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Systems for the Testing of
Construction Materials

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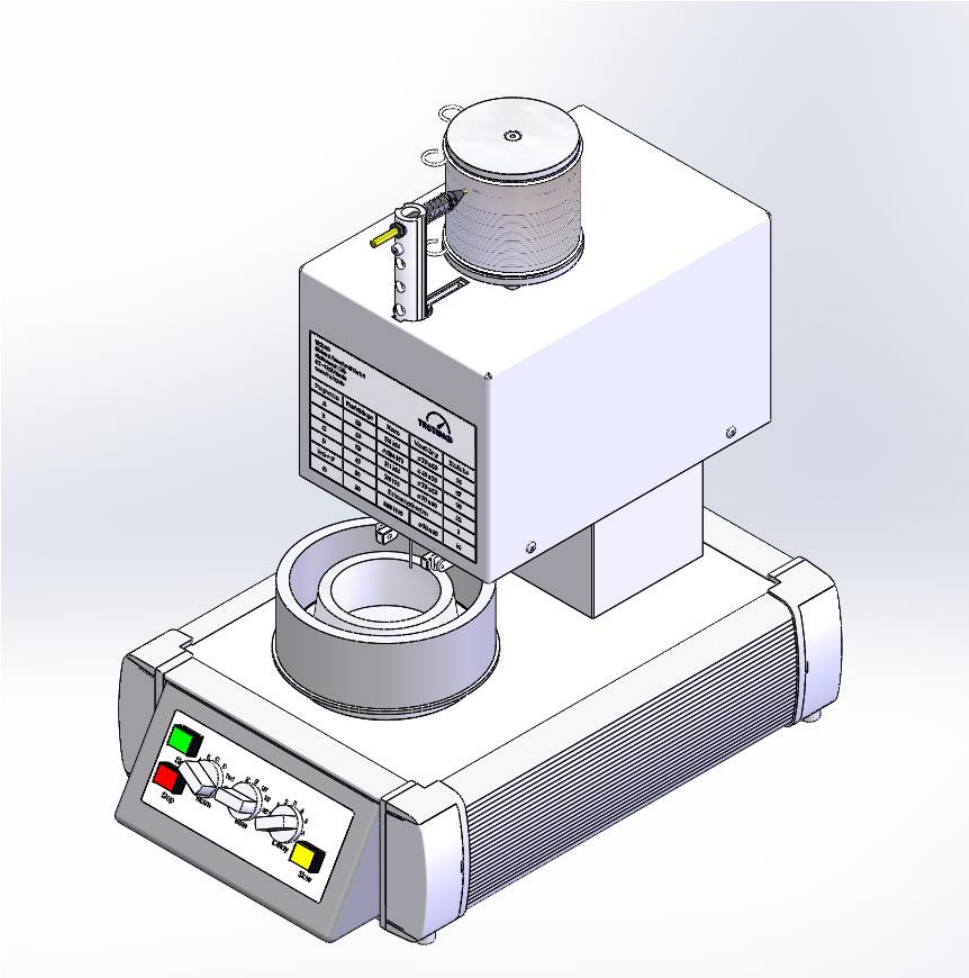
Operating Manual

Automatic Vicat Needle Apparatus



Importance of this Operating Manual:

CAUTION: Do not place this machine into operation until you have completely read this Operating Manual and have fully understood all its contents.

Contents Page

Attachments:
EG Declaration of Conformity
Inspection Record
Record of Measurement and Testing

1. Basic instructions

1.1 Designation

Designation of the manufacturer:	See page 1 of this Operating Manual
Device serial number	See the rating plate on the unit: it will show the complete ratings and the electrical specifications.

1.2 Purpose for which this system was designed

This Operating Manual contains the information required for operation of the products described here, for the purpose for which they have been designed. This Operating Manual is intended to be used only by technically qualified staff.

“Technically qualified staff” in the sense of this manual is defined as those persons who – as a result of their training; their experience; the instructions which they have received; as well as their knowledge of the relevant standards, regulations, accident-prevention regulations, and conditions under which this system will be used in the company – have been authorized by the person responsible for the safety of the company facilities to carry out the activities and actions required for operation of the equipment described below, and who can recognize and prevent any possible dangers arising from such operation (this definition of technically qualified staff has been provided in IEC 364).

The User must by all means observe the requirements and limit values, as well as all safety instructions, given in this Operating Manual. Any use of this device not in conformity with these stipulations shall be considered to be in violation of the use for which this system was intended. If this device must be operated under special conditions, or with special modes of operation, then this will be authorized only after consultation with the manufacturer, and after obtaining his prior and express approval.

This Automatic Vicat Needle Apparatus is intended only for determining the setting time for cement. The beginning and the end of the setting process is determined by the penetration behaviour of a steel needle into a cement paste sample, under certain specified conditions.

IMPORTANT NOTE:	The instructions given in this Operating Manual are valid only under conditions in which the device is correctly used. In order to properly perform the test, the User must observe the specific standards that apply to the test.

This operating manual contains safety instructions that are to be observed in order to exclude any risk of fatalities, injuries, damage to the equipment or improper operation. Safety markings are as follows:

Caution! 	This warning refers to dangers that could cause material damage.
Danger 	This warning refers to dangers that could cause severe injuries or even fatalities.
Note 	Provides practical advice on operation

1.3 Conditions under which this system may NOT be used

This system has been designed and built in accordance with the latest state of the engineering art, and with recognized engineering rules and regulations. However, danger can arise to the health and safety of the User, and of third parties, and damage can result to the components of the system, or to other objects of value in the vicinity. For these reasons, the User must observe the following instructions:

Do not take the device apart, and do not try to repair or to modify it.
Operate the device only in the range of voltage supply as given in this Operating Manual.
Do not operate the device in places that are subject to the following conditions:
Formation of ice, Heat radiation, Formation of condensate, Dust, Corrosive gases, Vibrations, Severe impacts, Do not operate the device in places with great relative humidity and temperature fluctuations.

Caution 	The mixing of cement with water causes the release of alkaline substances. In working with concrete, it is essential to take all necessary precautions to prevent dry cement from entering the eyes, mouth, or nose. Use protective clothing to prevent skin contact with wet cement or concrete. If cement or concrete enters the eyes, immediately and carefully wash out the eyes with clean water. Seek medical help without delay. If moist concrete comes into contact with the skin, wash it off immediately.

The operating person must take care not to endanger his or her own health and safety, or the health and safety of other persons. Only those persons may independently operate this system who have received sufficient training in the operation of this system.

If defects or damages to this system occur that impair its operational safety, the system must immediately be taken out of operation. It may be put back into operation only after all sources of danger have been eliminated.

1.4 Guarantee

Our **General Terms of Sales and Delivery** apply in all cases.

The Manufacturer guarantees that this Operating Manual has been prepared in conformity with the technical and functional parameters of the product as delivered. The Manufacturer reserves the right to add supplementary information to this Operating Manual as required.

The guarantee provided by the Manufacturer is the legal guarantee. This guarantee does not cover wear-and-tear parts.

The Manufacturer guarantees trouble-free operation only if the User observes the instructions in this Operating Manual, and only if the User employs the delivered system for the purpose for which it is intended.

The Manufacturer shall not be liable for damages that may occur if the product is used for purposes for which it is not intended, or if the User does not observe the instructions and rules for operation as set forth in this Operating Manual.

No claims for damages may be lodged against the Manufacturer if the product is modified in its structural or constructional characteristics without the prior written consent of the Manufacturer, or if its functional characteristics are modified without such consent.

Any person acting in violation of the above stipulations may be prosecuted before a court of law.

1.5 Acceptance of delivery, transport, and setting up

1.5.1 Acceptance of delivery

When accepting delivery of the product, first inspect it for its outer, visible condition. If this inspection is satisfactory, the delivery may be accepted from the freight forwarder (courier or other haulage company).

If there are no shortcomings, and if there are no transport damages, then use the bill of delivery to make sure that the consignment is complete, and that all parts have been delivered.

If you assume or suspect transport damage, or if transport damage becomes apparent only after you have accepted the delivery, immediately make an exact report of the conditions and any damage as they exist. Send us this report immediately by fax or e-mail. Important: Absolutely do not make any changes to the delivered goods.

After we have studied your report, we can make a decision whether we can correct the difficulties by one of the following options:

- Deliver spare parts to you, or
- Send a specialized fitter/installer to your plant, or
- Ask that you return the system to us for repair.

1.5.2 Transport

This system can be moved by hand to the place where it should be installed. Its weight (mass) is approx. 16 kg.

1.5.3 Setting up the system

Set up the system on a level base that is that not subject to vibrations, and that can effectively support the weight of the unit.

The ambient conditions that must be observed are as follows:

Permissible temperature conditions:	From + 5 °C to + 40 °C
Permissible relative humidity:	30 ... 50%
Maximum elevation:	1,000 metres above sea level

Caution 	Be sure to take all normal and logical precautionary measures to ensure that the equipment is not subject to impact, and that it is not damaged in any other way.

- We recommend that the Automatic Vicat Needle Apparatus be placed on a work desk, so that the drum with the plot of measuring results is located at a convenient level for the operating personnel.
- The main working position for the operating personnel is in front of the device.

1.6 Scope of delivery

In the standard version, the Automatic Vicat Needle Apparatus is delivered with the following accessories:

- Container for water storage
- Diagram recording paper (500 sheets)
- Recording stylus with ball-pen recorder and propelling-pencil leads (leads for mechanical pencil)
- Drop rod
- Ring according to EN: diameter 70 / 80 mm
- Needle, with diameter 1.13 mm x 50 mm length
- Allen wrench (socket wrench) (size no. 2)

Available as options:

- Needle, with diameter 1.13 mm x 30 mm, with special foot
- Consistency plunger
- Timer switch

1.7 Electrical connections

Danger 	In accordance with the pertinent standards, the yellow-green connection terminal must be connected to the earthing system before additional electrical connections are made. Before making the electrical connections. Also check the machine rating plate to make sure that the ratings of the building power supply conform to the requirements of the product for voltage, wattage, amperage, and frequency. The technical characteristics of this safety device must also satisfy the standards that apply in the country in which the machine is installed.
Caution 	The manufacturer of this product cannot be held liable for any damages that result because the information here is not observed.

Actual voltage: ± 10% of the rated voltage
Frequency: 50 Hertz ± 1% of the rated frequency, continually; ± 2% of the rated frequency, on a short-term basis
The manufacturer shall not be liable for damages to persons or property that arise because the above instructions have not been observed.
We recommend the use of a residual-current-operated circuit-breaker (RCCB) with 30-mA rated residual-current trip.

2. Characteristics of the equipment

The noise levels given here do not necessarily represent safe levels for persons operating the equipment. The safety and suitability of the noise levels for operating personnel are influenced by other factors such as the following: length of time that personnel are exposed to the noise, the surrounding environment, other equipment installed in the vicinity, etc.

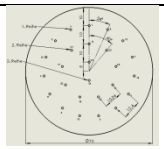
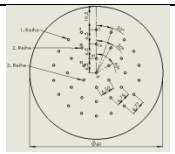
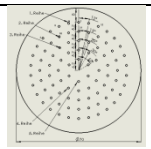
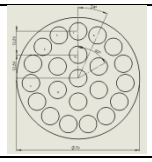
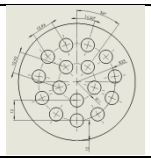
Official data on noise-exposure levels are necessary to evaluate the damage that personnel can suffer from being subjected to the noise from this equipment.

Sound pressure level equivalent “A” at the workplace:	23 dB(A)
Standards applying to the above data:	EN ISO 3746

This system belongs to those items of equipment whose acoustic emission in general does not reach a rating level of 90 db(A) (in accordance with DIN 45 635).

The noise emitted by the system will depend on various factors: e.g., the specific product, the place of installation, and the like. For this reason, it is not possible to indicate a generally valid sound pressure level for this system.

Technical data:	
Dimensions:	280 mm wide x 430 mm deep x 460 mm high
Weight (mass):	16 kg
Required electrical ratings:	110-230 VAC; 50-60 Hz
Weight (mass) of drop rod:	300g ± 1

Prog.	A	B	C	D	G
Graphic represen-tation					
Appl. Stan-dard	EN 196	ASTM 191	EN 196		DIN 1168
Needle cleaning	yes	yes	yes	no	no
Length of needle	50 mm	50 mm	50 mm	30 mm	50 mm
Diameter of: Mould	Ø 70 mm	Ø 65 mm	Ø 70 mm	Ø 70 mm	Ø 70 mm
Diameter of: Penetrations	26	37	90	22	16

The User can use the following program selections to set and to check the exact height of the needle:

Test + 30“ Check of needle height: Vicat ring
for needle length = 50 mm

Test + 1’ Check of needle height: Vicat ring
for needle length = 30 mm

Test + 2’ Check for lower end stop
Needle must be slightly above glass plate

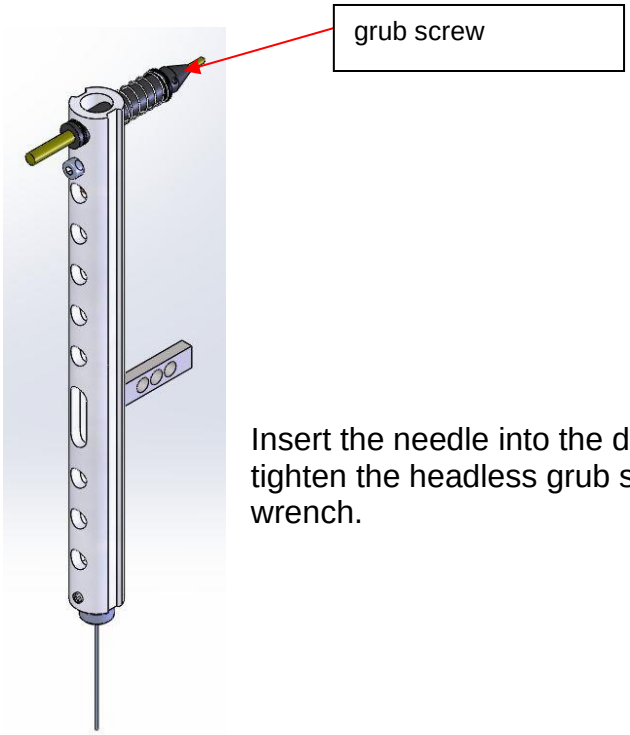
After a maximum of 3 minutes, the drop rod is automatically returned to its starting position.

3. Operating the Vicat needle apparatus

3.1 Putting the machine into operation

Attention 	For reasons of safety, the drop rod must be removed from the machine before it is transported. Before placing the Vicat needle apparatus into operation, take the drop rod and insert it into the machine at its proper place.

The recording stylus for plotting the Vicat results is delivered with a ballpoint-pen refill or with a propelling-pencil (mechanical-pencil) lead. After you insert the drop rod, you must use the knurled nut to set the exact distance between the point of the recording stylus and the recording drum.



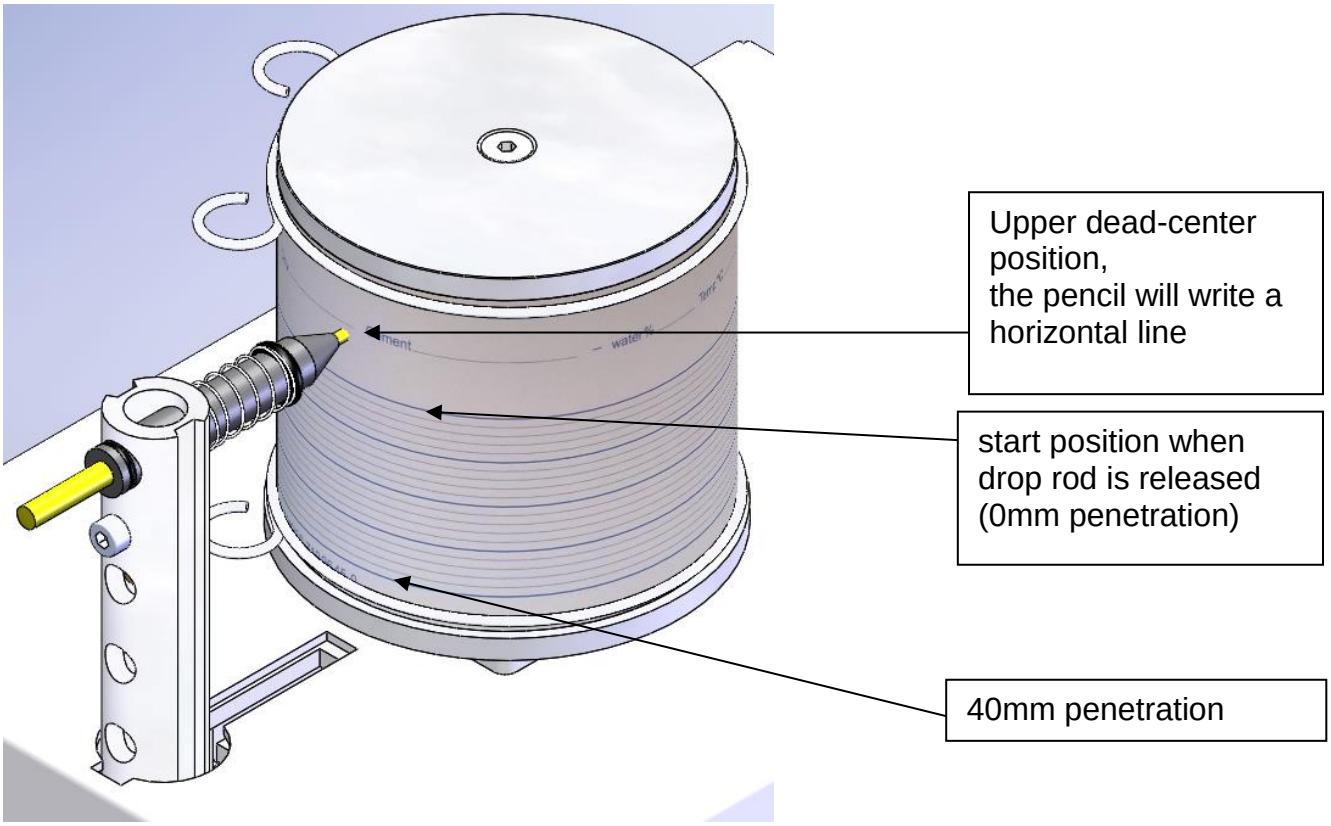
Insert the needle into the drop rod as far as it will go. Then lightly tighten the headless grub screw with the supplied no. 2 Allen wrench.

The next step is to wrap the recording paper around the recording drum. Use the paper-holding springs to hold the paper in place, and shove the paper up to the edge. The lowest paper-holding spring should be set so as to be positioned just over the edge.

Carefully insert the drop rod, from the top, all the way into the cover of the system housing lid, until it will go no farther. Push the recording stylus (ballpen refill or pencil lead) back so that it moves past the retaining spring of the recording drum with the paper.

Switch on the system by using the switch on the rear side.

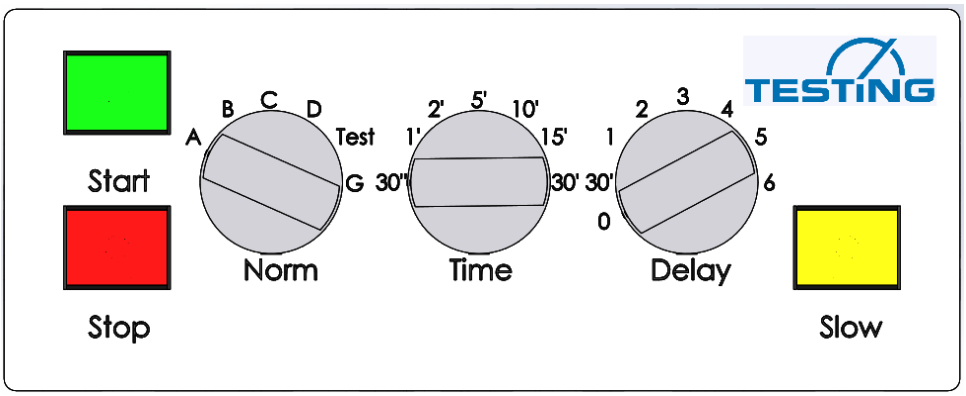
The system will now perform a self-test. If the system successfully passes the self-test, it will signal that it is ready for operation by showing the green signal lamp.



Switch on the device on the back side.

The device will start a self-check. When successfully done it will signalize readiness with a green lamp on.

3.2 Description of the control elements



Start	This button starts the test cycle.
Stop	This button stops the test cycle.
Standard	This setting is for selection of the standards that will apply for the test.
Time	This setting is for selection of the time interval between the start of one penetration and the start of the following penetration.
Delay	The setting is for a start delay
Slow	This button is for selection of the type of needle drop: **OFF** Free drop **ON** Damped (restrained) drop
Prepara-tion for settings	This control element enables moving the drop rod into its lower or upper position. *This function is used to prepare for the test, or to make settings for the system.*

The functions of the signal lamps:

Green lamp:

- is on when the system is switched on: This means that the system is ready for operation.
- flashes when the button is pushed: The test is running.

Yellow lamp:

- This lamp is off: The rod will drop in free fall.
- This lamp is on: Damped (restrained) drop of the rod.
- The button is pressed during the test: This will stop the test.

Red lamp:

- The red lamp is off: The system is ready for operation.
- The red lamp is flashing: The system has a defect. See the section below entitled “Troubleshooting”.
- If button is pressed during the “TEST” program: The red lamp button will then serve as a confirmation button.

- If button is pressed while the system is performing the normal test: This will stop the normal test procedure.

3.3 The test procedure

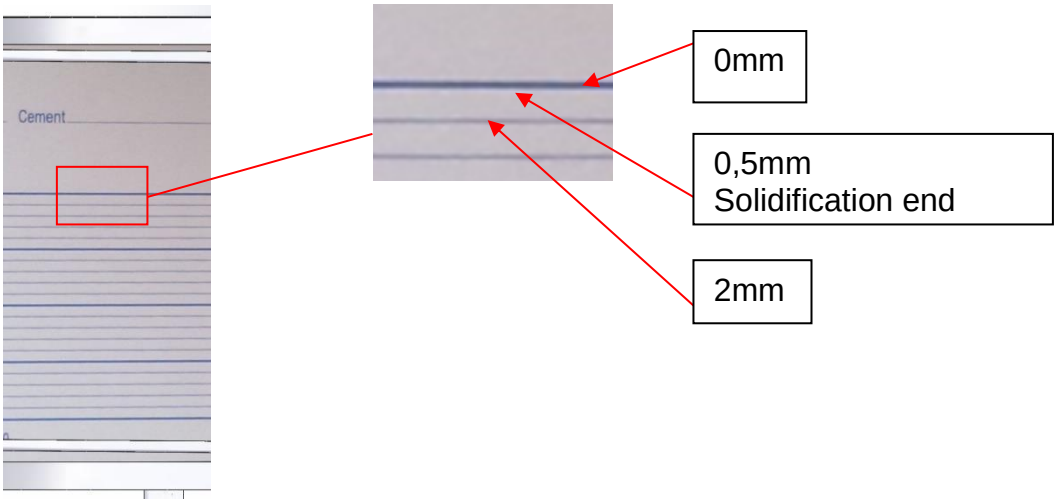
- Insert the drop rod from above into the device (in the reverse direction as shown in the drawing below).
- Switch on the system. The drop rod will now move into the upper position.
- Make your selection for the following parameters:
  - The standard that will apply to the test
  - The type of fall (free fall or damped fall)
  - The desired time
- Place the prepared test specimen on the rotary disk.
- Press the START button. The test procedure will then begin.

Programm	Needle length [mm]	Norm	Vicat-Ring [Size min.]	Anzahl der Einstiche
A	**50**	**EN 196**	**Ø 70/80**	**26**
B	**50**	**ASTM 191**	**Ø 65/75**	**37**
C	**50**	**EN 196**	**Ø 70/80**	**90**
D	**30**	**Erstarrungs-ende**	**Ø 70/80**	**22**
Test + 5'	**50**	**Normsteife**		**1**
G	**50 (Konus)**	**Gips DIN 1168**	**Ø70/80**	**16**

End of solidification

1st option:

You can read the end of solidification on the drum



2nd option:

- Stop the program at the appropriate time
- turn the Vicat ring upside dowm
- exchange the needle for start of solidification against needle for end of solidification
- choose program “D”

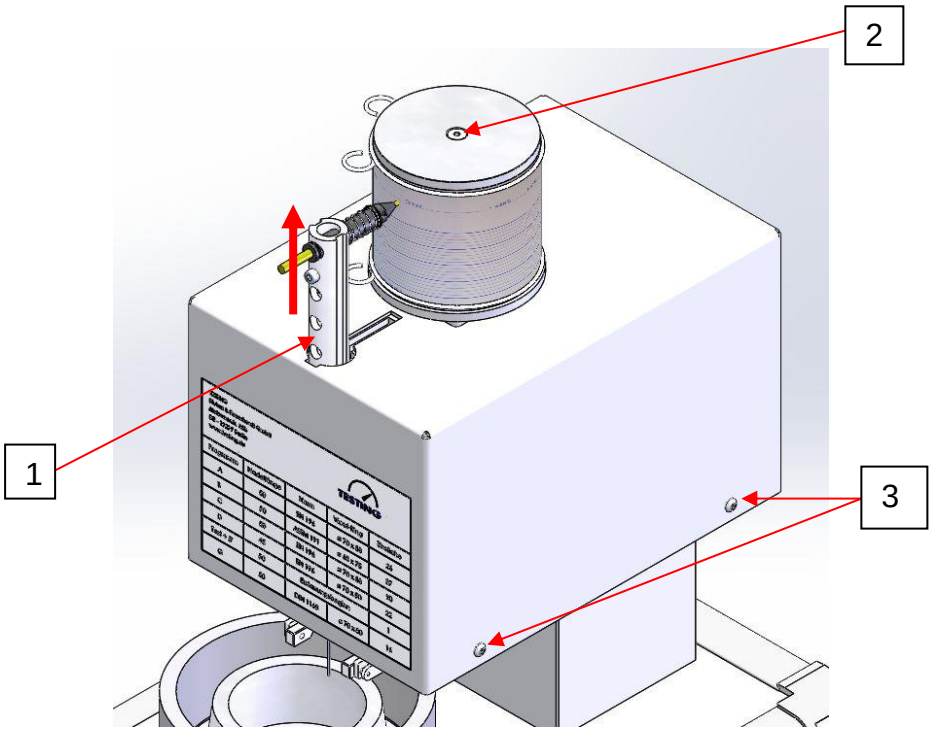
The drop rod will now be brought to a lower postion (according to shorter needle) and released from there (here: zero-line is 20mm lower).
The end of solidification will be determined by the impressions. When there are no circular impressions to be seen any more, the needle penetrates less than 0,5mm.
This means the end of solidification.

3.4 Calibration of the needle

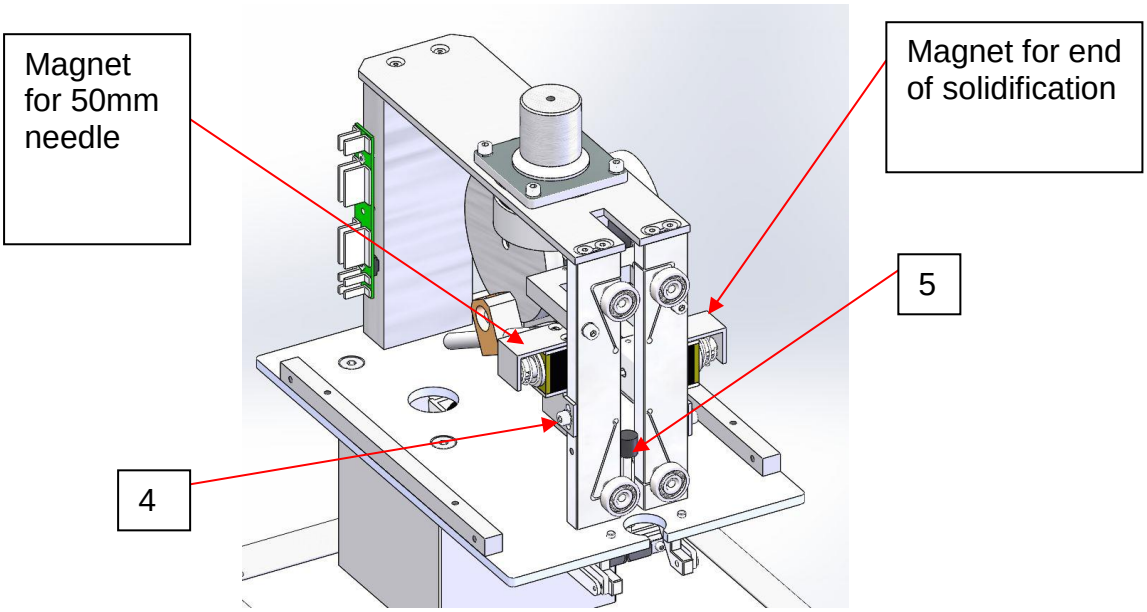
The Automatic Vicat Needle Apparatus is set at the manufacturer's plant in accordance with the heights of the needles as they are delivered. As a result, the User does not need to make any adjustment settings under normal conditions.

If, however, any deviations are discovered and the User must make adjustments to the needle calibration, then he should follow the steps below:

1. Remove the fall rod upward as shown in the drawing below (arrow 1 below).
2. Unscrew the countersunk-head screw on the drum (arrow 2 below).
3. Remove the 4 screws from the side wall of the upper part of the device (arrow 3 below).



4. Set the distance between the needle and the surface of the Vicat ring by using the magnets (see arrow 4 in drawing below).
5. Set the lower distance between the needle and the surface of the glass by using the limit stop (arrow 5 in drawing below).



4. Maintenance and cleaning

Please get directly in contact with the manufacturer in case of any special maintenance work that may become necessary: for example, repairs, exchange of parts, and all other tasks that are not described in this Operating Manual.
The Automatic Vicat Needle Apparatus needs practically no maintenance. After several years of use, we recommend cleaning the system thoroughly and lubricating the moving parts.
It may become necessary after using the Operating Manual for a long period of time, or using it in dirty surroundings, to clean the outside the system. Please proceed as follows:

1. Switch off the main power switch of the system.
2. Unplug the system from the power supply.
3. Use a brush or a vacuum cleaner to remove any dust that may lie loosely on the surface of the device. If necessary, you can clean the outside of the unit with a moist cloth. You can also use normal household cleaning agents if required.

Attention 	Do **NOT** use forced water, rushing water, gushing water, or spray water to clean the Automatic Vicat Needle Apparatus. Also do not use dripping sponges or other unsuitable cleaning agents to clean the system. If water enters the controller unit by using such unsuitable cleaning methods, this will result in permanent damage to the mechanical, electronic, and/or electrical components of the system.
	All maintenance or repair work involving components of the Automatic Vicat Needle Apparatus or its electrical system must be performed by suitably qualified specialists.

For instructions on how to clean all parts of the system related to the testing procedures (for example, the needles, weights, and containers), please consult the descriptions in the applicable standards.

5. Troubleshooting

Attention 	All maintenance, testing procedures, inspection, and maintenance work performed on the system components or the electrical system must be performed by suitably qualified specialists.

TROUBLE	POSSIBLE CAUSES	ACTION TO TAKE
The system will not start.	There is no power supply.	Check the power cable.
	Defective fuse.	Check the fuse on the main power switch.
The red signal lamp is flashing.	The drop rod was not inserted.	Insert a drop rod.
	The photoelectric switches (light barriers) do not detect the initial position.	Check the photoelectric switches (light barriers) in the device. Get in touch with the manufacturer.
The needle distances are not correct.	The setting of the needle height is not correct.	Make the adjustment as described above in the section on Calibration of the Needle.

6. Shutting down the system for longer periods of time

In the event that you intend to shut down the system for a longer period of time, it must be disconnected from the mains power supply. Then perform all required maintenance tasks. Finally, cover up the unit to protect it from dust.

7. Scrapping the system

If the system will no longer be used by anyone, we recommend the following procedure:

- Unplug the power cable from the mains power supply.
- Cover all dangerous parts (for example, sharp or protruding components)
- Take the system apart and scrap it according to the valid legal regulations in your area.

8. After-sales service

Great care was taken to assure that this Operating Manual was properly prepared. We cannot, however, guarantee that it has no mistakes, or that all data are complete and correct in the event of technical modifications.

8.1 Date of this version of the Operating Manual

Version No. 5
March of 2016

8.2 Copyright

The copyright to this Operating Manual is held by:

TESTING Bluhm & Feuerherdt GmbH

This Operating Manual is intended for use only by the User and his/her staff. It contains instructions and data that may NOT be:

- Reproduced,
- Distributed, or
- Provided to any third party.

Any person acting in violation of the above stipulations may be prosecuted before a court of law.

8.3 Spare parts and technical help

If you have any questions of technical nature, or if you need spare parts, please get in touch with the following address:

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Motzener Str. 26b
DE – 12277 Berlin
Germany

Tel. [+ 49 30] 710 96 45-0
Fax [+ 49 30] 7510 96 45-98
www.testing.de
info@testing.de

EC Declaration of Conformity in accordance with the Machinery Directive 2006/42/EC Appendix II 1.A

The authorised representative established in the community,

Mr. Feuerherdt

hereby declares that the following product

Manufacturer:	TESTING Bluhm & Feuerherdt GmbH Motzener Str. 26b 12277 Berlin
Product designation:	Vicat Needle Apparatus
Serial number:	continuous
Serial/Type designation:	1.0306

complies with all of the relevant provisions of the above named guidelines as well as the additional applied guidelines (following) - including any of the amendments thereto which are in force at the time of the declaration.

The following additional EU Directives have been applied:

Low Voltage Directive 2014/35/EC

The following harmonised standards have been applied:

DIN EN 60204-1	The Safety of Machines - Electrical Equipment of Machines - Part 1: General Requirements (corrigendum 2010)
DIN EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction (corrigendum 2013)

The name and address of the person who has been authorised to compile the technical documentation:
Mr. Metge

Location: Berlin
Date: 28/02/2014

(Signature)
Managing Director

(Signature)
Technician