal mould can be corrected by comparing to another mould with an Invar bar fitted between the stop ends. The apparent shrinkage from this reference mould is used to correct for temperature effects on the normal moulds.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6410</b>	Early Age Shrinkage Mould complete with 2 stainless steel inserts
Specimen dimensions:	45mm x 45mm x 45mm x 285mm long
Stainless Steel Inserts:	2 required per test, length 10mm, internal thread 6mm. maximum width 10.26mm across flats (inserts are not-re-usable)
Mould Dimensions (L x W x H):	450 x 150 x 80mm
Weight:	2kg
Shrinkage Measurement - Select one of the following measurement devices	
<b>VJT0105-M</b>	Mechanical Dial Gauge 12mm x 0.002mm
<b>VJT0105-MIT</b>	Digital Dial Gauge 12.7 x 0.001mm
<b>VJT0270</b>	10mm Linear Displacement Transducer LSCT

### ACCESSORIES

<b>VJT6411</b>	Invar Bar
<b>VJT6412</b>	Stainless Steel Inserts (pack of 10)

## JAF Calorimeter

The JAF conduction calorimeter is designed to measure the isothermal heats of hydration of small samples of cements. The system can also be used to obtain information on the reaction rate for a wide range of chemical and biochemical processes.

The principle on which the calorimeter works is that heat generated during the chemical reaction flows rapidly through a thermal conductor to a heat sink, which is maintained at a constant temperature by a surrounding water bath. The conduction path is formed by a sensitive thermopile, which produces an electrical output proportional to the heat flow through it. When used for cement analysis, the apparatus cuts out the tedium of the standard vacuum flask heat of solution method for measuring the heat of hydration cements. Results can be obtained at any selected time



interval, and coefficients of variation of 0.9% have been obtained at three days, which is a considerable improvement over the heat of solution method.

An electronic interface connects the two calorimeters to an IBM compatible PC, and all the software required to collect and analyse the data is supplied.

### The standard 2 pot system comprises of:

- Two medium - sensitivity Perspex JAF calorimeters with standard and small sample containers
- Water bath system complete with cooler to maintain the calorimeters under isothermal conditions
- Computer interface with software to allow the calorimeter outputs to be collected and then analysed
- Computer

A high temperature system is also available, which operates at temperatures up to 90°C. Instead of the Perspex units, two stainless steel calorimeters are supplied for temperatures above 50°C.

A larger water bath accommodating four standard calorimeters is also available for those wishing to carry out more than two tests.

### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6360</b>	JAF Calorimeter 2 pot System up to 60°C, with computer
<b>VJT6365</b>	JAF Calorimeter 2 pot System up to 96°C, with computer
Power supply:	240V 50Hz 1ph or 120V 60Hz 1ph
Dimensions (L x W x H):	Main Bath 900 x 420 x 490mm, Reservoir Bath 450 x 350 x 305mm, Cooler 360 x 465 x 300mm, Interface 325 x 245 x 105mm
Weight:	106kg
<b>VJT6370</b>	JAF Calorimeter 4 pot System up to 60°C, without computer
Power supply:	240V 50Hz 1ph or 120V 60Hz 1ph
Dimensions (L x W x H):	Main Bath 1170 x 420 x 465mm, Reservoir Bath 450 x 350 x 305mm, Cooler 360 x 465 x 300mm, Interface 325 x 245 x 105mm
Weight:	116kg

## BRE Screed Tester

Dense floor screeds, which on visual inspection appear to be sound, i.e. able to withstand imposed loads and traffic may be substandard. Specifications often state that the cement/sand screed should be semi-dry; a consistency which when manually compressed may result in the lower layers being insufficiently compacted. This may cause the screed to fail under the impact of heavy traffic or furniture movement. Subsequent remedial work on the screed is often costly and time consuming.

The BRE Screed Tester is designed to measure screed soundness as early as 14 days after laying. The device consists of a 1 metre long cylindrical guide rod, along which an annular weight of 4kg (or 2kg) travels when released. At the bottom of the guide rod the weight strikes the collar of a case-hardened steel anvil, which transmits the impact to the selected area of the screed. The indentation of the anvil into the screed, after four drops of the hammer; is measured with a purpose made electronic depth gauge.

To simplify the task of recording the indentation depths, an electronic data recorder, which connects directly to the electronic depth gauge, is available. The data recorder is a single channel data processor which records and prints the reading from the digital indicator every time the 'DATA' button on the recorder is pressed. At the end of the data collection, the readings are analysed and the following statistical values are printed.

### Printed Values:

- Number of readings
- Maximum reading
- Minimum reading
- Range
- Mean
- Standard deviation ( $\sigma$  and  $\sigma^2$ )



### ORDERING INFORMATION

**VJT6395** BRE Screed Tester complete with 2kg and 4kg weights, spare anvil, electronic depth gauge, template, handbook and calibration certificate traceable to British Standards in a plastic case

**VJT6397** Data recorder with printer and connection cables

### SPECIFICATIONS

#### Screed Tester

Drop weights: normal screeds – 4 kg  
floating screeds – 2 kg

Drop height: 1000mm

Contact area of anvil: 500mm<sup>2</sup>

Dimensions (L x W x H): 515 x 375 x 125mm (in case)

Weight: 11.75kg

#### Electronic depth gauge

Measuring range: 0 - 12.7mm

Resolution: 0.01mm

Operating temperature: 0 - 40°C

Weight: 160g

#### Data Recorder

Number of data entries: 1000

Printer: 5 x 7 dot matrix, character size 1.8 x 2.5mm

Power: Mains adaptor or 4 Ni-Cad batteries

Dimensions (L x W x H): 180 x 160 x 81mm

## Fineness - Blaine Apparatus

to BS 4359/2, EN 196/6, ASTM C204 and AASHTO T153

The Blaine Air Permeability Apparatus is used to determine the fineness of cement in terms of specific surface expressed as total surface area in square centimetres per gram of cement.

### The apparatus comprises of:

- Glass U-tube manometer with valve
- Steel stand
- Stainless steel test cell with disk and plunger
- Rubber aspirator bulb
- Filter papers
- Manometer liquid
- Thermometer

### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6413</b>	Blaine Air Permeability Apparatus complete with 1000 filter papers
Weight:	12kg

### ACCESSORIES

<b>VJT6413-C</b>	Standard reference cement, used to calibrate the Blaine Apparatus
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## Vicat Apparatus

to BS 4550, EN 196:3, ASTM C187, C19 and AASHTO T129, T131

The Vicat method is used to determine the water content that will produce the required consistency of cement. The apparatus consists of a metallic frame, graduated scale with index, 300g sliding probe, 10mm diameter consistency plunger, glass base plate and thermometer. Needles and moulds are ordered separately according to the relevant standard.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6415</b>	Vicat Apparatus
Dimensions (L x W x H):	160 x 200 x 300mm
Weight:	5kg

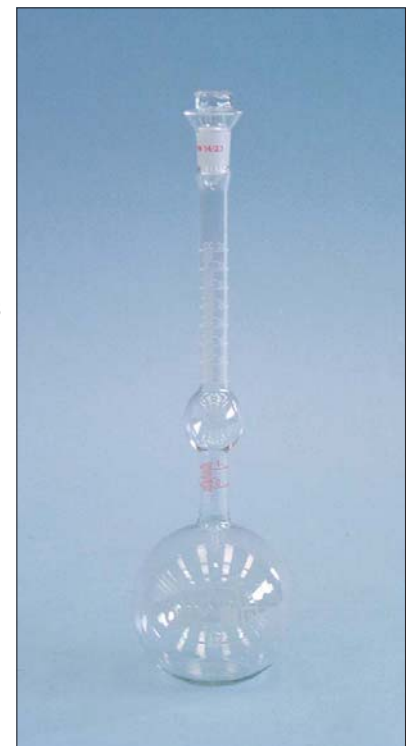
### ACCESSORIES

<b>VJT6416</b>	Initial Needle, 1.13mm diameter to BS and EN
<b>VJT6416-A</b>	Initial Needle, 1mm diameter to ASTM and AASHTO
<b>VJT6417</b>	Vicat Mould, brass with ring to BS
<b>VJT6417-A</b>	Vicat Mould, plastic to ASTM and AASHTO
<b>VJT6418</b>	Final Needle 1.13mm diameter to BS and EN
<b>VJT6418-A</b>	Final Needle, 1mm diameter to ASTM and AASHTO

## Le Chatelier Flask

to EN 196/3, ASTM C188 and AASHTO T133

The Le Chatelier Flask is used to determine the specific gravity (relative density) of hydraulic cement and lime. The neck of the flask is graduated from 0 to 1ml and from 18 to 24ml in divisions of 0.1ml.



### ORDERING INFORMATION AND SPECIFICATIONS

<b>VJT6414</b>	Le Chatelier Flask
Capacity:	250ml
Weight:	500g