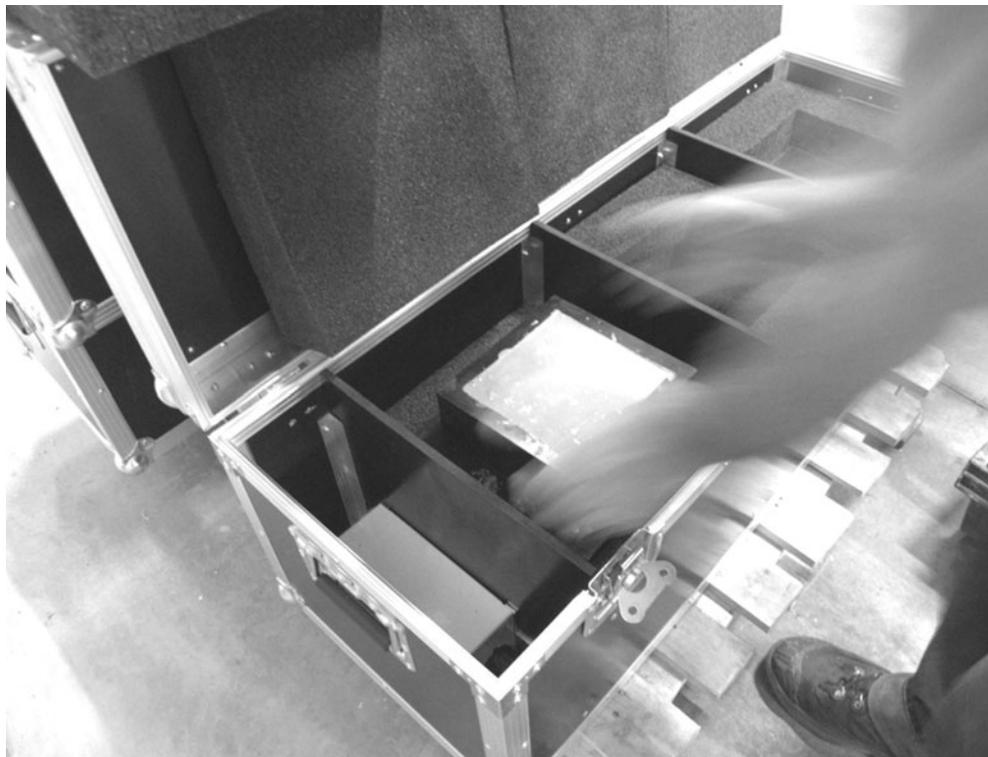


The Formwork Experts.

Concremote calibration box

User Information

Instructions for assembly and use (Method statement)



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General

Introduction

- This manual describes the calibration box, its function and intended use.
- This manual is aimed at all persons who will be working with the Doka product or system that it describes. It contains information on the standard design for setting up this system, and on correct, compliant utilisation of the system.
- All persons working with the product described herein must be familiar with the contents of this manual and with all the safety instructions it contains.
- Persons who are incapable of reading and understanding this booklet, or who can do so only with difficulty, must be instructed and trained by the customer.
- The customer is to ensure that the information materials provided by Doka (e.g. User Information booklets, Instructions for Assembly and Use, Operating Instruction manuals, plans etc.) are available to all users, and that they have been made aware of them and have easy access to them at the usage location.

Transporting, stacking and storing

- Observe all regulations applying to the handling of formwork and scaffolding. In addition, the Doka slinging means must be used - this is a mandatory requirement.
- Remove any loose parts or fix them in place so that they cannot be dislodged or fall free!
- All components must be stored safely, following all the special Doka instructions given in the relevant sections of this manual!

Maintenance

- Only original Doka components may be used as spare parts. Repairs may only be carried out by the manufacturer or authorised facilities.

Disposal

- The calibration box includes a storage battery that has to be disposed of separately.

Shipment

- The storage battery included with the calibration box is a lithium-ion polymer battery < 100 kW. This must be clearly indicated (e.g. 'Lithium-ion batteries, not restricted, class 9') when shipping the product (particularly when shipped by air).

Symbols used

The following symbols are used in this booklet:



Important note

Failure to observe this may lead to malfunction or damage.



CAUTION / WARNING / DANGER

Failure to observe this may lead to material damage, and to injury to health which may range up to the severe or even life-threatening.



Instruction

This symbol indicates that actions need to be taken by the user.



Sight-check

Indicates that you need to do a sight-check to make sure that necessary actions have been carried out.



Tip

Points out useful practical tips.



Reference

Refers to other documents and materials.

Manufacturer

- B | A | S Remote Sensing B.V.
- We reserve the right to make alterations in the interests of technical progress.

Safety

Suitability of operators

Filling the calibration box and producing the test cubes should be carried out by trained persons.

Only the trained staff of a concrete laboratory may perform the calibration tests.

The current User Information booklets are the basis for operating the product. Users are obliged to comply with all instructions and provisions set out therein.

Use for the designated purpose only

The calibration box must only be used for its intended purpose, as part of the Concremote service. The manufacturer accepts no liability whatsoever if the product is used other than for its intended purpose.

Manufacturer's liability

The manufacturer will only be liable for personal and material damage that has been caused by specially trained staff while using the product in accordance with its intended purpose, this User Information booklet and the relevant safety instructions, and provided that all safety devices have been fully operational!

Protection against hazards

Charging the calibration box

In case of danger, switch off the battery charger by unplugging it from the socket.



System description

Concrete monitoring: how it works, how it is used

Measuring concrete strength in real time.

Concremote is a service for performing non-destructive real-time measurement of concrete strengths in structure members (floor-slabs, walls, beams, ...) on the site.

This service comprises two parts:

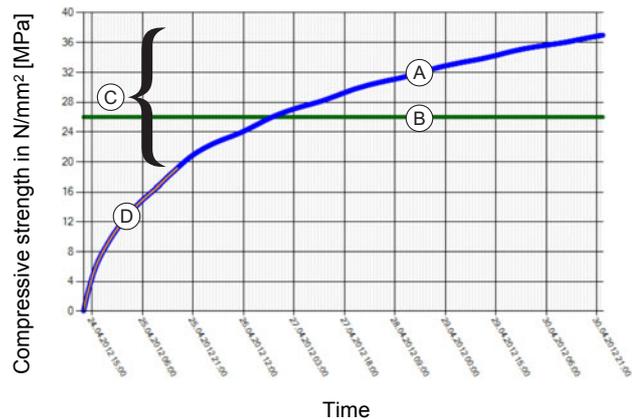
- measuring-sensors
- data management and processing



The **sensors** placed on the structure member continuously measure the heat development of the concrete, which is mainly influenced by the hydration heat of the cement and by ambient temperatures. The more intense the heat development, the faster the strength development of the concrete.

The **measured data** (temperature measurements) from the structure member are transmitted to the computing centre via the mobile communications network as data packets. At the computing centre, they are automatically evaluated by the maturity monitoring method, using calibration measurement.

A separate calibration measurement is needed for each different grade of concrete to be measured at the site. This calibration measurement must be performed either by the clients themselves, by the concrete supplier or by an appointed test laboratory – ideally, using the calibration box. For this purpose, six cubes are stored under defined partially adiabatic conditions. The cubes are tested at different times, depending on the target value (in N/mm^2 / MPa, for stripping, curing, etc.). Each of these tests yields a compressive strength value, and the temperature value associated with it. From this calibration measurement, the relationship can be computed between the strength and the maturity of the grade of concrete concerned.



- A** Compressive strength development
- B** Target value line
- C** Calibrated range
- D** Non-calibrated range (orange)

The Concremote software continuously provides these data and strengths to its users, enabling them to live monitor the strength development in a specific structure member.

As soon as the target value (in N/mm^2 / MPa) is reached, the next steps (stripping, pre-stressing, etc.) can be taken.

Basic drawings of product



Easy calibration of concrete

- Measuring device and cube mould included
- Use of standard cubes sized 15x15x15 cm
- 2 boxes (6 concrete cubes) are needed for calibration
- For multiple use, with no 'lost' parts



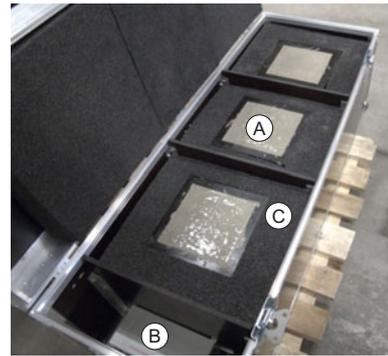
Important note:

- Max. battery life before recharging: 4 weeks
- Requires continuous network connectivity

Technical data

Designation	Concremote calibration box
Article number	583049000
Storage temperature	Store at a constant temperature between 0 and 30°C.
Dimensions	1040 mm (length)
	375 mm (width)
	375 mm (height)

Components



A Cube mould sized 15x15x15 cm (3 moulds)

B Measuring device and storage battery (1 sensor)

C Insulation (lids, middle parts and bottom covers, 3 each)

Use

General

Each different concrete mixture needs to be calibrated with the calibration box in order to be able to calculate its strength development, based on the temperature data measured by the sensors.

The strength values computed by Concremote are based on calibration curves that are generated either before or while using the system for the first time.

Calibration is required for each concrete mixture, or grade of concrete, to be measured with the sensors. 2 calibration boxes are necessary for testing a concrete mixture!

Calibration boxes can be used repeatedly.

If Concremote is used for measuring several different concrete mixtures, each one of these requires calibration.

Calibration is recommended to be made prior to first using the sensors. This will ensure that the measured results can be read and used from the very beginning.

The net weight of the calibration box is 22.50 kg. Whether empty or full, the box should always be carried by 2 persons.

Preparation

Before using the calibration box, specify the number of calibrations and the test laboratory with your Doka contact person.

Some basic concrete data and the target value (the required strength) need to be known for working out a calibration test procedure.

The **necessary concrete data** are the following:

- Concrete ID number
- Order number
- Product code
- Concrete manufacturer
- Supplier's plant (address, phone number etc.)
- Quantities [kg/m³]
- Concrete strength class (e.g. C20/25)
- Strength development (fast, medium etc.)
- Exposure class (e.g. XC0)
- Cement type (e.g. CEM I)
- w/b ratio, w/c ratio (e.g. 0.5)
- Max. particle size (e.g. max. particle size 32 / grading curve 22)
- Consistence class (e.g. F3, F45)
- Additives

The target value is to be determined by the construction firm in consultation with the structural designer. For assistance, please refer to the 'Concremote' User Information booklet.

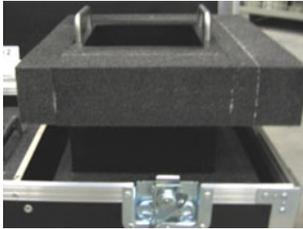
Never separate a fully charged calibration box **from the power supply for more than 4 weeks**. Otherwise data transmission cannot be guaranteed.



You can make a function test using the power adapter supplied with the box. The green light on the power adapter indicates that the box is fully charged.

Filling the calibration box

- ▶ Store the calibration box safely and close to its filling location.
- ▶ Switch on the calibration box (switch to I).
- ▶ Filling can be done either on the site or in the concrete mixing plant, depending on the project.
- ▶ Take the plastic cube moulds out of the calibration box before filling them.



- ▶ If necessary, apply a small amount of release agent to the cube moulds.
- ▶ Cover the opening (for blowing out the samples) at the bottom of each cube mould with the enclosed paper.
- ▶ Fill each cube mould and compact the concrete with a vibrating table, in the way standard test cubes are made.



Important note:

- ▶ Only use properly mixed concrete and never initial quantities mixed in the concrete mixer!
- ▶ Immediately after compacting, place the cube moulds back into the calibration box, properly insert the insulation and close the calibration box.

Transporting and storing the calibration box with filled cube moulds

The filled calibration boxes must be transported to the test laboratory either within 2 hours, or after between 18 and 24 hours, to ensure that the hardening process is not affected.

The total weight exceeds 35 kg. The box must therefore always be carried by two persons.

Make sure that the calibration box is charged.

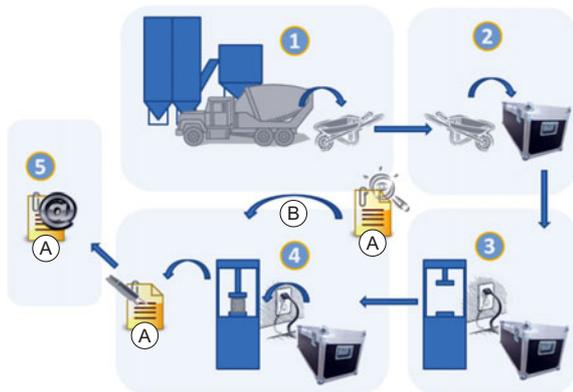
The calibration box requires a GSM network for transmitting data. Therefore, store the box in a place where GSM connectivity is available.



You can check via the software or a mobile communications device, whether the signal is strong enough.

Making calibration measurements

- Take the concrete to be tested out of the mixer.
- Fill the cube moulds and compact the concrete according to the Standard.
 - DIN EN 12390-2:2009-08: Testing hardened concrete, part 2: Making and curing specimens for strength tests
 - ONR 23303
ICS 91.100.30
Test methods for concrete ('PVB'),
National application of testing standards for concrete and its source materials
- Transport the filled calibration boxes to the concrete laboratory.
- Once there, connect the calibration boxes to the power supply.
- Next, the concrete laboratory technician will contact the support team. A separate test protocol will be completed for each calibration.
- Test the cubes according to the test protocol (see the section 'Calibration test protocol (sample)'). Remove the specimens from the box in the order laid down in the test protocol. Blow them out of their moulds with compressed air and pressure test the samples with an approved pressure testing device. Write down the date, exact time and the measurement result of the pressure test (in kN).
- Send the test protocol to support@concremote.com.



A Test protocol

B Tested on: Thu, Fri, Mon etc.

As an alternative, and after consultation with the support team, calibration can also be performed in a water bath. In this case, cable sensors and measuring cables are necessary for each single calibration measurement.

Cleaning and maintenance

After each calibration, clean the cube moulds and calibration boxes dry.



Do not use a water hose or high-pressure cleaner to clean the calibration boxes!

Should any additional maintenance be necessary, please contact your Doka contact person.

Malfunctions

If the calibration box is stored outside the GSM network, no data transmission will be possible.

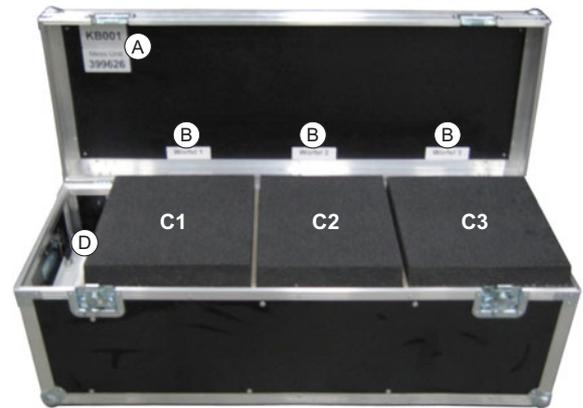
The calibration box is equipped with a storage battery. If the storage battery is not connected to the power supply too long, no data will be recorded.

Should any other malfunction occur, please contact the support team or your Doka contact person.

Calibration test protocol (sample)

Contact details for questions and data transfer:

Landline: +31 77 850 7220
 E-mail: support@concremote.com
 Fax: +31 77 850 7223



- A Serial number of the calibration box
- B Test cube number
- C Test cube
- D Calibration box On/Off

Test data

Building site	Concrete designation	ID number	Delivery note number

	Calibration box 1 (B1)	Calibration box 2 (B2)	Calibration box 3 (B3)	Date of concrete placing
Serial number:				DD-MM-YYYY

Calibration box	Test cube	Tested by	Test date / time	Compressive strength [kN]	Predicted strength [kN]
B1	C1		DD-MM-YYYY / hh:mm	xx	xx
	C2		DD-MM-YYYY / hh:mm	xx	xx
	C3		DD-MM-YYYY / hh:mm	xx	xx
B2	C1		DD-MM-YYYY / hh:mm	xx	xx
	C2		DD-MM-YYYY / hh:mm	xx	xx
	C3		DD-MM-YYYY / hh:mm	xx	xx
B3	C1		DD-MM-YYYY / hh:mm	xx	xx
	C2		DD-MM-YYYY / hh:mm	xx	xx
	C3		DD-MM-YYYY / hh:mm	xx	xx

If the actual values obtained from the tests differ from the predicted values by more than 5 kN, please contact the support team.

Near to you, worldwide

Doka is one of the world leaders in developing, manufacturing and distributing formwork technology for use in all fields of the construction sector.

With more than 160 sales and logistics facilities in over 70 countries, the Doka Group has a highly efficient distribution network which ensures that equipment and

technical support are provided swiftly and professionally.

An enterprise forming part of the Umdasch Group, the Doka Group employs a worldwide workforce of more than 5600.

