Automatic Vicat Apparatus with printer
CE350

Impact Test Equipment Ltd
www.impact-test.co.uk - www.impact-test.com
www.impact-testsets.co.uk
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Addendum: - Needle Calibration Guide
CHAPTER 1 | GENERAL INFORMATION

1.1 | GENERAL FEATURES

- **THIS MANUAL IS ADDRESSED TO** the carrier, the installer, the user, the maintenance operator, the scrapping operator.
- Please read it carefully because it informs you about the operating of the machine in safety conditions.
- The user can use the machine only about what concerns him and about he was trained to. The user has to know the machine functioning about what concerns his use.
- The buyer has the responsibility to ensure that the users are trained and have all the information and the clarifications written on the given documentation. Even if the user or the operator has these security dispositions, he has to be aware of potential risks that can occur during the use of the machine.
- Only through the replacement of original parts is guaranteed the functional liability and the optimisation of machine performances. When the user changes something on the machine, he is totally responsible for what he is doing.
- The machine was projected and manufactured with mechanical and electric security devices to protect the operator or the user from possible physical injuries.
- All the necessary operations to keep the machine efficient before and after the use are on relief of the user.
- This manual has to be considered a part of the product and concerns only the machine it is delivered with.
- Keep the manual in a safe place during the whole life of the appliance to consult it for any needs.
- In case of sale, the manual and its enclosures should be sell together with the machine.
- The manufacturer assumes no liability for any damages caused by a misuse of the machine.
- The manufacturer reserves the right to make changes to the documentary information or to the appliance without advance notice.
- Messages meaning:

  - **WARNING** This warning refers to all those procedures that have to be carefully followed to avoid any damage to the machine or its equipment.
  - **DANGER** This warning refers to all those procedures that could present some risks for the operator, if not carefully followed.

1.2 | SIMBOLOGY INFORMATION

All graphic symbols used are identified in CEI 3-27 and UNI ISO 2972; each symbol and its relative function is described in this manual.

1.3 | MANUAL INTENT

This instruction manual is prepared to provide all necessary information, as fully and clearly as possible, about the installation, use and maintenance of the machine, from the moment it is sold till it is out of service and/or is demolished.

All procedures to face emergency situations, that could occur during working range described by the developer, are present in this manual.

Users or rather the recipients of this manual are who, for their competence parts, have necessity or obligation to give instructions or work on the machine.

**Important note:**
This manual does not replace experience and technical preparation of the authorized users, but the manual must be considered a guide instrument in carrying out function.

1.4 | STRUCTURE OF THE MANUAL

The instruction manual consists of a single volume, written in a descriptive language and equipped with all pictures and necessary attachments for a correct interpretation and execution of the usage and maintenance activities of the machine.

Rules and regulations, the users need to know to achieve the objectives of the manual, are shown in this manual.
1.5 MODIFY AND INTEGRATION

This manual reflects the machine conditions at the sell moment. It is an integral part of the machine. Eventual changes, improvements, adjustments which will be applied to the subsequently traded machines do not force the MANUFACTURER to work on the machine previously supplied. Previously supplied machine and manual must not be considered lacking and inadequate.

1.6 DEVELOPER IDENTIFICATION

See heading in first page.

1.7 MACHINE OR EQUIPMENT IDENTIFICATION

Identification plate is on the back of the machine. On the plate there are identification data and electrical characteristics.

1.8 USE DESTINATION

Note: If during the installation will be found different conditions from those agreed or they will change during the next period, costumer must immediately contact the manufacturer before using the machine.

The Automatic Vicat is used to detect the setting time of a hydraulic binder. The Automatic Vicat has been specially developed to grant the operator an easy and accurate determination of the initial and final setting times. The results given grant absolute precision and validity since the Automatic Vicat can execute the whole test automatically, thus avoiding any possibility of error due to manual work (air pockets, false settings and clots). Furthermore, this appliance has a program including tests on plasters, according to the DIN 1168 standards. The operator can select the free fall or the guided fall of the probe.

1.9 INTENTED USE – NOT INTENDED USE

This equipment is intended only and exclusively for use under conditions described in the chapter “USE DESTINATION”. Any other use is considered improper and therefore not expected.
1.10 MACHINE STRUCTURE AND WORKING PRINCIPLE

The Vicatronic E044 is formed by a load-bearing frame, upon which the whole structure of the appliance is located. Its compactness together with its reduced weight allows an easy handling and moving. A rotating plate (A7) allows the correct positioning of the specimen taking into account the probe (A6) and the selected program and nature of test to be carried out.

The appliance is programmed through the Control Panel (A1), which is located on the upper part of the appliance.

The probe (A6) is operated by a step-by-step motor linked to an asymmetrical cam device, which drops into the specimen from a known height. The specimen – holder plate which is also powered by two step-by-step motors, guarantees highly precise and repetitive positioning. The instrument automatically records digitally every specimen and is able to show this as and when required on a digital graphic display (coordinated by every probing time [minutes]/test [mm]), or otherwise in graphic form simulating the old fashioned pen tracing on the paper.

For further information contact the retailer or producer.

1.11 SET OF PROGRAMS

The Vicatronic allows to select the following test programs:

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>EN –UNI 196-3 BEFORE 06-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NUMBER OF PENETRATIONS</td>
<td>26</td>
</tr>
<tr>
<td>CONICAL MOULD</td>
<td>70 / 80 / 40 mm</td>
</tr>
<tr>
<td>MIN. DISTANCE BETWEEN TWO PENETRATIONS</td>
<td>10 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>EN –UNI 196-3 AFTER 07-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NUMBER OF PENETRATIONS</td>
<td>86</td>
</tr>
<tr>
<td>CONICAL MOULD</td>
<td>70 / 80 / 40 mm</td>
</tr>
<tr>
<td>MIN. DISTANCE BETWEEN TWO PENETRATIONS</td>
<td>10 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>ASTM C 191</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NUMBER OF PENETRATIONS</td>
<td>41</td>
</tr>
<tr>
<td>CONICAL MOULD</td>
<td>60 / 70 / 40 mm</td>
</tr>
<tr>
<td>MIN. DISTANCE BETWEEN TWO PENETRATIONS</td>
<td>6.4 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>DIN 1168 GYPSUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NUMBER OF PENETRATIONS</td>
<td>22</td>
</tr>
<tr>
<td>WEIGHT OF MOVING PROBE</td>
<td>100 g.</td>
</tr>
<tr>
<td>CONE-SHAPED NEEDLE</td>
<td>08 mm / Length 50 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>CUSTOM PROFILE 90</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NUMBER OF PENETRATIONS</td>
<td>90</td>
</tr>
<tr>
<td>CONICAL MOULD</td>
<td>80 / 90 / 40 mm</td>
</tr>
<tr>
<td>MIN. DISTANCE BETWEEN TWO PENETRATIONS</td>
<td>6 mm</td>
</tr>
</tbody>
</table>
CHAPTER 2  SAFETY INFORMATION

2.1  GENERAL SAFETY STANDARDS

- The use, lifting, installation, maintenance and scrapping of the machine are allowed only to **qualified staff**. Qualified staff is composed by people who are authorised by the safety responsible to do any activities due to their experience and acknowledgement of the operating of the machine and of the standards, rules and actions. The user must be carefully taught about the operating of the machine to avoid any misuse of it and about the safety devices, which the machine could be eventually equipped with. The safety devices will have to be kept always assembled and to be daily checked. The manufacturer offers training and assumes no liability for any damages due to a misuse of the machine by an unskilled staff.

- The manufacturer recommends to carefully follow the instructions and procedures of the operating manual and the safety standards concerning the safety devices and the general rules of the work environment.

- Verify the accordance of the machine to the standards in force in the State where the machine has to be installed.

- The operating manual must be carefully read by the safety responsible, by the operators and maintenance engineers. It must always be kept near the machine in order to be able to read it any times it will be necessary.

- Any tampering or modifications of the machine (electric, mechanical etc.) that are not allowed by a written agreement of the manufacturer must be considered as not permitted and the manufacturer will not accept to be charged for any damages.

- The removal or the tampering of the safety devices will be an infringement to the EEC Safety Standards. The manufacturer assumes no liability for any damages.

- The machine has to be installed in safe places, far from fire and explosions.

- We do recommend using only original spare parts and accessories; on the contrary the manufacturer assumes no liability.
• Be careful that any dangerous situations won’t happen during the working; stop immediately the machine in the event that it will not work properly and ask the manufacturer or the Authorised Service Staff of the dealer.

The manufacturer assumes no liability for any damages to people, things and animals caused by the non-compliance of the above instructions.

2.2 SAFETY DEVICES

DEFINITION: Active safety devices are the devices or solutions which eliminate or reduce the risks of the operator and require active and conscious intervention by the operator for the preventive action to be carried out.

• ACTIVE SAFETY DEVICES
  Active Safety Devices are all those disposals and devices, which eliminate or greatly reduce the risks for the operator. They require a conscious and active behaviour of the operator in order to be activated.
  On the back of the appliance a main switch can be found (A8) which also acts as an emergency switch.

2.3 DANGEROUS PARTS AND RESIDUAL RISKS

Dangerous zone is defined any zone in the equipment or close to the equipment where a person is exposed to risk of injury or damage to health.

During some intervention procedures on the equipment there are residual risks for the operator. These risks can be avoid following carefully the procedures described in this manual and using indicated personal protective equipments.

GENERAL INFO

- Before starting to use the equipment, ensure that all components are in good working order. Check there are no defective or damaged parts. If necessary, repair or replace any damaged part.
- Be aware of the possibility of electric shocks (both direct and indirect), which could be caused by electric system failures.
- Do not subject the appliance to impacts or shocks.
- Do not expose the appliance to fire, extreme temperatures or welding sparks.
- Do not allow corrosive substances to come into contact with the appliance.
- Do not wash the machine with jets of water.

DURING USE

In order to grant maximum safety levels for the operator do not touch any moving part of the appliance during test execution and wear the convenient protection devices. During test execution always be aware of the potential danger of finger or limb crushing or damage. Never wear loose clothing, ties, watches, chains, etc., which may entangle with moving parts of the machine.

DURING TRANSPORTATION

When transporting ensures that the machine is held and secured appropriately and that it cannot slide. Do not stand in a direct line with the application of force. Do not allow people access to loads that are not supported appropriately by mechanical means.

<table>
<thead>
<tr>
<th>RISK OR DANGER</th>
<th>PROTECTIVE DEVICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINGER SQUEEZE</td>
<td>REINFORCED GLOVES</td>
</tr>
<tr>
<td>CUTS OR ABRASIONS</td>
<td>REINFORCED GLOVES</td>
</tr>
</tbody>
</table>

The manufacturer assumes no liability for any damage to people and things due to a lack of observation of instructions and the use of safety devices.
2.4 NOISE

Acoustical Pressure $L_{eq}$ in the workplace $12 \text{dB (A)}$
Acoustical power emitted by the appliance $L_{WA}$ $\text{dB (A)}$
Standard Reference $\text{EN ISO 3746}$

Chapter 3 INSTALLATION

WARNING Consult the chapter “DANGEROUS PARTS AND RESIDUAL RISKS” before advance.

3.1 TRANSPORTATION

The indications in this section must be followed during transport phases of the machine and in the following situations:

- Storage of equipment
- First installation
- Relocation

Machine is usually sent and delivered in an adequate packaging for the consignment and the intended destination and suitable to protect the machine during transportation.

Movements of cases and packaging with lifting means must be executed with caution, strictly observing the sense of orientation indicated on the packaging.
We recommend to use forklift or crane with precaution to use belts and ropes, ignoring chains if possible.

ATTENTION Take the normal and logical precautions to avoid collision and rollovers.

ATTENTION Protect machine from atmospheric agents. Water and humidity could provoke oxidisation which would cause serious and irreversible damage.

ATTENTION Do not overlap case or packaging one above the other.

3.2 UNPACKING

After removing the package, check that any part of the machine is not damaged. In case of doubt, DO NOT USE THE MACHINE and ask the manufacturer.

DANGER The materials used for the package (plastic, polystyrene, screws, nails, wood etc.) have to be kept far from children. They must be thrown away in a proper collection centre.

ATTENTION Pay attention to avoid collisions and turnover.

ATTENTION Before throwing away the package, pay attention that accessories, manuals, documents, spare parts are not inside.
3.3 INSTALLATION

The machine must be placed in a suitable environment for the aim it has been conceived for (in a laboratory protected from atmospheric agents). A skilled operator must carry out installation.

<table>
<thead>
<tr>
<th>ALLOWED TEMPERATURE</th>
<th>from +5°C to +40°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOWED HUMIDITY</td>
<td>from 20% to 95%</td>
</tr>
<tr>
<td>MAX HEIGHT OVER SEA LEVEL</td>
<td>NL</td>
</tr>
</tbody>
</table>

As previously mentioned this appliance has been designed for laboratory use. It is therefore advisable for it to be placed in an environment with a stable temperature.

- The machine must be installed so that it is accessible from all sides for maintenance purposes.
- Neither unauthorised personnel nor dangerous objects are allowed in the vicinity of the machine.

**ATTENTION**
The appliance has been calibrated to work at a specific room temperature. If the real working temperature should be different from the one it is calibrated for, recalibration of the appliance is recommended in order to ensure correct data reading.

3.4 ELECTRICAL CONNECTORS

**DANGER**
The connection of electrical system must be performed by qualified personnel.

**DANGER**
Before connection, consult electrical plants attached to instruction manual and the plate on the machine for information about supply voltage, frequency and the nominal current.

**DANGER**
Make the connection of the grounding devices, through the terminal PE (yellow-green) before any other connection.

**DANGER**
Apply a disconnecting device upstream the connection cable with electric network. The disconnecting device must be combined with a protection device against overcurrent with differential switch (lifesaving). Characteristics of these device must be satisfactory for the current rules in the nation where machine is installed, and dimensioned depending on machine characteristics.

**DANGER**
In order to ensure optimum performances the appliance requires a constant electrical supply without interruptions or loss of voltage. If the electric supply network is not stable and free from disturbance, the appliance must be connected to a current equalizer with a power of 30 Watts.

**ELECTRICAL TOLERANCES:**

- Real voltage ± 10 % of the nominal one.
- Frequency: between 50-60 Hz with variations of +/− 2 %
- The harmonic distortion of the sum from the second to the fifth harmonics not more than 10 % of the total voltage as a real value between the conductors. A further distortion of 2% is accepted for the sum from the sixth to the thirtieth harmonics of the real total value between the conductors.
- With reference to the voltage imbalance of the three-phase voltage, neither the inverted sequence component nor the zero sequence components must be more than 2% of the direct sequence component of the voltage.
- The voltage pulses must not last more than 1.5 ms with an up/down time between 500 ms and 500 µs and a peak value not higher than 200% of the real value of the nominal supply.
- The electric supply must not be interrupted nor zeroed for more than 3 ms. It must not take more than 1 s. between two interruptions.
- The voltage interruptions must not be more than 20% of the voltage peak for more than one cycle. Between two interruptions it must not take more than 1 s.

The manufacture accepts no responsibility for any damage to people, things or animals caused by the non-compliance of the above instructions.
Chapter 4  MACHINE FEATURES

4.1  MACHINE FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH</td>
<td>400 mm</td>
</tr>
<tr>
<td>WIDTH</td>
<td>200 mm</td>
</tr>
<tr>
<td>HEIGHT</td>
<td>470 mm</td>
</tr>
<tr>
<td>MASS</td>
<td>12 Kg</td>
</tr>
<tr>
<td>SUPPLY</td>
<td></td>
</tr>
<tr>
<td>Model E044</td>
<td>220V 50-60Hz</td>
</tr>
<tr>
<td>Model E044-Y</td>
<td>110V 50-60Hz</td>
</tr>
<tr>
<td>Upon request</td>
<td>Other types of supply</td>
</tr>
<tr>
<td>POWER</td>
<td>20W</td>
</tr>
<tr>
<td>PRINTER</td>
<td>Thermal</td>
</tr>
<tr>
<td>PRINTER PAPER TYPE</td>
<td>Thermal ls 57 mm roll diameter max 29 mm</td>
</tr>
</tbody>
</table>

4.2  CALIBRATION

The machine is controlled and calibrated by the manufacturer using sampling tools, which are periodically checked by official institutions.

**ATTENTION**

Laws now in force foresee calibration checking after every machine transportation. Once the machine is installed and ready to work, official institutions must check the calibration before this can be used for official tests.

Chapter 5  OPERATOR INTERFACE

5.1  ENCLOSED DESCRIPTION A – COMPLETE APPLIANCE

<table>
<thead>
<tr>
<th>Control</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 CONTROL PANEL</td>
<td>Allows to set and program the appliance depending on the particular needs of each test.</td>
</tr>
<tr>
<td>A2 NEEDLE</td>
<td>Probe movement allows the specimen (positioned on rotating plate) to be tested.</td>
</tr>
<tr>
<td>A3 GLASS PLATE</td>
<td>Positioned between the specimen and the rotating plate.</td>
</tr>
<tr>
<td>A4 FRAME</td>
<td>The part which bears the load of the appliance.</td>
</tr>
</tbody>
</table>
| A5 CALIBRATED WEIGHT  
(Not present in enclosed document) | This weight is used for the precise calibration of the probe weight at a value of 300 g, and has to be always inserted in the appropriate hole of the probe. **N.B. When the needle is used for consistency tests with a 10 mm diameter and a 50 mm length, the calibrated weight must be removed in order to ensure a total probe weight of 300 g.** |
| A6 PROBE      | Due to the vertical displacement caused by the appliance, specimen penetration takes place by the needle. |
| A7 SPECIMEN – HOLDER PLATE | Holds the specimen during test execution.                                    |
| A8 MAIN SWITCH | Allows the machine to be turned on and off.                                  |
| A9 FUSE CARRIER | Protects the machine from possible short-circuits or failures.               |
| A10 ADDITIONAL WEIGHT (NOT PRESENT IN ENCLOSED DOCUMENT) | The additional weight applied to the probe leads to an overall weight of 1 Kg. In order to apply it to the probe the calibrated weight (A5) must be removed and the additional weight applied in its place. |
5.2 ENCLOSURE DESCRIPTION B – CONTROL PANEL

<table>
<thead>
<tr>
<th>CONTROL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1 ESC BUTTON</td>
<td>By pressing the ESCAPE button it is possible to leave any menu.</td>
</tr>
<tr>
<td>B2 PROGRAMMING ENCODER</td>
<td>A knob which can easily program and input test data by being clicked around. The ENTER function is carried out by pressing the knob, thus confirming the chosen data.</td>
</tr>
</tbody>
</table>

5.3 ENCLOSURE DESCRIPTION C – PROBE CLEANING DEVICE

<table>
<thead>
<tr>
<th>CONTROL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 FIXING SCREWS</td>
<td>Secure the probe cleaning device to the structure of the appliance.</td>
</tr>
<tr>
<td>C2 PAD HOLDER</td>
<td>Fixes the pad to the needle (A6) so it can be cleaned during tests.</td>
</tr>
<tr>
<td>C3 FIXING BUTTON FOR HOLDER</td>
<td>Regulates the pad holder position (C2). This aids the operator while preparing the cleaning device.</td>
</tr>
<tr>
<td>C4 PAD</td>
<td>Cleans the needle (A2) of residual cement particles as it moves up.</td>
</tr>
</tbody>
</table>

CHAPTER 6 USE

DANGER Consult the Chapter “DANGEROUS PARTS AND RESIDUAL RISKS” before proceeding.

6.1 WARNING

Before proceeding with the ordinary use of the appliance, we recommend checking that the appliance is in proper working conditions and has no broken or used parts. If necessary make all the routine and special maintenance operations detailed in this manual.

For safety reasons, the probe (A6) must be disassembled when transporting. Before use put it into the appropriate runners (from above).

ATTENTION Insert the probe keeping it perfectly vertical and let it fall down independently. An incorrect positioning or forcing could damage the internal mechanisms.

ATTENTION Once the appliance is switched on do not touch, turn or move the specimen holder. If above instruction is not followed the appliance can be seriously damaged.

6.2 SWITCHING ON THE APPLIANCE

ATTENTION Before switching on ensure that the appliance is connected to the electric supply.

To switch on, press the button (A8) on the back of the appliance.

6.3 TEST PREDISPOSITION

Before proceeding with the standard and continual use of the machine check it is in perfect working order by carrying out one complete cycle without any cement or mortar paste added.

If you find any defective or suspect equipment, repair or replace it immediately. In case of problems during this test cycle, see Chapter “DIAGNOSIS”.

If instructions given in this manual are not able to solve the problem, please contact our After Sale Service or ask your local distributors for information about the repair procedures and diagnosis service.

The Vicatronic has been designed to offer maximum ease of use even in the most complex functions. The controls have been reduced to a minimum and consist of a high-resolution multi-function graphic
display with high contrast and legibility. The encoder allows easy and quick access to the various menus at the click of a button and a single ESC (ESCAPE) button, which allows departure from any menu.

When the machine is switched on it will be in the position ‘zero’ which verifies the position of the motors and puts them in the correct position for the test to begin (positioning photo-sensor search). There will be a slight delay of between 8-10 seconds during positioning.

The first acronym with the machine positioned and ready to receive the test settings is as follows:

TEST EXECUTION
ARCHIVES
FREE TESTS
OPTIONS
INSTRUMENTS

**ATTENTION**  the ESC (ESCAPE) button allows to esc from any menu.

By turning the encoder knob it is possible to run through the various menus of the visualised acronym, the selected menu will appear highlighted in negative. Pressure on the knob confirms selection and opens further menus.

N.B. The machine is programmed with a series of factory settings, which are proposed upon the first test setting after which the device will represent the data from the previous test.

**ATTENTION**  Before carrying out a test, the needle must be calibrated to the zero point.

- By activating the menu TEST EXECUTION, the following acronym will be given:

**TEST NUMBER**
--------
**TEST TYPE**
ASTM
**OPERATOR CODE**
--------

Whenever it is possible, give an identification number to the test (10 alphanumerical characters) which it is preparing itself to carry out, the profile type which one wants to follow according to the following standards ASTM, EN ,EN196-3/2005, DIN (plasters), 90 penetrations, FREE1: FREE5 (programmable user).

It is also possible to enter an operator code, which will be shown on the test report (10 alphanumerical characters).

When the arrow on the lower right side of the display becomes active (dark arrow on white background) and it is confirmed with pressure on the knob allows passage to the next acronym:

**CLIENT CODE**
---
**TEST DATE**
DD/MM/YY
**TEST TIME**
HH/MM/SS

For this acronym it is also possible to enter relevant details to the test to be carried out, a 10 character alphanumerical code for the client code and a 6 character numerical one, spaced, for date and time.

The exit arrow gives access to the following acronym:

**TIME FIRST PENET.**
HH:MM:SS

**START DELAY [M]**
MMM
**SPECIMEN TYPE**
---

With TIME FIRST PENET., the start time for the test can be set. (NB. Check the machine clock has been set or consult the paragraph menu options and set the time and date).

As an alternative to the above-mentioned function, which allows a time delay of the test at a defined time, with the START DELAY function it is possible to set a time delay for the start of the test from 0 to 999 minutes. One function automatically excludes the other.

The specimen time function memorizes the preparation start time of the mix to be tested.
The benchmark SPECIMEN TIME is extremely important because it corresponds to the correct time to consider as test time and it corresponds to the mixing time of the water and the mixture. Based on the judgement of the operator, the Vicatronic appliance visualises the time taken to prepare the mixture (SPECIMEN TIME) or the time taken from the start of the machine.

The aforementioned arrow moves to the following acronym:

**WATER [%]**

XX.X

**TEMPERATURE [°C]**

XX.X

**HUMIDITY [%]**

XX.X

Where the relevant test details (3 character numerical with decimal point) can be entered.

Arrow for the following acronym:

**FALL TYPE**

GUIDED

**INTERVAL TYPE**

FIXED

**START OF SETTING READING**

NO

**START OF SETTING TAKEN** must be selected as NO for the Vicat test standards, for the description of the selection YES see paragraph **START AND FINISH SETTING READINGS** (next page).

**FALL TYPE** gives the option of either carrying out the test with the probe in **FREE** or **GUIDED** FALL, where the probe can be lightly rested on the specimen.

**INTERVAL TYPE** sets the sampling frequency in various ways in order to completely satisfy the demands of many types of products to be tested. The different modes are as follows: **FIXED, ZONES, THRESHOLD, COMBINED, MANUAL**

In every mode the minimum interval is 30 seconds while the maximum is 999 minutes.

Only for model E044-03 is possible to set a minimum time of 15 seconds if the type of test is “spiral” (are not made concentric circles, but simultaneous movement of rotation and translation).

Precharged rules are all standard type so they do not allow to choose a time of 15 seconds. For use this function is necessary to create custom test.

The **FIXED** modes sets an interval between one probing and another in a constant and repetitive manner of the set interval (e.g. 10 minutes) with a range between 0.5 and 999 minutes (30 seconds and 16.65 hours).

The **ZONES** mode divides the test cycle penetrations set in penetration phases with different interval times for every phase. There are 5 different phases available. A programming example follows:

After having selected **INTERVAL TYPE** and **ZONES** and confirmed the **START OF SETTING READING** (YES or NO) if the test profile ASTM has been selected, which consists of 41 penetrations, the display shows the acronym:

**ZONES**

<table>
<thead>
<tr>
<th>ID</th>
<th>TIME [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>1</td>
</tr>
<tr>
<td>41</td>
<td>1</td>
</tr>
<tr>
<td>41</td>
<td>1</td>
</tr>
<tr>
<td>01</td>
<td></td>
</tr>
</tbody>
</table>

In the ID column (probing) it will be displayed the penetration number which defines the end of the phase. As a default in the column the device proposes the maximum number of penetrations relative to the selected test profile. It doesn’t allow to overtake this value. It will be displayed in TIME column the time linked to the phase.
Each phase ends with the penetration number set in ID column of the same phase and begins with the penetration number set in ID column of the previously phase (or the beginning if it concerns the first phase). For example:

**ZONES**

<table>
<thead>
<tr>
<th>ID</th>
<th>TIME [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>41</td>
<td>1</td>
</tr>
</tbody>
</table>

This example indicates 3 phases:
- First phase: includes the penetrations from 1 to 10 with an interval of 3 minutes.
- Second phase: includes the penetrations from 10 to 25 with an interval of 2 minutes.
- Third phase: includes the penetrations from 25 to 41 with an interval of 1 minute.

For the preparation is necessary to place the cursor (a small filled circle) next to the value, which should be changed (this operation can be done scrolling the cursor until one of the arrow positioned at the left bottom of the display will be highlighted and the highlighted value will be changed by turning the knob of the encoder).

The **THRESHOLD** mode allows to set a depth of penetration from the base of the plate (XX.X mm) and 2 different time intervals between the penetrations. First time interval is related to penetrations that precede the achievement of set depth while second time interval is related to penetrations that follow the achievement of set depth.

The **COMBINED** mode is a combination of the two previous **ZONES** and **THRESHOLDS**, carrying out an interval in zones until the reading of a penetrations threshold. Then it allows to carry out the intervals like the **THRESHOLDS** set.

The **MANUAL** mode gives the user the possibility to set the time interval as desired for each individual penetration. The acronym appears as follows:

**MANUAL**

<table>
<thead>
<tr>
<th>ID</th>
<th>TIME [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>01</td>
<td>C</td>
</tr>
</tbody>
</table>

By running through the data on the display in the exact same way as used up to now, the operator can set different interval times between one probing and the next, as desired. **ID** corresponds to the probe number, in this acronym for convenience the **C** icon has been inserted where the operator can copy the previous interval set, on the remaining penetrations.

**START AND FINISH SETTING READINGS**

If yes is selected on the referring window, the instrument will get ready for finishing setting readings according to the relative standard; once the penetration in mm is bigger than standard requirements previously set, the apparatus will advise the operator to rotate the specimen by a sound alarm. Then the operator has to reset the test parameter for the final readings.

After rotating the specimen, the user can set different samples to survey time parameters.

**START**

If this acronym appears on the machine display, it has all necessary data to carry out a test and by pressing the knob it will bring us to the following acronym:

**CONFIRM START TEST**

By pushing the knob the start of the test is confirmed.

During the test the following acronym can be viewed:

**CANCEL TEST DATA TEST MEASURES TEST**

**CANCEL TEST** obviously requires reconfirmation.
DATA brings back to the data menu and the relevant set data can be displayed according to the test-taking place.

TEST MEASURES simulates on the display the pen tracing of the probing. By pressing the knob in this acronym one can pass from one probing to the next by seeing the relevant numerical data (probing number taking place, highlighted probing number, penetration size highlighted in mm, 4 times are also visualised: \( P \) = time taken for the specimen preparation (time to add water to the compound) \( I \) = time to start the probing (start Vicatronic), \( F \) = remaining time to the end of the test and the last at the bottom the remaining time until the next penetration.

TEST ARCHIVES

In TEST ARCHIVES menu, the data and tracing graph of every test carried out can be seen. It is also possible to launch the thermal printer on the machine, or the separate printer with a USB connection port, or alternatively to download the selected data onto a personal computer via an RS232 serial port. The archive can contain up to 50 completed tests. The acronym can be displayed as follows:

**TEST ARCHIVE**  
**TEST**  
**N.50**

![Image of test number and date]

Used to delete all the archive test.

for obsolete data in memory to be deleted. By selecting the required test number and activating the suitable control memory space will be freed up.

(DATA) gives the numerical data for the selected test and also, scrolling through the menu, the settings can be viewed again.

(MEASURES) shows the test graphics. The display shows the probing sequences, as they would appear on a traditional pen tracing vicat. By pressing the knob one enters the graphic and by running the highlighted cursor the data can be viewed (time \( P-I-F \), penetration number, penetration size) on any probing.

(COMMUNICATE) the data transmission is activated on the PC via RS232 port (see photo1 ref. Z), the data is transferred to the PC and can be managed via (MS HYPER TERMINAL) or by means of the VICAT-WIN or VICAT-NET software.

activates the thermal printer on the Vicatronic with the option of reduced printing (paper saver) or complete print.
Printing example

In case of a complete print, the appliance prints a “report” (see picture on the side) with all data concerning the last test. The terms M[mm] and D[mm] indicate the arithmetic mean and the standard deviation of the penetrations, respectively.

On the bottom of the print, for each penetration, are visible the penetration times (minutes.seconds format) elapsed since the preparation of the specimen (see column “D1” P[m.s]) and the times elapsed since the start of the machine penetration (see column “D2” I [m.s]).

activates the separate printer via the USB port (See photo 1 ref. X).
FREE TEST

In this menu the personalised test profile can be set, consisting of a sequence of penetrations upon request. Setting is simple and involves an effortless division of the sample area to be tested in circles along which to distribute the penetrations, determining the number of penetrations and the circle radius. Various lines then appear which correspond to the circles. The number of penetrations must be entered per circumference and its radius. Vicatronic automatically calculates on the basis of the entered data the coordinates to transmit to the motors for positioning.

The programming acronym of the free tests appears as follows:

FREE TEST
FREE 1

NO. DIAMETERS XX

POINTS DIsh MOTION

1 0,00
2 0,00
3 0,00

FREE 1

DIAMETERS refers to the number of circumferences onto which the probing are distributed. POINTS refers to the number of probing (penetrations) which are to be carried out on that circumference, starting from the most external then in succession to the most internal. DISH MOTION refers to the variation of the circumference of the previous and the current penetration (in the case of the first value, you must enter the outer circumference that represents the hypothetical edge of the specimen).

The small number at the bottom corresponds to the progressing number of circles with set penetrations.

DATE TIME LANGUAGE

In this menu the date, present time and the language of the country in which it operates can be set.

An example of the above acronym is:

hh:mm:aa
DD:MM:YY
ITA Italian

INSTRUMENTS MENU

Needle calibration

Enter the INSTRUMENTS menu, position the glass plate (see A3, Attachment A), and activate the “needle calibration” command.

During the needle calibration procedure the equipment reads and stores 2 points: the first point corresponds to the surface on which the specimen has been placed (the glass plate), while the second one corresponds to the uncovered surface of the specimen, usually of 40 mm thick.

Wait for the probe first descent and then regulate the needle position by using the screw with hexagonal inserts (see picture 2).

Note: in order to safeguard the needle and the glass plate throughout the free fall probe test, it is necessary that the needle point skims over the glass plate without hurting it, when the probe is completely down.

After the needle regulation, lock the screw with hexagonal inserts and press the display knob to confirm it; wait until the probe goes up and reads automatically the first calibrating point.

Then the probe will immediately goes down for a second descend, reading the second calibrating point.

Wait until the probe completes the descend; then put a reference block of 40 mm thick between the needle and the glass plate (Impact suggests Jonsonn reference blocks).

Press the display knob to confirm that the operation has been executed and then wait until the probe goes up and reads automatically the second calibrating point.

If a reference block of 40 mm thick is not available, the operator may use a block with a different thick, providing that its value is inserted in the appropriate screen (“instruments” menu, “needle data” command).
CALIBRATION PULLEY

Factory set and protected by password. This is not available to the operator.

RESET POSITIONS

Allows the motors to be taken back to zero in the case of irregular functioning.

FACTORY DEFAULT

The FACTORY DEFAULT command has to be activated only in cases of real operative difficulty and when in extreme cases the machine must be RESET if with the usual controls it is impossible to return to a situation of normal control. Due to its criticality, this function is protected by password. The machine will be returned to its original factory settings and will return the memory to its initial state.

The password of "factory default" is "12345678"

ATTENTION

The FACTORY DEFAULT erases all the archived data.

Connecting to a Personal Computer

As previously described, Vicatronic can be connected to a personal computer via a serial port. The transmission to the PC takes places at the speed of 38400 baud-rate, 8bit data, 1 bit stop, no parity. The data transmitted by the suitable RS232 cable (full pin to pin) to PC can be managed using the HYPER TERMINAL in MS WINDOWS (usually available on all PCs).

For the use of the HYPER TERMINAL, refer to the relevant Microsoft user’s guide. Select the port (COM –1-2-3 etc) where the device is to be connected.

The downloaded and saved data can be elaborated on the PC using the usual MS OFFICE programs (EXCEL, WORD, etc.)
VICATWIN

VICATWIN is a SW developed specifically for data management of the VICATRONIC. Test reports can be drawn, modified, implemented and personalized. Graphics can be developed with curves, values and the possibility to develop reports with own logos. The more complete VICAT-NET version also offers the possibility to connect various VICATRONICS in network using the RS485 connection (see photo1 ref. Y). This allows programming, activation, starting tests and data extraction from a remote PC. Once the specimens have been prepared in advance, the operator can organise a sequence of tests without leaving the PC.

6.4 TOOLING UP

PROBE CLEANING DEVICE (OPTIONAL)
The probe-cleaning device is supplied assembled and ready for use with the Automatic Vicat E044 appliance. Instructions must be closely followed to correctly connect the device to the appliance:

1. On the opposite wall to the specimen holder plate, there are two threaded holes prepared for screwing the device.
2. Position the cleaning device as shown in figure 2, attachment C. Ensure the device is correctly centred on the screw holes.
3. Fasten the fixing screws in the holes without completely tightening them.
4. Regulate the device so the pads are perfectly aligned with the needle.
5. Tighten the fixing screws completely.

**ATTENTION** Before using the appliance for Official Tests, verify it is in perfect working order.

**ATTENTION** It is advisable to replace the pads before tests. See the following paragraph.

**PAD REPLACEMENT (SEE ATTACHMENT C).**
For pad replacement, follow these instructions:

1. Push the fixing button pad holder C3 in order to free and remove the holders easily.
2. Cut some new pads with a 65 mm length and insert them into the special holders.
3. Push the fixing button pad holder (C3), replace the holders so they fit the needle perfectly, and then release the stroke.
4. Add three or four oil drops into the holders and wait at least a couple of minutes before starting a test.
NOTE  If a mould tank is being used for water testing of the specimen (OPTIONAL), assemble the supporters after the insertion of the mould tank and disassemble them before the insertion of the mould tank.

6.5 SPECIMEN POSITIONING

ATTENTION  Before using the appliance for routine procedures ensure that the installed probe is suitable for the test to be performed.

The preparation as well as the positioning of the material to be tested can be done in different ways depending on the test nature. For correct specimen preparation and positioning, see the specific standards.

6.6 EMERGENCY STOP

In case of emergency it is possible to stop the test run immediately by pressing the ESC button and confirming with ENTER or alternatively flick the emergency switch (A8) which can be found on the back of the appliance.

ATTENTION  It is important to remember that test suspension causes test cancellation.

6.7 STARTING AFTER EMERGENCY STOP

DANGER  Before switching on the appliance again find and solve the problem that caused the emergency stop.

To start the appliance after an emergency stop, press the button.

6.8 SWITCHING OFF

At the end of a cycle of test follow these instructions to switch off the appliance:

Press the button positioned on the back of the appliance.

6.9 OPERATING EXAMPLE

The machine can be used in many different ways depending on the type of test to be carried out. Here follows a “standard-procedure” description which allows even an inexperienced operator to carry out a test. The operator's experience will allow optimal use of the machine on the basis of the customer needs.

DANGER  Do not attempt to use the appliance before having carefully read and understood all the instructions given in this manual.

ATTENTION  Before using the appliance for official tests, verify it is in perfect working order.

1. Switch on the appliance (see the special chapter “SWITCHING ON THE APPLIANCE” of this manual).
2. Place the glass plate on the mould.
3. From the INSTRUMENTS menu activate the NEEDLE CALIBRATION command.
4. Insert the needle into the probe; let it touch the glass plate and fix it using the special screw.
5. Push the button confirming the calibration and re-position the probe in the highest dead point.
6. Place the specimen on the glass plate. Go to the test execution menu and start the test after having inserted the required data.

An example of the test configuration data:

<table>
<thead>
<tr>
<th>TEST NUMBER</th>
<th>alphabetical identification code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABCD1234</td>
<td></td>
</tr>
<tr>
<td>TEST TYPE</td>
<td>Profile test type according to ASTM C191 standard</td>
</tr>
<tr>
<td>ASTM</td>
<td></td>
</tr>
<tr>
<td>OPERATOR CODE</td>
<td>operator’s alphabetical identification code</td>
</tr>
<tr>
<td>PIPP01234</td>
<td></td>
</tr>
</tbody>
</table>
CLIENT CODE  client’s alphanumerical identification code
Zxyw9876
TEST DATE  Date of test
15/04/03
SPECIMEN TIME  Preparation time of the compound to be tested and the actual start of
counting time taken by appliance.

TIME FIRST PENET. Start of probing time to be selected instead of START DELAY
hh.mm.ss
LATE STARTING. [m]
123
SPECIMEN TYPE  alphanumerical code defining the compound to be tested on
WATER [%] Numerical code relative to the % of the specimen’s water content
80.0
TEMPERATURE [°C] Numerical code giving the environmental temperature of the test
24.5
HUMIDITY [%] Numerical code giving the environmental humidity
60.0
FALL TYPE  Guided or FREE fall
GUIDED
INTERVAL TYPE  Interval type between probing
FIXED
START OF SETTING READING  Start of setting reading with rotating specimen test
suspension
NO and re-start with different settings for the END OF SETTING

ATTENTION Never manually move the specimen holder plate

N.B. If there is just a brief suspension of voltage in the electrical supply during the test,
the cycle will be interrupted in order to avoid offsetting the recorded times.

CHAPTER 7  MAINTENANCE

DANGER  See Chapter “DANGEROUS PARTS AND RESIDUAL RISKS” before proceeding.

DANGER All maintenance operations must be done after switching off the machine and
disconnecting the supply cable.

DANGER Skilled operators must carry out all maintenance operations concerning parts of the
machine and of the electric system.

DANGER Only original spare parts are allowed. The producer assumes no liability in the case of
use of non-original spare parts.

7.1 ROUTINE MAINTENANCE

In order to maintain machine efficiency, periodically clean and oil all non-painted parts.
Avoid the use of solvents, which damage the painted parts as well as parts made of synthetic
materials.

The appliance doesn’t need special maintenance.
It must be installed in a dust free room.

7.2 CALIBRATION

Ensure official institutions according to the laws now in force make a periodic calibration check.

CHAPTER 8  DIAGNOSIS

In this chapter some common problems can be found that may occur during the machine use.
WARNING  Skilled operators must carry out all maintenance, checking, control and repairing operations of each part of the machine.

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE CAUSE</th>
<th>CURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>After acting on the Main Switch, the appliance doesn’t switch on.</td>
<td>Lack of supply</td>
<td>Check the right use of the Main Switch</td>
</tr>
<tr>
<td></td>
<td>Fuses are broken</td>
<td>Verify the Main in the Panel</td>
</tr>
<tr>
<td>The probe (A6) doesn’t go up or down completely.</td>
<td>Probe broken or damaged</td>
<td>Contact the After Sales Service for probe replacement</td>
</tr>
<tr>
<td></td>
<td>Failure of the inside components of probe movement</td>
<td>Contact the After Sales Service</td>
</tr>
<tr>
<td>The probe (A6) stops when going upwards or downwards.</td>
<td>Failure of the inside components of probe movement</td>
<td>Contact the After Sales Service</td>
</tr>
<tr>
<td>The rotating plate does not turn or turns slowly.</td>
<td>Failure of the inside mechanisms of the rotating plate</td>
<td>Contact the After Sales Service</td>
</tr>
<tr>
<td>The Control Panel buttons are out of order.</td>
<td>Control Panel failure</td>
<td>Contact the After Sales Service</td>
</tr>
</tbody>
</table>

ATTENTION Contact the after sales service for any other problem that is not listed in the above table or in case malfunctioning continues after the intervention of the operator.

Chapter 9  SCRAPPING

9.1  SETTING ASIDE

In case of setting aside for a long time ensure the electric supply is disconnected. Perform all the maintenance operations. Oil the parts that are not varnished and cover the machine from dust.

9.2  SCRAPPING

When the machine is not used anymore ensure to:

- Disconnect the electric supply cable.
- Cover/destroy any parts which may be sharp or protruding and are potentially dangerous.
- Disassemble the machine and scrap it according to the present laws.

Recycling notice for the disposal of electrical and electronical devices

This symbol, placed on the device or on the package and/or on the documentation, suggests that the device shouldn’t be dispose together with other home garbage at the end of its life cycle.

To avoid further environment or health-care damages, caused by the unsuitable disposal of garbage, we kindly recommend the user to separate this device from other different types of garbage and to recycle it in a responsible way to avoid the arguable reuse of material resources. Indeed users must take care at the disposal of the equipment that have to be discarded, taking them away to the next recycling site for the appropriate recycling treatment for electrical and electronical devices. Gathering and Recycling deplete devices allows the preservation of natural resources and grant for them the adequate treatment respecting health and environment.

For further information about your local recycling site, please contact your local city hall or city waste treatment department. The developer, as producer of electrical and electronical devices, will provide to finance the recycling and treatment services for deplete devices that will come back through these recycling site, accordingly to the local statement.
Automatic Vicat Apparatus
CE350
Needle Calibration Guide

Impact Test Equipment Ltd
www.impact-test.co.uk - www.impact-test.com
www.impact-testsets.co.uk
Impact Test Equipment Ltd.
Building 21 Stevenston Ind. Est.
Stevenston
Ayrshire
KA20 3LR

T: 01294 602626
F: 01294 461168
E: sales@impact-test.co.uk

Test Equipment
www.impact-test.co.uk

Test Sieves & Accessories
www.impact-test.com

Test Sets to International Standards
www.impact-test.co.uk
Needle calibration for the CE350 Automatic Vicat is carried out in two stages, to ensure accuracy.

1. Press OPTIONS >> NEEDLE CALIBRATION

2. The needle is lowered until it touches the glass plate, for the first stage of the calibration.

3. Lock the needle by tightening the screw at the side.

4. Confirm the first (0mm) stage needle calibration.
5. The needle will rise and then descend again for the second (40mm) stage of the calibration.

6. Before the needle descends for the second time, place a 40mm distance piece or 40mm high EN mould on the plate, so that the needle will touch and stop at 40mm high.

7. Confirm the second (40mm) stage needle calibration.

8. The needle calibration is now complete. The needle will rise again and be ready to run a test.