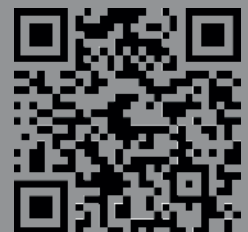


# **Building Materials Testing Systems**



The company „Schleibinger Geräte Teubert u. Greim GmbH“ was founded 1995 by the engineers Markus Greim and Oliver Teubert and communications technician Anton Schleibinger. Our aim is to develop, build and sell innovative testing systems for building materials.

Most of our products are based on patents or licensing agreements with industry partners and universities. Schleibinger Geräte focuses on special products for the building materials market, which are developed and built in our own factory.

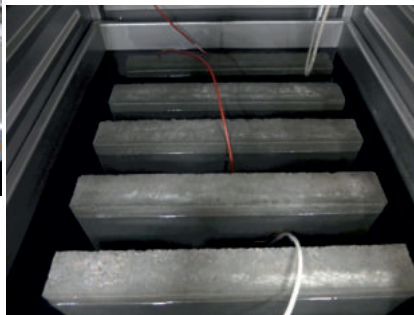
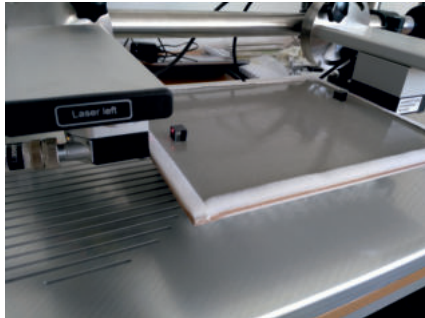
Schleibinger Geräte develops and produces building materials testing systems for testing workability, early strength, shrinkage and durability of paste, mortar, concrete and similar materials.

We are a company that ensures the satisfaction of our customers through high quality and innovative products. An intensive relationship with our customers and the continuous development of our products are the prerequisites for this. As a result of our work, we supply sophisticated measuring instruments that provide optimum performance. This applies to our services and the individual support service.



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- Rheology
- Durability
- Shrinkage
- Setting and Maturity

## AKROMAT

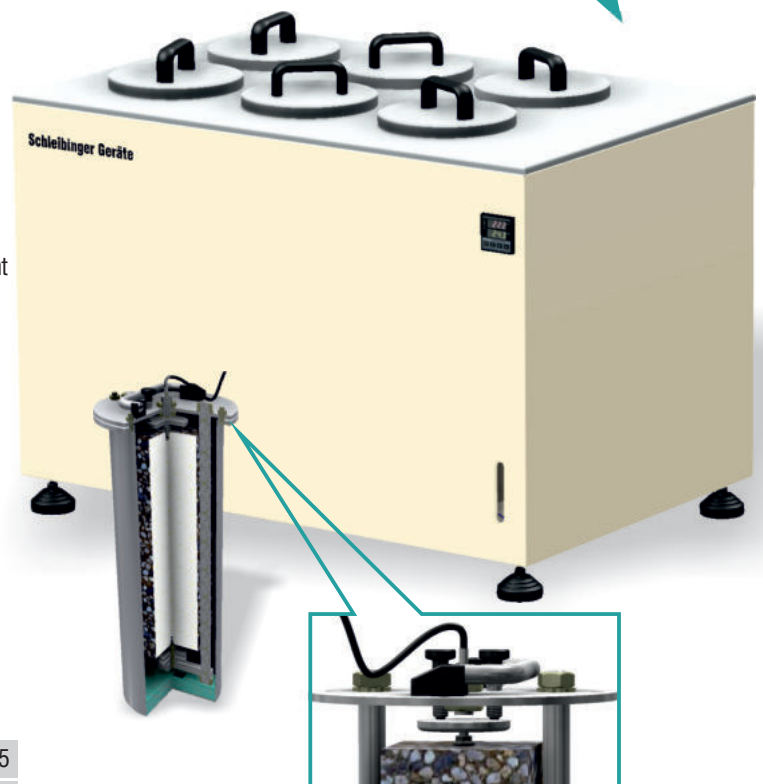
### Alkali Silica Reactor with online monitoring

for testing of the specimen on alkali-silica reactivity.

- ⇒ online measurement - no need to take out the samples anymore
- ⇒ continuous and very accurate measurement of the length change of each specimen with an inductive sensor
- ⇒ continuous measurement and recording of temperature and length change on data logger every minute
- ⇒ storage of the sample separately in a closed sample container
- ⇒ control of the temperature and humidity
- ⇒ no extra power supply required
- ⇒ measuring tolerances due to manual handling are minimized
- ⇒ an alarm is triggered if the maximum expansion of 0.3 mm/m is reached. The measurement can be stopped and a new measurement with new specimens can be started.
- ⇒ Stop or start of each specimen can be done independently

#### Specifications:

- temperature profile freely programmable from room temperature to max. +65 °C
- insulated
- outside dimensions (L x W x H): 85 x 63 x 64 cm
- for max. 6 ASR specimen with the size of 280 x 75 x 75 mm
- measurement range of the sensor: 3mm
- sensor resolution: 1.5 µm
- water content: approx. 9 liters
- power capacity: 340 W at 230 V AC
- weight: approx. 43 kg (empty state)
- power supply: 200...240 V, AC (110 V on request)



AKROMAT - Alkali Silica Reactor	Item No. K005
AKROMAT - sample container	Item No. K006
AKROMAT - sample holder	Item No. K007
AKROMAT - data logger	Item No. K008

## Rheometer Viskomat NT

### rheometer for mortar and paste

Rheological investigations are of fundamental importance for the development, manufacturing and processing of building materials. Viskomat NT is a versatile rotational viscometer and was developed for the measurement of rheological parameters of fine grained building materials such as cement paste, mortar, plaster etc. with a maximum particle size of 2 mm. In addition to determining the setting time of paste or mortar, the influence of various admixtures and additives can be investigated.

- ⇒ measurement profile freely programmable
- ⇒ incl. Ethernet Base100/T interface
- ⇒ no special PC or software is necessary
- ⇒ incl. mortar probe (1) and cement paste probe (2)

#### Specifications:

- velocity controlled: 0.001 ... 400 rpm
- max. motor torque: 1000 Nmm
- measuring torque range: 0 ... 250 Nmm or 0 ... 500 Nmm
- torque resolution: 0.01 Nmm
- sampling rate: 0.005 s ... 60 s
- sample volume: approx. 370 ml
- power supply: 110...240V/ 50...60 Hz
- weight: approx. 42 kg

Rheometer Viskomat NT	Item No. V0001
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#### Shear Stress Controlled Drive for Viskomat NT

for measurement of deformation at given torque.

- torque resolution: 0.1 Nmm
- angle resolution: 0.01 °

Shear Stress Controlled Drive for Viskomat NT	Item No. V0006
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#### Oscillation Mode for Viskomat NT\*

- max. amplitude 3.6°
- max. frequency 10 Hz
- \*only available with the option „Shear Stress Controlled Drive“ (Item No. V0006)

Oscillation Mode for Viskomat NT	Item No. V0030
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#### 1. Mortar Probe for Viskomat NT

for suspensions with the maximum grain size of 2 mm. Made of hardened stainless steel; incl. built-in temperature sensor.

Mortar Probe for Viskomat NT	Item No. V0011
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#### 2. Cement Paste Probe for Viskomat NT

for suspensions with the maximum grain size of 0.18 mm. Made of stainless steel. Incl. built-in temperature sensor.

Cement Probe for Viskomat NT	Item No. V0013
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#### 3. Modified Cement Paste Probe for Viskomat NT

for suspensions with the maximum grain size of 2 mm. Made of stainless steel. Incl. built-in temperature sensor.

Modified Cement Paste Probe for Viskomat NT	Item No. V0003
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#### 4. Sample Container for Temperature Control

double-wall sample container with the connectors to the external temperature control unit.

Sample Container for Temperature Control	Item No. V0009
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#### 5. Plate-Cone Probe for Viskomat NT

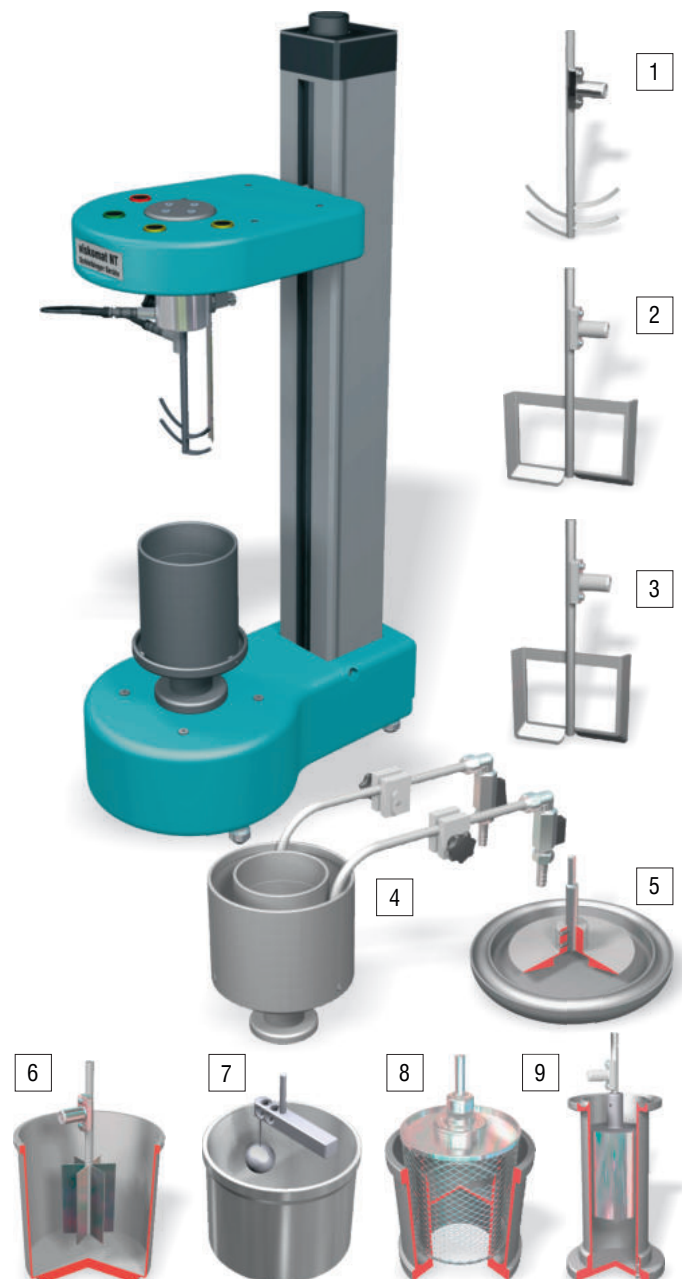
specially developed for glue like specimen with the particle size of 0.5 mm maximum. Fits best for speeds between 0 and 0.5 rpm.

Plate-Cone Probe for Viskomat NT	Item No. V0002
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#### Calibration Oil

470 ml, approx. 12500 mPas at 25 °C

Calibration Oil	Item No. V024
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#### 6. Vane Probe for Viskomat NT

6 wings, diameter 40 mm, height 60 mm, incl. built-in temperature sensor. Optional sample container with inner diameter 100 mm, inner height 110 mm, smooth inner wall structure.

Vane Probe for Viskomat NT	Item No. V0004
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Sample Container for Vane Probe	Item No. V0005
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#### 7. Sphere Probe with Sample Container

incl. 3 spheres with diameters of 30, 20 and 10 mm. Made of stainless steel. Incl. sample container with 140 mm diameter and 110 mm height.

Sphere Probe with Sample Container, Viskomat NT	Item No. V0007
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#### 8. Basket Probe for Viskomat NT

developed by Prof. R. Vogel, Weimar. Double gap system with a braided structure surface. Specially developed for self compacting mortars without segregations during the measurement. Incl. sample container.

Basket Probe for Viskomat NT	Item No. V0014
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#### 9. Cylindrical Measurement System

according to DIN 53019, EN ISO 3219.

Diameter 50 mm, bottom cone formed, specimen volume 127.7 ml, inside height 125 mm; incl. temperature sensor. Made of stainless steel.

Cylindrical Measurement System for Viskomat NT	Item No. V0070
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## Rheometer Viskomat XL

### rheometer for fresh concrete

Based on 20 years of experience with rheometers for mortar and fresh concrete, Schleibinger has developed the Viskomat XL for the measurement of the rheological parameters of building materials such as fresh SCC, or UHPC or similar with the maximum grain size up to 16 mm. In addition to determining the setting time of mortar or concrete, the influence of various admixtures and additives can be investigated.

- ⇒ measurement profile freely programmable
- ⇒ incl. Ethernet Base100/T interface
- ⇒ no special PC or software is necessary
- ⇒ incl. concrete probe (1) and vane probe (5, excl. basket)

#### Specifications:

- velocity controlled: 0.001 ... 80 rpm
- max. torque: 10 Nm
- measuring torque range: 0 ... 3 Nm or 0 ... 10 Nm
- torque resolution: 0.001 Nm
- accuracy: 0.02 Nm
- sampling rate: 0.005 s ... 60 s
- volume of the sample container: approx. 3.0 l
- power supply: 110...240 V/ 50...60 Hz
- total weight: approx. 90 kg

Rheometer Viskomat XL	Item No. VX0001
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#### Shear Stress Controlled Drive for Viskomat XL

for measurement of deformation at given torque.

- torque resolution: 0.001 Nm
- angle resolution: 0.01 °

Shear Stress Controlled Drive for Viskomat XL	Item No. VX0006
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#### Oscillation Mode for Viskomat XL\*

- max. amplitude: 3.6°
- max. frequency: 4 Hz

\*only available with the option „Shear Stress Controlled Drive“ (Item No. VX0006)

Oscillation Mode for Viskomat XL	Item No. VX0030
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#### 1. Concrete Probe for Viskomat XL

for suspensions with the maximum grain size of 8 mm. Incl. built-in temperature sensor. Made of stainless steel.

Concrete Probe for Viskomat XL	Item No. VX0011
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#### 2. Mortar Probe for Viskomat XL

for suspensions with the maximum grain size of 4 mm. Incl. built-in temperature sensor.

Mortar Probe for Viskomat XL	Item No. VX0013
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#### 3. Sphere Probe for Viskomat XL

incl. 3 spheres with diameters of 30 mm, 20 mm and 10 mm. Made of stainless steel.

Sphere Probe for Viskomat XL	Item No. VX0007
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#### 4. Temperature Control for the Sample Container

for temperature control of the sample during the measurement. Incl. connectors to the external temperature control unit (e.g. chiller)

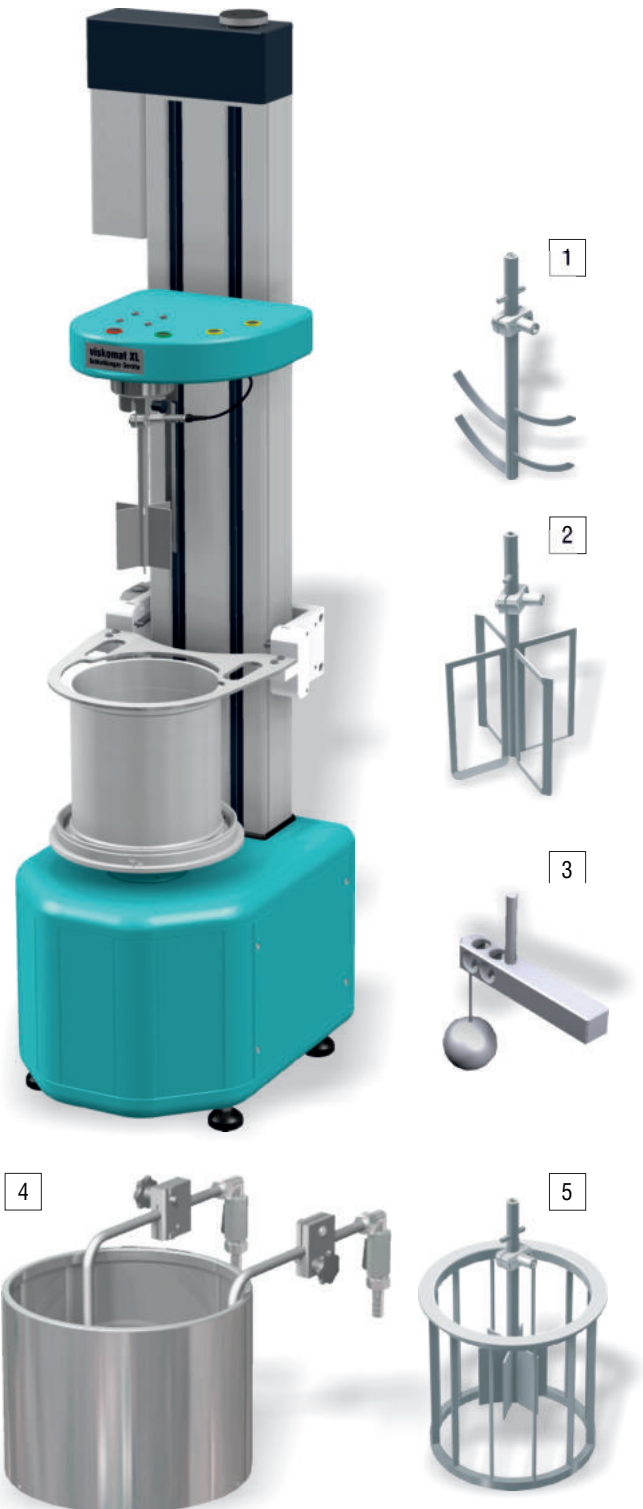
Temperature Control for the Sample Container	Item No. VX0009
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#### 5. Vane Probe and Basket for Viskomat XL

6 wings, diameter 69 mm, height 69 mm, incl. build-in temperature sensor. The basket fits into the standard sample container of Viskomat XL and can be used for preventing of wall sliding of the sample during the measurement. Made of stainless steel.

Vane Probe for Viskomat XL	Item No. VX0004
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Basket for Viskomat XL	Item No. VX0005
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## Chiller

external temperature control unit for Viskomat NT or Viskomat XL

#### Specifications:

- temperature range: 0 ... 65 °C
- cooling capacity at 20 °C: 250 W
- heating capacity: 1 kW
- max. delivery rate of the pump: 18 l/min
- max. delivery height of the pump: 3 m
- dimensions (W x L x H): 28 x 47 x 60 cm
- power supply: 230 V/ 50 Hz
- weight: approx. 25 kg



Chiller	Item No. V0019
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## eBT-V

mobile Rheometer for fresh concrete



specially designed for measurement of fresh concrete in the lab as well as on the construction site. Using the mobile rheometer eBT-V, the flow resistance of fresh concrete is measured, and thus the relative yield stress and relative viscosity are determined. The rheometer can be used in two different modes:

### P mode:

for ordinary vibrated concrete, very stiff concrete as well as for modern flowable concrete. The rheometer rotates on the shaft, which is installed in the center of the sample container. One turn of 360° is enough to measure. Probe (1) or probe (2) can be used. Depending on the maximum particle size used, the required sample volume is 20 liters (optional) or 40 liters (4).

### V mode:

for modern flowable, self-compacting or ultra high strength concrete. From the angular velocity and the measured torque, the relative plastic viscosity and relative yield stress are calculated using the Bingham model. Vane probe (3) is required. The recommended sample amount is approx. 15 liters (5).

- ⇒ robust
- ⇒ measurement profile freely programmable
- ⇒ cable free, battery powered
- ⇒ bluetooth based
- ⇒ portable
- ⇒ operation and analysis on smartphone

### Specifications:

- max. speed: 40 °/sec or 40 rpm
- max. torque: 10 Nm
- sample volume: 15 l or 20 l or 40 l

Delivery incl. measuring device, sample containers 40 l (4) and 15 l (5), shear bodies with a cylinder and spherical shape (1, 2), vane cell with 6 wings (3), device holder with 12 antislip roads, smartphone with charger and operation app installed, user manual.

Mobile Rheometer eBT-V	Item No. B0010
Sample Container for eBT-V P-Mode, 20 liters	Item No. B0003
Trolley for the eBT-V specimen container	Item No. B0020

## SLIPER - Sliding Pipe Rheometer

portable rheometer for testing the pumpability of fresh concrete.

The SLIPER works on the piston principle providing a vertical standing pipe which is filled with fresh concrete. The piston placed vertically and contains a pressure and a distance sensors. While the pipe is sliding downwards, the pressure in the pipe is measured and the speed of the pipe is recorded simultaneously. The measurement data are sent wirelessly to a smartphone and stored there. Following, graphic analysis can be done on the smartphone as well as the forecast for pumping pressure.

The properties of the fresh concrete are evaluated by the software app included. With this software the design and parameters for the pump application may be estimated. Therefore a computational model is used which calculates the expected pressure loss in the concrete pipe.

- ⇒ portable
- ⇒ robust
- ⇒ battery powered
- ⇒ low sample volume of approx. 6 liters
- ⇒ designed for lab and construction site

### Specifications:

- pipe diameter: 125 mm
- filling height: approx. 500 mm
- pressure range: 0 - 1000 mbar
- speed range: 0 - 4 m/s

Delivery incl. measuring device, set of weights, 2x battery packs with charger, smartphone with charger and operation app installed, user manual, transport cases.

Sliper

Item No. B0200



## Alkali-Silica-Reactor

for testing of the specimen on alkali-silica reactivity

- NF P18-454 (Décembre 2004): Béton - Réactivité d'une formule de béton vis-à-vis de l'alkali-réaction - Essai de performance
- RILEM test method TC 101-ARP AAR-4 -Detection of Potential Alkali-Reactivity - Accelerated method for testing aggregate combinations using concrete prisms.
- ASTM C1293: Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction.

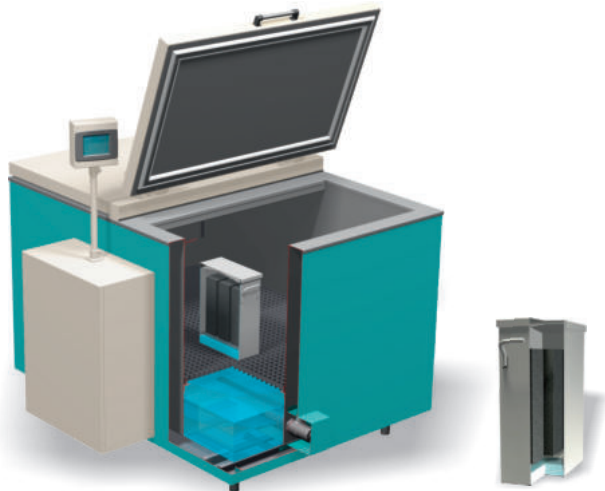
- ⇒ color touch screen
- ⇒ integrated data logger with Ethernet BaseT/100 interface
- ⇒ temperature freely programmable
- ⇒ insulated
- ⇒ for max. 24 ASR specimen containers

### Specifications:

- temperature range: room temperature to max. +65 °C
- heating power: 2 x 6 kW
- inside dimensions (L x W x H): 150 x 109 x 67 cm
- outside dimensions (L x W x H): 185 x 158 x 122 cm
- interior made of stainless steel
- water content: approx. 280 liters
- insulation: rigid foam, 50 mm
- 2 lids with torque compensated hinges, insulated, with lid sealant
- removable grating for max. 600 kg of load
- power supply: 3x230/400 V, 3x32 A, 50 Hz (others on request)

Alkali-Silica-Reactor

Item No. K001



### ASR Fog-System

fog-generating system for the Alkali Silica Reactor. Recommended for tests at 38 °C or 40 °C.

- ⇒ incl. high pressure pump
- ⇒ special nozzles for droplets size: < 30 micron
- ⇒ spraying profile freely programmable

ASR Fog-System

Item No. K003

### ASR Specimen Container

for 3x specimen with a size of 75 x 75 x 280 mm.

- ⇒ incl. lid with drip-down tin
- ⇒ incl. removable grating for specimen at the level of 50mm
- ⇒ incl. specimen spacers at 260 mm height

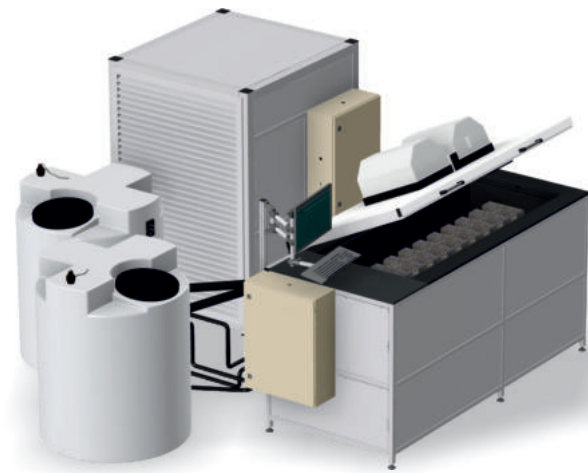
- inner size (L x W x H): 280 x 130 x 400 mm
- made of 1.5 mm thick stainless steel, complete welded, pickled and passivated
- weight: approx. 6.5 kg
- A maximum of 24 containers fit into the ASR reactor.

ASR Specimen Container

Item No. K002

## Salt-Water-Freeze-Thaw System

for testing of the freeze-thaw resistance of samples when stored alternatively in water and saline



### SWF Test Equipment

according to EN 13687-1 "Products and systems for the protection and repair of concrete structures - Test methods - Determination of thermal compatibility- Part 1: Freeze-thaw cycling with de-icing salt immersion". The test chamber can be automatically flooded with tempered water or salt solution with a concentration of up to 30 %.

Optionally, the air of the test chamber can also be tempered and thus storage of the samples in the air and e.g. thawing under water will be possible. As a result, many different freeze-thaw test methods can be realized from the freely selectable temperatures for the liquid and for the atmosphere within the test chamber:

- EN 13687-3: Products and systems for the protection and repair of concrete structures - Test methods; Determination of thermal compatibility - Part 3: Thermal cycling without de-icing salt impact;
- CEN/TS 12390-9: Testing hardened concrete. Freeze-thaw resistance with de-icing salts (except CF/CDF procedure) and the following standards:
- CEN/TS 772-22:2006-09, CEN/TR 15177:2006-06, ASTM C666-03 (procedure B), ASTM C672/C672M-12, ASTM C1262-10, DIN 52104, EN 4226, EN 13581, EN 1338, EN 1339, EN 1340, EN 12004-2:2017-05, EN 1367-1, EN 1367-6, EN 13383-2, EN 12371, EN 12091, EN 12467, EN 14891, ONR 23303:2010, SIA 262/1:2013-08, SN 505262-1, ISO/DIS 13007-2.2.

- ⇒ automatic flood and change of water and saline solution
- ⇒ no movement of the samples necessary
- ⇒ corrosion-free design
- ⇒ temperature profile freely programmable
- ⇒ continuous temperature recording
- ⇒ incl. Ethernet BaseT/100, RJ45
- ⇒ control of the system via smartphone or tablet or WEB browser
- ⇒ 90 degrees opening of the lid

### Specifications:

- chamber size (l x w x h): 850 x 2000 x 500 mm
- max. total weight of the specimen: 500 kg
- **container A** for saline solution: isolated, 1000 l volume,
  - temperature range -15 °C ... +5 °C
- **container B** for water: isolated, 1000 l volume,
  - temperature range +5 °C ... +60 °C
- size of the equipment (w x d x h): 3.8 x 3.4 x 2 m
- installation space needed (w x d x h): 5 x 5 x 2.5 m (approx. 10 m<sup>2</sup> depending on arrangement of single parts)
- power supply: 2x (3x 32 A / 400 V)

SWF Test Equipment

Item No. SF001

Option Air Temperature Control

Item No. SF002



## CDF Test Equipment freeze-thaw test equipment

for testing the freeze-thaw resistance of building materials. The tests can be carried out in accordance with CDF/CIF Test RILEM, CEN/TS 12390-9, Cube (VDZ) Test, ASTM C666 (Procedure A) and the following procedures:

- CDF RILEM TC 117 FDC
- CIF RILEM TC 176 IDC
- CF/CDF Test according to CEN/TS -12390-9
- CEN/TR 15177 2006-06: Testing the freeze-thaw resistance of concrete. Internal structural damage
- EN 13581: Product and systems for the protection and repair of concrete structures - Test method - Determination of loss of mass of hydrophobic impregnated concrete after freeze-thaw salt stress.
- ONR 23303: XF1 Freeze-Thaw Resistance

- ⇒ temperature profile freely programmable
- ⇒ incl. data logger with network interface

### Specifications:

- temperature range: -20° ... +20°C
- environmental conditions (without water cooling): 5 - 28°C, rel. humidity < 65%.
- max. waste heat approx. 3 kW/h
- dimensions (L x W x H): 225 x 95 x 105 cm
- interior dimensions (L x W x H): 170 x 54 x 20 cm
- space requirement: 350 x 145 cm
- required fuse: 3 x 32 A ore 3 x 25 A (B)
- power supply: 230/400V , 50 Hz (others on request)
- weight: approx. 560 kg

CDF Test Equipment	Item No. C0001
Option Air and Watercooling	Item No. C0005
Option ASTM and Cube (VDZ) Test	Item No. C0124

### 1. Sample container for CDF test

for specimen up to 150 x 150 mm	Item No. GN-B 1/2
for specimen up to 150 x 110 mm	Item No. GN-B 1/3

### 2. Sample container for ASTM C666 part A

dimensions (l x w x h): 320 x 105 x 105 mm. made of stainless steel. The unit can fit a maximum of 20 containers.

Container for ASTM	Item No. C0665B
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### 3. Sample container for Cube test

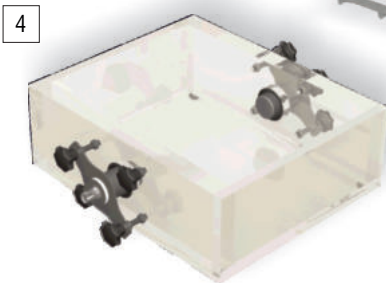
for two 100 mm cubes, incl. lid and spacers. Made of stainless steel with 2 mm thickness. The unit can fit a maximum of 15 containers.

VDZ Test Container	Item No. C0114
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### 4. CIF test container

for ultrasonic transit time measurement according to RILEM TC 176. Made of PMMA; incl. holders for transducers.

Ultrasonic Test Container	Item No. C0026
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## Vikasonic

for measuring of ultrasound run time and early setting behaviours of mortar and paste.

- ⇒ easy operation with one button
- ⇒ calculation of speed of sound and Young ´s modulus according to Rayleighs law
- ⇒ different excitation voltages adjustable
- ⇒ USB port for data recording as text files directly on an included USB storage device.
- ⇒ Ultrasonic measurement range: 2  $\mu$ s - 24000  $\mu$ s
- ⇒ battery (3 AA) or mains powered (110..240V/50..60Hz)
- ⇒ dimensions test cell:  $\varnothing$  110 mm x 175 mm
- ⇒ sample volume: approx. 177 ml

Vikasonic incl. test cell	Item No. U0001
Vikasonic incl. transducers, 80 kHz	Item No. U0002
Vikasonic measurement unit only	Item No. U0003





## Slab Test Equipment

freezing chamber (Slabtester) with temperature and time controlled refrigerating and heating system. For freezing and thawing of the specimens according to:

- EN 1338: Testing of concrete paving blocks
- EN 1339: Concrete paving flags. Requirements and test methods.
- EN 1340: Concrete kerb units. Requirements and test methods.
- CEN/TS 12390-9: Testing hardened concrete. Freeze-thaw resistance with de-icing salts (slab test).
- ONR 23303: XF2, XF4 Freeze-Thaw Resistance.

- ⇒ inner and outer surface made of stainless steel.
- ⇒ 3 fans for air circulation in the freezer
- ⇒ temperature profiles are freely programmable
- ⇒ color touch screen display
- ⇒ built-in data logger with Ethernet 100Base/T interface
- ⇒ incl. 4 grids

### Specifications:

- minimum temperature: -35°C
- maximum temperature: +45°C
- refrigerant: R290 (Propane)
- dimensions (W x L x H): 70 x 83 x 212 cm
- interior dimensions (W x L x H): 53 x 65 x 155 cm
- grid size (W x L): 53 x 65 cm
- maximal load per grid: 60 kg
- power supply: 110 V / 60 Hz or 230 V / 50 Hz, or 240V / 60 Hz, other voltages on request
- weight: approx. 150 kg

Slab Test Equipment	Item No. C0103
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## Freeze-Thaw Test with Flooding

additional feature for testing of natural stones, aggregates, tile glue and other building materials according to the following standards:

- EN 1367-1: Tests for thermal and weathering properties of aggregates. Determination of resistance to freezing and thawing.
- EN 1367-6: Tests for thermal and weathering properties of aggregates. Determination of resistance to freezing and thawing in the presence of salt (NaCl).
- EN 12004-2: Adhesives for tiles. Determination of tensile adhesion strength for cementitious adhesives.
- EN 12091:2013 Thermal insulating products for building applications. Determination of freeze-thaw resistance.
- EN 12371: Natural stone test methods. Determination of frost resistance.
- EN 13383-2: Armourstone Part 2: Test Methods

- ⇒ removable test container made of stainless steel for placing into the Slabtester
- ⇒ outer water tank with pump and heating unit
- ⇒ flooding and emptying are freely programmable

### Specifications:

- inner tank (W x L x H): 50 x 60 x 48 cm
- sample capacity: max. 40 samples with the size of 50 x 50 x 300 mm
- volume of the outer water tank: 150 liters

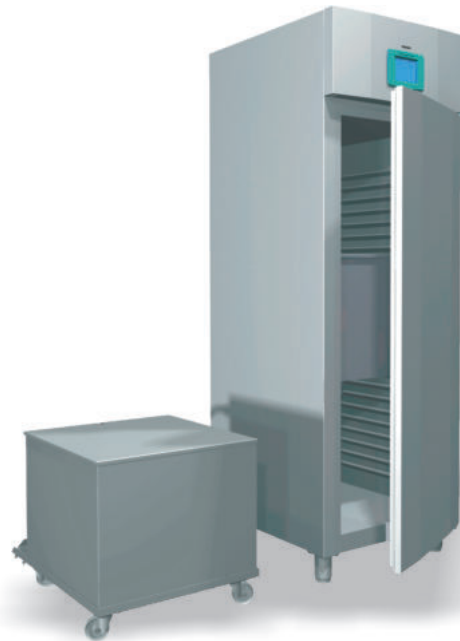
Option Freeze-Thaw Test with Flooding	Item No. C0108
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## Freeze-Thaw Test with Flooding and Water Circulation

for testing of building materials according to CEN/TR 15177 part 7: Testing the freeze-thaw resistance of concrete. Internal structural damage.

Similar to option „Freeze-Thaw Test with Flooding“ for natural stones, aggregates and tile glue. In addition, water is constantly circulated and tempered in the outer tank during thawing. Circulation time and duration are freely programmable.

Option Freeze-Thaw Test with Flooding and water circulation	Item No. C0108-S
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## Freeze-Thaw Test with Spraying\*

for testing of building materials according to CEN/TS 772-22: Methods of test for masonry units. Determination of freeze/thaw resistance of clay masonry units.

- ⇒ automatic spraying equipment
- ⇒ spraying freely programmable
- ⇒ for maximum sample size of 58 x 58 cm

\*only available with the option „Freeze-Thaw Test with Flooding“ (Item No. C0108).

Option Spraying	Item No. C01085
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## Soil Freeze-Thaw Chamber

for measuring the load-bearing capacity of soils used for building roads, unimproved airstrips or for soils under paved airstrips under freeze-thaw conditions.

CBR (California Bearing Ratio) equipment according to SN 670321a.

- ⇒ incl. data logger for recording the measured data and control of the chillers
- ⇒ incl. Ethernet 100Base/T interface
- ⇒ LVDT sensor.

### Specifications:

- accuracy: < 3 micron
- total weight: approx. 150 kg
- space requirement: 120 x 100 cm

For operation of the Soil Freeze-Thaw Chamber 2 chillers are required:

- temperature range: -20 ... +100 °C
- cooling capacity at -10 °C: 250 W

Soil Freeze-Thaw Chamber	Item No. B0100
Chiller for Soil Freeze-Thaw Chamber	Item No. B0019

## 1. Shrinkage Drain

for continuous measuring of shrinkage behaviours of building materials as described in:

- ÖNORM B 3329: Grout - Requirements and test methods.

### Specifications:

- robust
- different sizes available
- incl. 1 gauging sensor with measurement range of 5mm
- resolution:  $< 2 \mu\text{m}$

Data logger is required (Item No. S0001).

Shrinkage Drain for Concrete, 1000 x 100 x 60 mm	Item No. S0033
Shrinkage Drain for Concrete, 500 x 100 x 60 mm	Item No. S0036
Shrinkage Drain for Mortar, 1000 x 60 x 40 mm	Item No. S0103
Shrinkage Drain for Mortar, 500 x 60 x 40 mm	Item No. S0104
Shrinkage Drain for Mortar, 250 x 60 x 40 mm	Item No. S0144



2



## 2. Data logger

for recording the measurement data from the Schleibinger Shrinkage Drain.

Up to 10 shrinkage drains can be connected to the data logger. The measurement values are digitised and stored by the data logger. In addition, the data of the temperature and rel. humidity sensors can be recorded simultaneously.

- connection for up to 10 shrinkage drains
- incl. Ethernet Base100/T interface
- dimensions: 24 x 21 x 6 cm
- weight: approx. 1.8 kg.
- power supply: 110...240 V/ 50...60 Hz

Data Logger for Shrinkage Drain	Item No. S0001
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### Temperature Measurement

additional temperature measurement channel for measuring of the specimen temperature with a thermocouple type K.

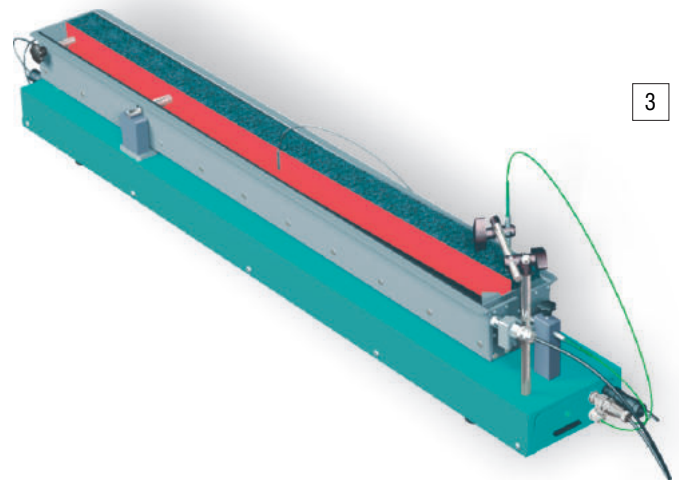
Channel for the Thermocouple	Item No. S0027
Thermocouple type K, 1m	Item No. S0028

### Combined Temperature and Humidity Channel

for measurement of the environmental conditions incl. sensor.

- humidity sensor: 0 ... 100%  $\pm 1.8$  % r. H., not condensing
- temperature accuracy:  $\pm 0.5$  °C

Combined Temperature/Humidity Channel	Item No. S0016
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## 3. Bending Drain

### Curling profile apparatus

for measuring of curling and shrinkage behaviours of building materials according to:

EN 13892-9: Methods of test for screed materials. Dimensional stability.

- ⇒ robust
- ⇒ incl. built-in data logger with Ethernet Base100/T interface
- ⇒ USB connector type A
- ⇒ heating system for simulation of the floor heating up to +70 °C.
- ⇒ heating profile freely programmable
- ⇒ temperature measurement of the sample
- ⇒ combined temperature/humidity sensor for the environment

### Specifications:

- specimen size: 1000 x 100 x 50 mm
- dimensions (L x W x H): 128 x 17 x 29 cm
- sensors: 2x gauging sensors
- measurement range: 5 mm
- resolution:  $< 2 \mu\text{m}$
- power supply: 110...240 V/50...60 Hz
- weight: approx. 35 kg

Delivery incl. measuring device, data logger, thermocouple type K for temperature recording of the sample, combined temperature and humidity sensor for the recording of ambient conditions, neoprene foil for sample preparation, user manual.

Bending Drain	Item No. S0018
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## 1. Shrinkage Cone

for measuring of shrinkage or expansion behaviour of flowable building materials in the first minutes and hours after mixing.

The sample container is a special cone shaped sample container. Due to the direct mathematical correlation of the volume change with the height change, the conical container can be used for direct shrinkage determination. In addition, the sample container can be connected to a temperature control unit and thereby the temperature of the sample during the measurement can be adjusted. The measurement data is digitized and continuously recorded by the data logger supplied with the system.

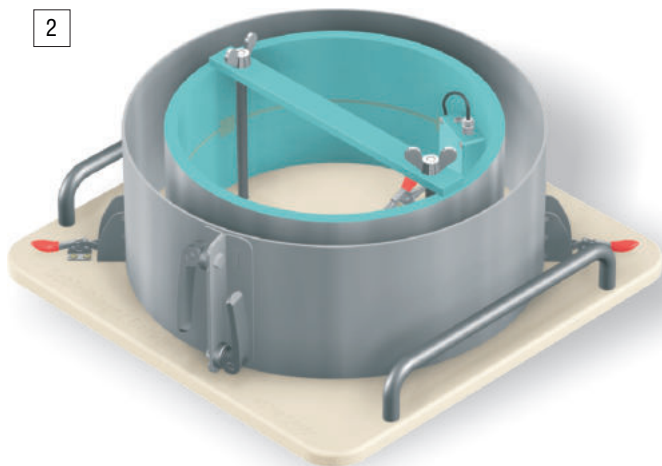
- ⇒ contactless measurement with a laser
- ⇒ incl. Ethernet Base100/T interface
- ⇒ operation over web browser
- ⇒ sample volumen: approx. 350 ml for mortar or approx. 680 ml for concrete

### Specifications:

- measuring range: 10 mm; resolution: < 2 µm
- light source: semiconductor laser <1 mW, 670 nm, class 2 IEC 60825-1:2015-07
- power supply: 110...240 V/ 50...60 Hz

Shrinkage Cone	Item No. S0050
Sample Container for concrete, 680 ml	Item No. S0051
Sample Container for mortar, 350 ml	Item No. S0052

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## 2. Shrinkage Ring

### Ring for Restrained Shrinkage ASTM C1581

for determination of age at cracking and induced tensile stress characteristics of mortar and concrete under restrained shrinkage according to ASTM C1581.

In addition, the temperature of the sample can be measured simultaneously with the thermocouple type K. For the recording the measurement data a data logger is required (Item No. S0003). Up to 5 Shrinkage Rings can be connected to one data logger.

### Specifications:

- inner steel ring Ø 330 x 13 x 150 mm, tolerances: ASME B 46.1
- outer ring: stainless steel Ø 405 mm
- incl. 4 strain gauges and strain gauge amplifier
- base plate: made of PP
- sample volume: approx. 6.6 l
- weight: approx. 25 kg

Shrinkage Ring ASTM C1581	Item No. S00031
Data Logger for Shrinkage Ring	Item No. S0003

1



3



## 3. Thin Layer Shrinkage System

for the measurement of the shrinkage and expansion behaviour of building materials applied in thin layers in the first minutes and hours after mixing. Simultaneously measurement of the temperature and humidity from the environment and the temperature of the sample as well as the measurement of the weight loss of the sample during the measurement are possible. The measurement data is digitized and continuously recorded by the data logger supplied with the system.

- ⇒ contactless measurement with 2 laser sensors
- ⇒ horizontal and vertical measurement possible by turning the laser sensors
- ⇒ incl. Ethernet Base100/T interface
- ⇒ operation over web browser

### Specifications:

- measuring range of the laser: 10 mm; resolution: < 2 µm
- light source: semiconductor laser <1 mW, 670 nm, class 2 IEC 60825-1:2015-07
- distance between the laser sensors, horizontal arrangement: up to 35 cm
- distance of the laser sensors to the base plate, vertical arrangement: up to 25 cm
- dimensions (L x W x H): approx. 85 x 45 x 55 cm
- power supply: 110...240 V/ 50...60 Hz
- weight: approx. 30 kg

Thin Layer Shrinkage System, TLSS	Item No. S0060
Reflector for TLSS, T-Shape, extra lightweight	Item No. S0055-T



**Made in Germany**

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