حكومة دبي
GOVERNMENT OF DUBAI

بلدية دبي
DUBAI MUNICIPALITY

CERTIFICATE OF TECHNICAL APPROVAL

Dubai Central Laboratory Department (DCLD) of Dubai Municipality,
hereby award this certificate to :

DOKA GULF FZE

For the product(s)

CONCREMOTE

(As per the attached details)

Manufactured by :
DOKA INDUSTRIES GmbH
at Factory of
BAS Research &Technology –Venlo, the Netherlands

ENGR. AMIN AHMMED MOHAMMAD
Director, Dubai Central Laboratory Department
Dubai Municipality

TA Certificate No.: 157
Valid Until : 13-11-2017

DCL
TECHNICAL APPROVAL
TAC -157
Concremote Sensor

Current Issue Date: 14-11-2016
Original Issue Date:14-11-2016

The above product(s) have been assessed and found fit for their intended use, provided they are used according to the supplier instructions.

The attached details bearing the same Certificate No. forms an integral part of this certificate.
This certificate is subject to the Terms and Conditions of the technical approval system

F-RS-007

Report on **VERIFICATION AND DEMONSTRATION** as part of TA 157-2016 Concremote – Concrete Maturity device used for determining early age concrete strength using weighted maturity method.

Date: July 26-2016

This report summarizes results for step 3 of TAR 157-2016 for Concremote. Concremote is a concrete maturity device used for determining early age concrete strength using weighted maturity method.

Background

The weighted maturity method uses the fundamental concept that concrete properties develop with time as the cement hydrates and releases heat. The maturity method is a technique to account for the combined effects of time and temperature on the compressive strength development of concrete. No matter how the maturity is reached; fast or slow, gradual or accelerated: equal maturity means equal compressive strength.

Concremote sensors measure concrete temperature and elapsed time (cumulative hours passed) of concrete hydration. To establish a direct relationship between compressive strength and the corresponding maturity a correlation curve is used. The correlation curve is an empirical relationship found when concrete of known maturity is laboratory tested for strength. This leads to a set of data points that correlate maturity to compressive strength. In step 2 of the TAR the production of the correlation curves used in verification and demonstration of Concremote have been inspected and evaluated.

Approval requirement

Concremote shall be verified and evaluated based on demonstration castings using 4 unique mix-designs.

The mix-designs selected for the verification and evaluation are:

A. C40/20 with high GGBS no Microsilica
B. C45/20 with low GGBS and 20 kg Microsilica
C. C40/20 with low GGBS no Microsilica
D. C45/20 with high GGBS and 20 kg Microsilica

For each of these unique mix-designs a unique correlation curve is produced according Concremote calibration process and installed in the Concremote web portal.

For the verification and demonstration Concremote sensors will be applied on fresh concrete on 4 castings. Simultaneously 4 test cubes per casting will be produced for which 2 cubes are cured outdoor next to concrete structure and 2 cubes are cured in water tank of on-site laboratory. The test cubes will also be connected to Concremote sensors to measure the actual compressive strength gain and corresponding maturity of the test cubes. This allows comparison of Concremote compressive strength gain measurements with laboratory tested compressive strength results for the test cubes at identical time and under identical curing/hardening conditions. This makes also transparent the differences in maturity (curing/hardening conditions) between IN-SITU (IN-PLACE) concrete and test cubes.

The test cubes will be laboratory tested for compressive strength within 5 hours before or after the IN-SITU (IN-PLACE) Concremote sensors have reached their predefined compressive strength target value. The testing laboratory will be identical to test laboratory contracted for construction site.

The compressive strength test results of the cubes as reported by the laboratory will be compared to compressive strength results of test cubes measured by Concremote. Concremote measurement results on compressive strength calculations include a safety margin as defined in applicable standard EN-NEN-5970. As a consequence the compressive strength result of the cubes as calculated and published in Concremote web portal is intended to be lower than actual laboratory compressive strength test result.

<u>Method statement demonstration castings</u>

1. The defined job-site where demonstration castings took place is THE HILLS in Dubai. Main Contractor is CCC; Project manager is William Parker.
2. During July 17 to July 24 a total of 4 castings took place where Concremote sensors were installed and activated:
    a. 2 castings for slab floors using Concremote slab sensors
        i. Casting (1) using mix-design C45 with low GGBS content and MS (OPC+36% GGBS+20 kg MS)
        ii. Casting (2) using mix-design C45 with high GGBS content and MS (OPC+68% GGBS+20 kg MS)
    b. 2 castings on vertical structures using Concremote formwork Wall panel sensor plus Concremote cable sensor
        i. Casting (3) using mix-design C40/20 with low GGBS (OPC+36% GGBS) and no microsilica
        ii. Casting (4) using mix-design C40 with high GGBS (OPC+66% GGBS) and no microsilica

3. For all 4 castings concrete ready-mix was supplied by Ready Mix Beton (RMB) batching plant in Dubai. RMB holds a certificate of conformity from DCL and is registered with Dubai Municipality.
4. For all 4 RMB mix-designs, calibration according to Concremote calibration process had been conducted and correlation curves were available.
5. Casting took place after job-site had fulfilled pre-conditions set by Dubai legislation, permit specifications and consultant approval.
6. The cable sensor was placed by positioning the temperature probes on the rebar via tie-wraps prior to casting
7. The formwork Wall panel sensor was placed in the formwork panel prior to casting
8. After casting and surface operations the slab sensors were placed on top of the fresh concrete
9. All sensors were activated after casting had been completed
10. During casting Concremote concrete technologist has produced 4 test cubes placed under 2 predefined curing regimes:
    a. 2 cubes were placed in outdoor conditions next to concrete structure
    b. 2 cubes were placed directly in the water tank of the laboratory container available on the job-site at controlled temperature of 20°C - 23°C
11. Minimum of 1 test cube per curing regime was connected to a separate Concremote sensor. This sensor did measure the compressive strength and maturity gain of the test cubes.
12. Based on the Concremote IN-PLACE strength gain results the test cubes were transported to testing laboratory contracted for construction project.
13. When Concremote IN-PLACE sensors compressive strength result achieved target value of 28 N/mm^2 to 38 N/mm^2 (in case of slabs) and 25 N/mm^2 to 35 N/mm^2 (in case of vertical elements), test cubes from both curing regimes (outdoor and water tank) were tested for compressive strength at the test laboratory
14. All test cubes were audited for weight, dimensions and quality according to applicable standard for the project. Cubes that did not fulfill standard were not tested
15. The compressive strength results for each test cube was registered including, ID of test cube, date & time of test, weight, dimensions, density kg/m^3 ,quality of breakage, max load kN and stress N/mm^2. In addition the maturity per test cube was registered per curing regime.

Results

All 4 castings and corresponding measurements have taken place. The detailed measurement results per casting are shown in Appendix 1.

A summary of the measurement results is visualized in following 4 tables:

mix Code	Mix-design	Structure	Sensor type	Measurement start IN-PLACE	End Measurement target value IN-PLACE	Time elapsed HRS:MIN	Lab testing
A	C40/20 high GGBS no MS	Column	Cable + Wall	July 17 - 23:58	July 19 - 21:00	45:02	July 19 - 15:10
B	C45/20 low GGBS 20 kg MS	Slab	Slab sensor	July 19 - 22:37	July 20 - 17:20	18:43	July 20 - 16:10
C	C40/20 low GGBS no MS	Column	Cable + Wall	July 17 - 23:46	July 19 - 08:20	32:34	July 19 - 05:10
D	C45/20 high GGBS 20 kg MS	Slab	Slab sensor	July 23 - 10:00	July 24 - 10:30	24:30	July 24 - 11:40

mix Code	Mix-design		IN-PLACE Concremote N/mm^2	IN-PLACE Concremote Maturity	Outdoor Concremote N/mm^2	Outdoor Concremote Maturity	Outdoor lab N/mm^2	Watertank Concremote N/mm^2	Watertank Concremote Maturity	Watertank lab N/mm^2
A	C40/20 high GGBS no MS	1	29.1	3035	27.5	2700	30.5	14.3	1180	16.5
		2	28.8	3000	27.5	2700	32.0	14.6	1180	17.0
B	C45/20 low GGBS 20 kg MS	1	30.7	1090	29.2	1015	32.0	9.2	560	12.0
		2	30.9	1115	29.0	1015	31.5	9.5	560	12.5
C	C40/20 low GGBS no MS	1	27.8	1980	25.7	1760	32.0	12.0	900	16.0
		2	27.8	1980	25.4	1760	30.5	11.7	900	16.0
D	C45/20 high GGBS 20 kg MS	1	33.5	1830	26.1	1570	30.0	3.2	680	6.5
		2	37.1	2120	26.4	1570	30.5	3.2	680	6.5

mix Code	Mix-design	Sensor Type	Start Measurement Celsius	Minimum Temperature Celsius	Maximum Temperature Celsius	Average Temperature Celsius
A	C40/20 high GGBS no MS	Cable sensor	30.1	30.1	54.3	46.9
		Wall Panel sensor	30.6	30.6	49.1	41.5
B	C45/20 low GGBS 20 kg MS	Slab sensor	30.6	30.6	54.5	44.3
C	C40/20 low GGBS no MS	Cable sensor	30.4	30.4	56.7	49.6
		Wall Panel sensor	32.1	32.1	51.4	43.0
D	C45/20 high GGBS 20 kg MS	Slab sensor	30.3	30.3	57.5	43.0

Overall we can draw following main conclusions from the measurement results:

- The IN-PLACE maturity gain in all measurements is higher than maturity gain of Outdoor test cubes or Water tank test cubes. This underpins the thesis that IN-PLACE hardening conditions are more in favor for faster compressive strength buildup compared to test specimens. This learning is common in all countries in the world where maturity method is applied.
- The compressive strength calculated by Concremote for the test cubes is in all 4 castings lower than laboratory tested compressive strength results for test cubes. This is the consequence of the safety factor which is included in applicable standard EN-NEN-5970 weighted maturity method and is therefore a desired consequence.
- The Water tank test cubes have significant slower compressive strength buildup compared to IN-PLACE and to Outdoor test cubes. This is a logical consequence of cooling concrete down to 20 Celsius and in addition the GGBS will further slowdown at hardening temperatures below 25 Celsius. The Water tank cubes harden under ideal (laboratory conditions) and will result in highest compressive strength possible however at a much lower pace of hardening compared to IN-PLACE strength gain performance.
- The Outdoor test cubes run significant risk of dehydration and reduction of final strength. In 3 from 4 castings the Outdoor cubes reach maximum temperature of 50 Celsius and above. Although from concrete technology standpoint this is acceptable for IN-PLACE concrete (large structure/volume) it is very questionable how this influences the strength gain in cubes with 150x150x150 dimensions. It is therefore not recommended to use Outdoor cubes under Dubai climatological conditions as a reliable method to define early age compressive strength gain in concrete structures.
- The IN-PLACE compressive strength results for all 4 castings is significantly faster than assumed by supervision consultant. For the slab floors Post Tensioning needs to take place. Utilizing the IN-PLACE measurement results on strength gain allows for time accurate PT operations.
- Concremote measurement results provide more detailed insight on hardening conditions (temperature concrete during placing, temperature curing profile, maximum temperature, influence of weather conditions and altitudes (high rise and civils work below ground level) and is real-time accessible for all stakeholders in construction process. The traditional test cube strength result report does not reflect the condition under which strength gain took place, nor does is refer to hardening condition of the concrete structure itself.

- The castings of 4 unique mix-designs, all utilizing green concrete alternative binder to OPC, demonstrate the importance of the C-Value per binder type in the weighted maturity method. The high GGBS mix-designs require more maturity per 1 N/mm^2 than lower GGBS mix-designs.

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Managing Director

Bastiaan Bos
Concremote Product Manager

The Formwork Experts.

Doka Concremote

Measurement results VERIFICATION AND DEMONSTRATION as part of TA 157-2016 Concremote – July 2016

Appendix 1

Results Summary Verification & Demonstration

4 measurements; IN-PLACE – OUTDOOR cubes – WATERTANK cubes

mix Code	Mix-design	Structure	Sensor type	Measurement start IN-PLACE	End Measurement target value IN-PLACE	Time elapsed HRS:MIN	Lab testing
A	C40/20 high GGBS no MS	Column	Cable + Wall	July 17 - 23:58	July 19 - 21:00	45:02	July 19 - 15:10
B	C45/20 low GGBS 20 kg MS	Slab	Slab sensor	July 19 - 22:37	July 20 - 17:20	18:43	July 20 - 16:10
C	C40/20 low GGBS no MS	Column	Cable + Wall	July 17 - 23:46	July 19 - 08:20	32:34	July 19 - 05:10
D	C45/20 high GGBS 20 kg MS	Slab	Slab sensor	July 23 - 10:00	July 24 - 10:30	24:30	July 24 - 11:40

mix Code	Mix-design		IN-PLACE Concremote N/mm²	IN-PLACE Concremote Maturity	Outdoor Concremote N/mm²	Outdoor Concremote Maturity	Outdoor lab N/mm²	Water tank Concremote N/mm²	Water tank Concremote Maturity	Watertank lab N/mm²
A	C40/20 high GGBS no MS	1	29.1	3035	27.5	2700	30.5	14.3	1180	16.5
		2	28.8	3000	27.5	2700	32.0	14.6	1180	17.0
B	C45/20 low GGBS 20 kg MS	1	30.7	1090	29.2	1015	32.0	9.2	560	12.0
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		2	27.8	1980	25.4	1760	30.5	11.7	900	16.0
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		2	37.1	2120	26.4	1570	30.5	3.2	680	6.5

Results Summary Verification & Demonstration

4 measurements; IN-PLACE – OUTDOOR cubes – WATERTANK cubes

mix Code	Mix-design	Sensor Type	Start Measurement Celsius	Minimum Temperature Celsius	Maximum Temperature Celsius	Average Temperature Celsius
A	C40/20 high GGBS no MS	Cable sensor	30.1	30.1	54.3	46.9
		Wall Panel sensor	30.6	30.6	49.1	41.5
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C	C40/20 low GGBS no MS	Cable sensor	30.4	30.4	56.7	49.6
		Wall Panel sensor	32.1	32.1	51.4	43.0
D	C45/20 high GGBS 20 kg MS	Slab sensor	30.3	30.3	57.5	43.0

Mix-design A. C40/20, high GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns
View Sensors
- 639388 - Cable Sensor
- 648181 - Cable Sensor
- 648181 - Wall Panel
- 396259 - Wall Panel

Measurements outside area correlation curve

concrete properties:
DMBD C40/20 (65%GGBS) 0.40 final version

Description:
DMBD C40/20 (65%GGBS) 0.40 final version

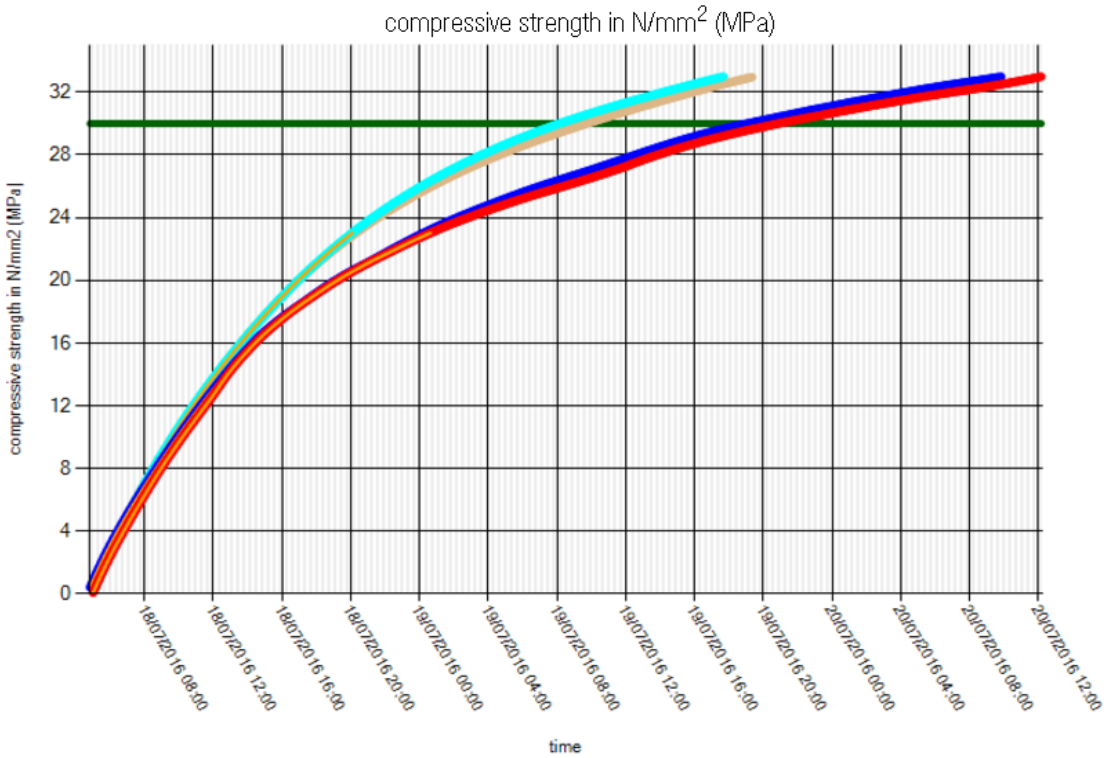
Description:
DMBD C40/20 (65%GGBS) 0.40 Calibration boxes - final version

C-value:	1,50
a constant:	1.00
standard deviation:	1.94 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
18-07-2016 - Column C40/20 - High GGBS
Time period:
from: 7/18/2016 00:14
to: 7/21/2016 00:14
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement
Strength gain

Mix-design A. C40/20, high GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns
View Sensors

- 639388 - Ambient temperature
- 639388 - Cable Sensor
- 648181 - Cable Sensor
- 648181 - Wall Panel
- 396259 - Ambient Temperature
- 396259 - Wall Panel

concrete properties:
DMBD C40/20 (65%GGBS) 0.40 final version

Description:
DMBD C40/20 (65%GGBS) 0.40 final version

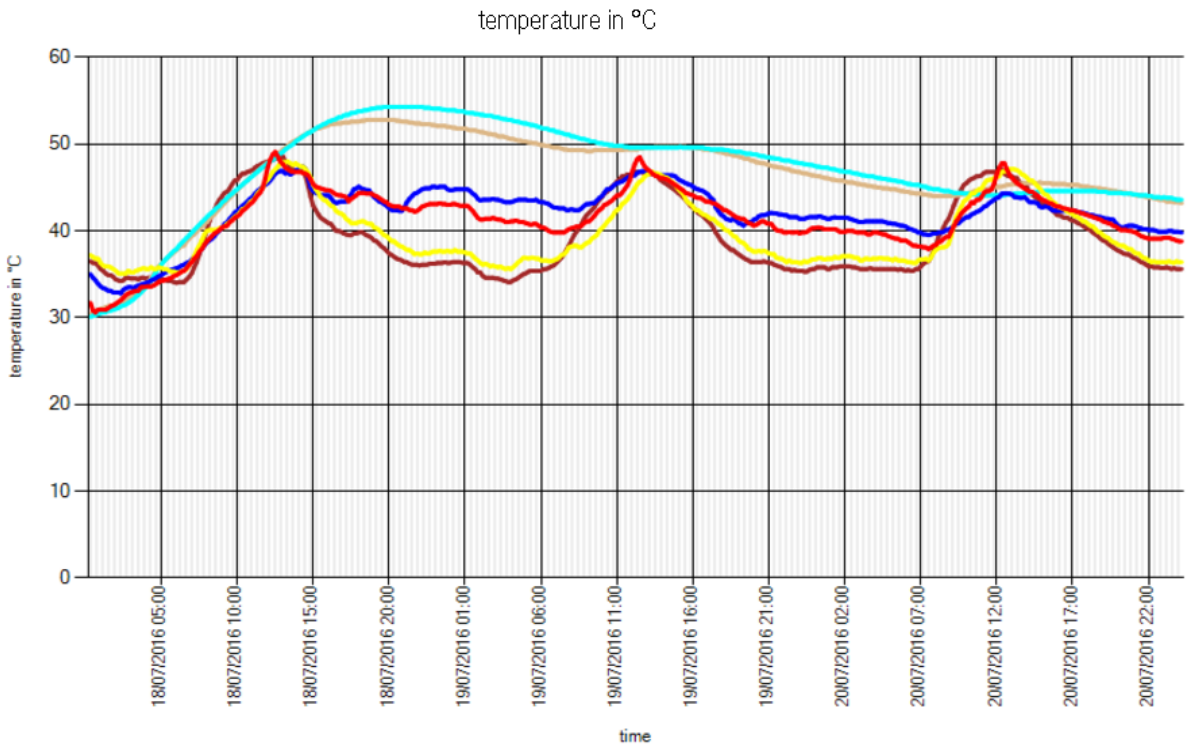
Description:
DMBD C40/20 (65%GGBS) 0.40 Calibration boxes - final version

C-value:	1,50
a constant:	1.00
standard deviation:	1.94 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
18-07-2016 - Column C40/20 - High GGBS
Time period:
from: 7/18/2016 00:14
to: 7/21/2016 00:14
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement Temperature evolution

Mix-design A. C40/20, high GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns
View Sensors
- 639388 - Cable Sensor
- 648181 - Cable Sensor
- 648181 - Wall Panel
- 396259 - Wall Panel

concrete properties:
DMBD C40/20 (65%GGBS) 0.40 final version

Description:
DMBD C40/20 (65%GGBS) 0.40 final version

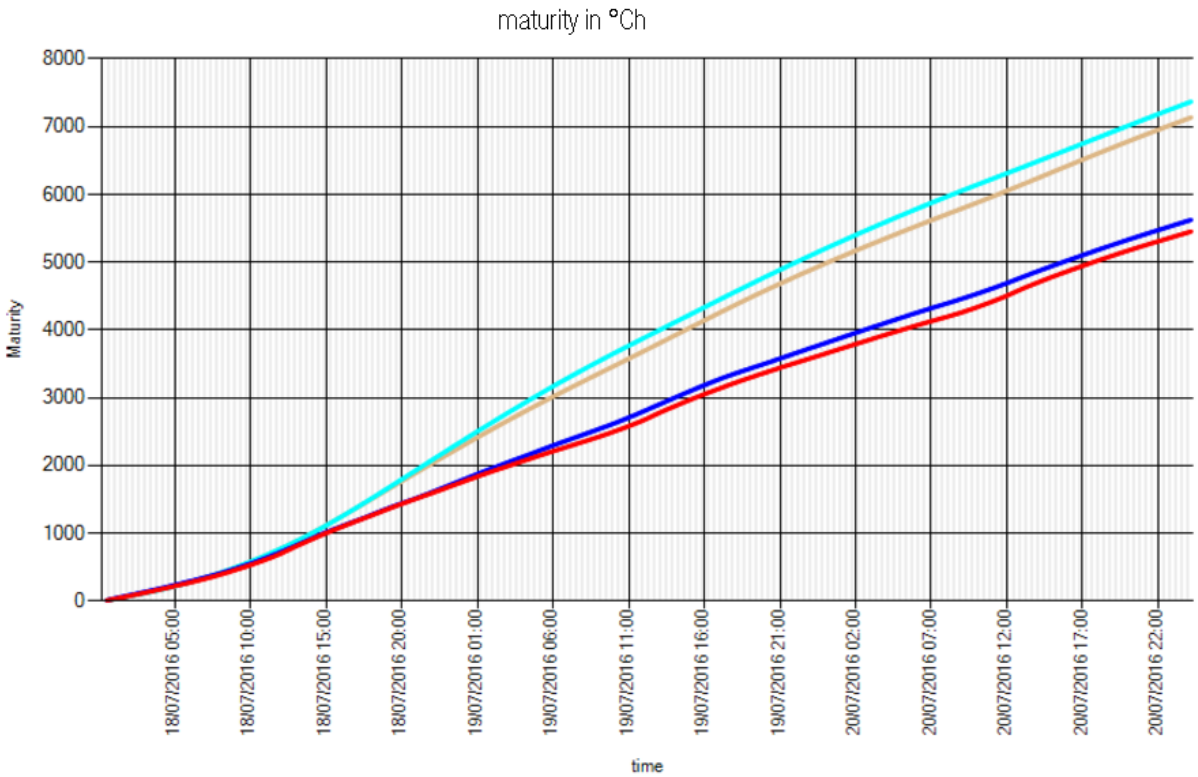
Description:
DMBD C40/20 (65%GGBS) 0.40 Calibration boxes - final version

C-value:	1,50
a constant:	1.00
standard deviation:	1.94 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
18-07-2016 - Column C40/20 - High GGBS
Time period:
from: 7/18/2016 00:14
to: 7/21/2016 00:14
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement
Maturity gain

Mix-design A. C40/20, high GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View	Sensors
☑	651060 - O2
☑	651060 - O3

Measurements outside area correlation curve

concrete properties:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

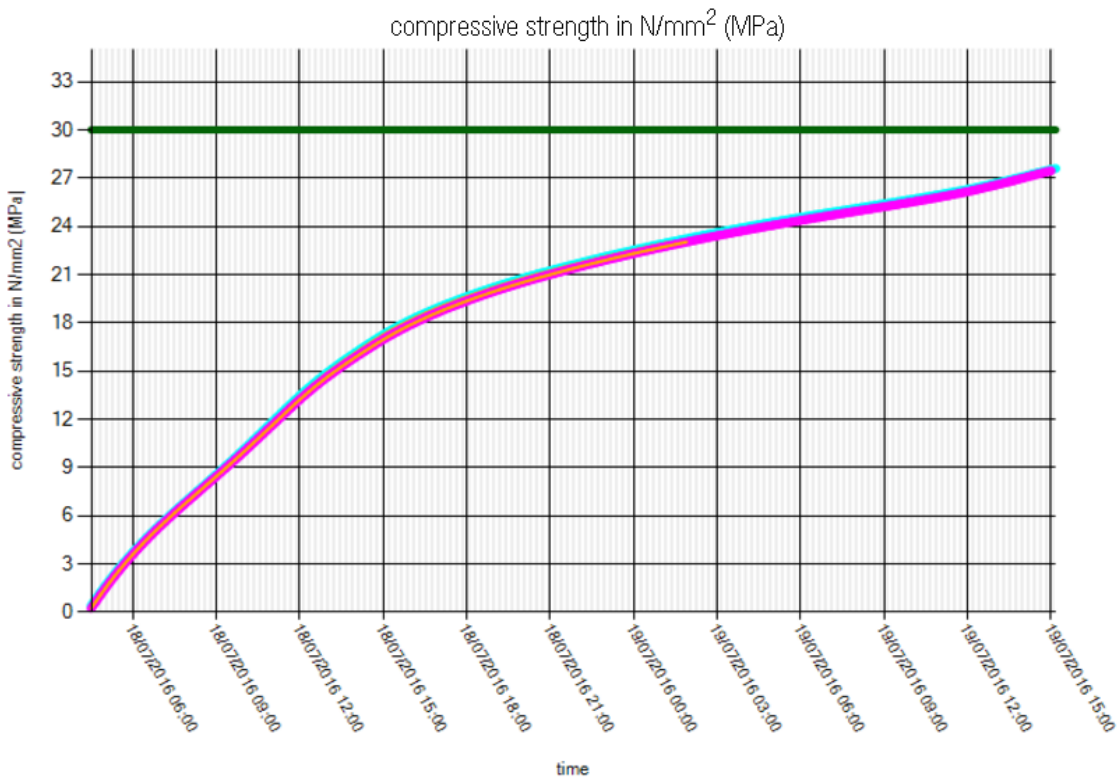
DMBD C40/20 (65%GGBS) 0.40 Calibration boxes final version 1.50

C-value:	1.50
a constant:	1.00
standard deviation:	1.94 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Outside Cubes C40/20 - High GGBS
Time period:
from: 7/17/2016 23:36
to: 7/19/2016 15:10
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement
Strength gain

Mix-design A. C40/20, high GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View	Sensors
☑	651060 - O2
☑	651060 - O3

concrete properties:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

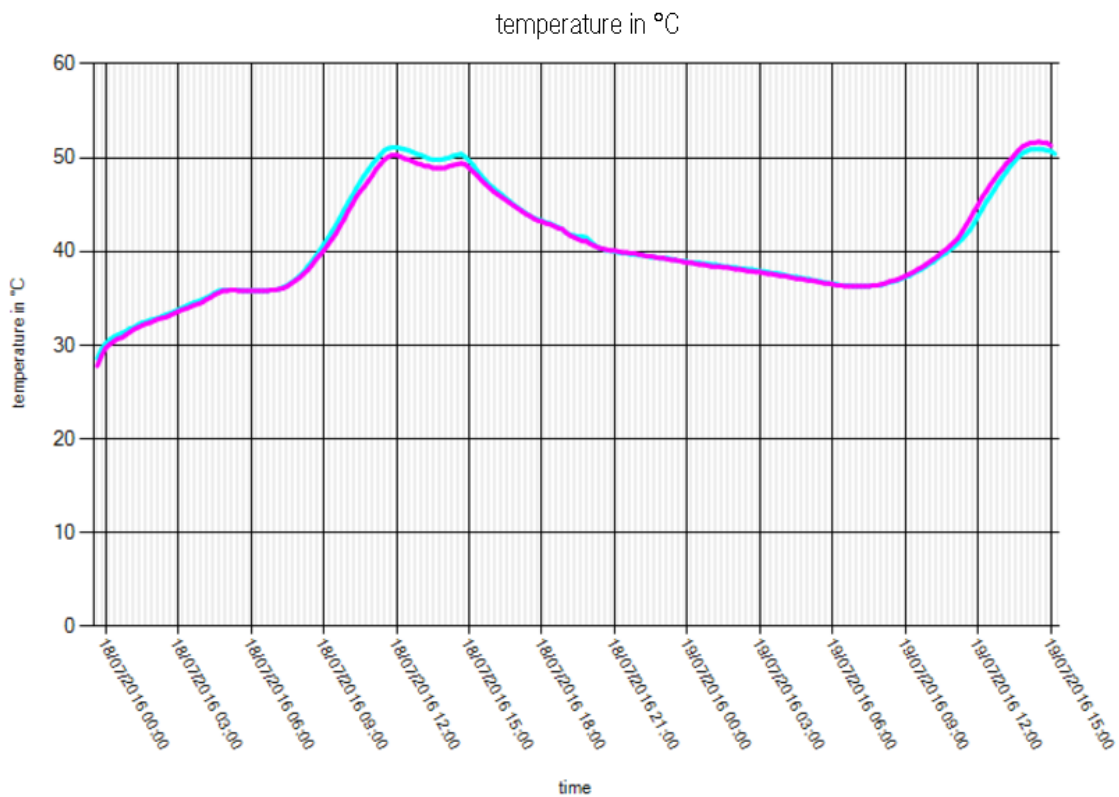
DMBD C40/20 (65%GGBS) 0.40 Calibration boxes final version 1.50

C-value:	1.50
a constant:	1.00
standard deviation:	1.94 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Outside Cubes C40/20 - High GGB
Time period:
from: 7/17/2016 23:36
to: 7/19/2016 15:10
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement Temperature evolution

Mix-design A. C40/20, high GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View	Sensors
☑	651060 - O2
☑	651060 - O3

concrete properties:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

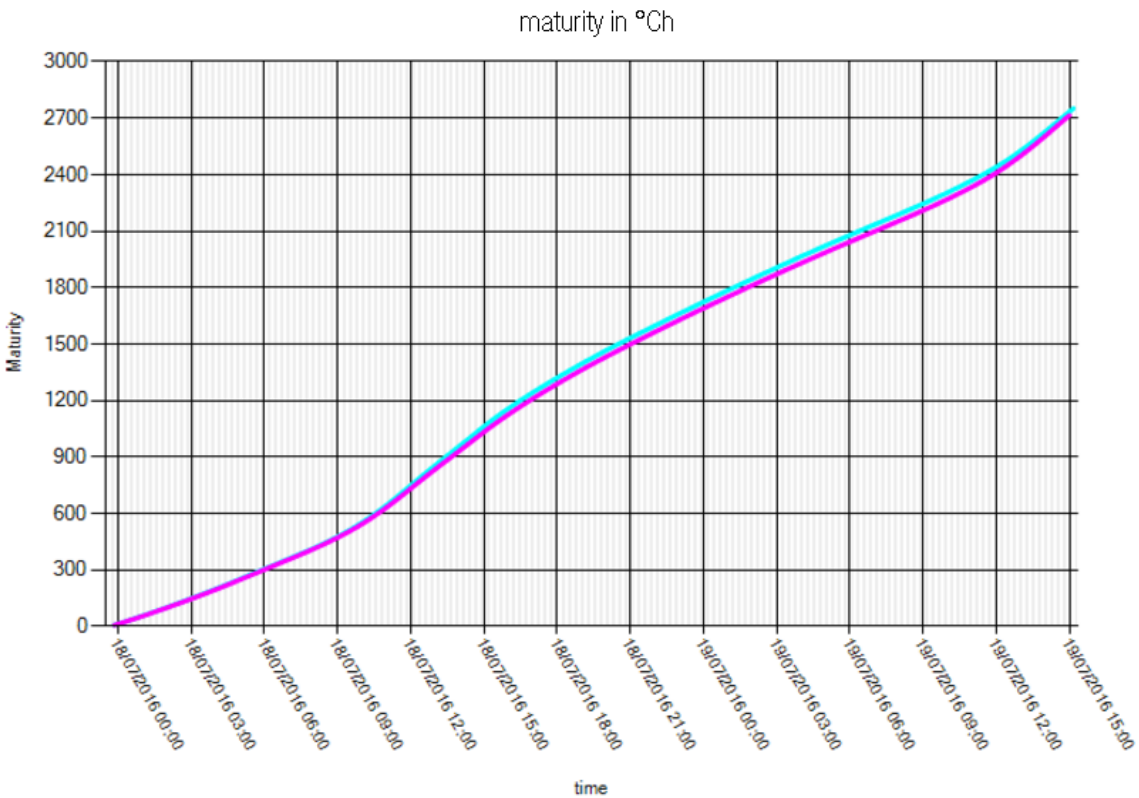
DMBD C40/20 (65%GGBS) 0.40 Calibration boxes final version 1.50

C-value:	1.50
a constant:	1.00
standard deviation:	1.94 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Outside Cubes C40/20 - High GGBS
Time period:
from: 7/17/2016 23:36
to: 7/19/2016 15:10
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement
Maturity gain

Mix-design A. C40/20, high GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View	Sensors
☑	044315 - T2
☑	159546 - T3

Measurements outside area correlation curve

concrete properties:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

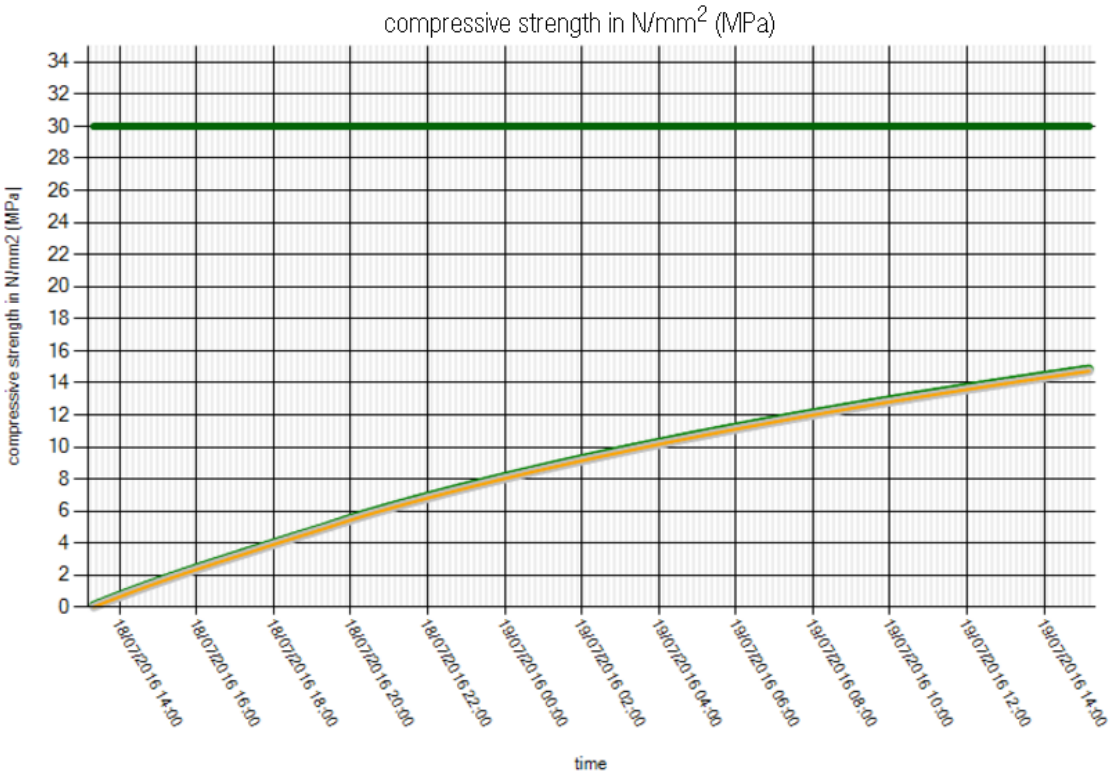
DMBD C40/20 (65%GGBS) 0.40 Curing tank final version 1.50

C-value:	1.50
a constant:	1.00
standard deviation:	1.94 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Water Tank Cubes C40/20 - High G
Time period:
from: 7/17/2016 23:41
to: 7/19/2016 15:30
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement Strength gain

Mix-design A. C40/20, high GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns
View Sensors
- 044315 - Ambient Temperature
- 044315 - T2
- 159546 - Ambient Temperature
- 159546 - T3

concrete properties:
DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:
DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

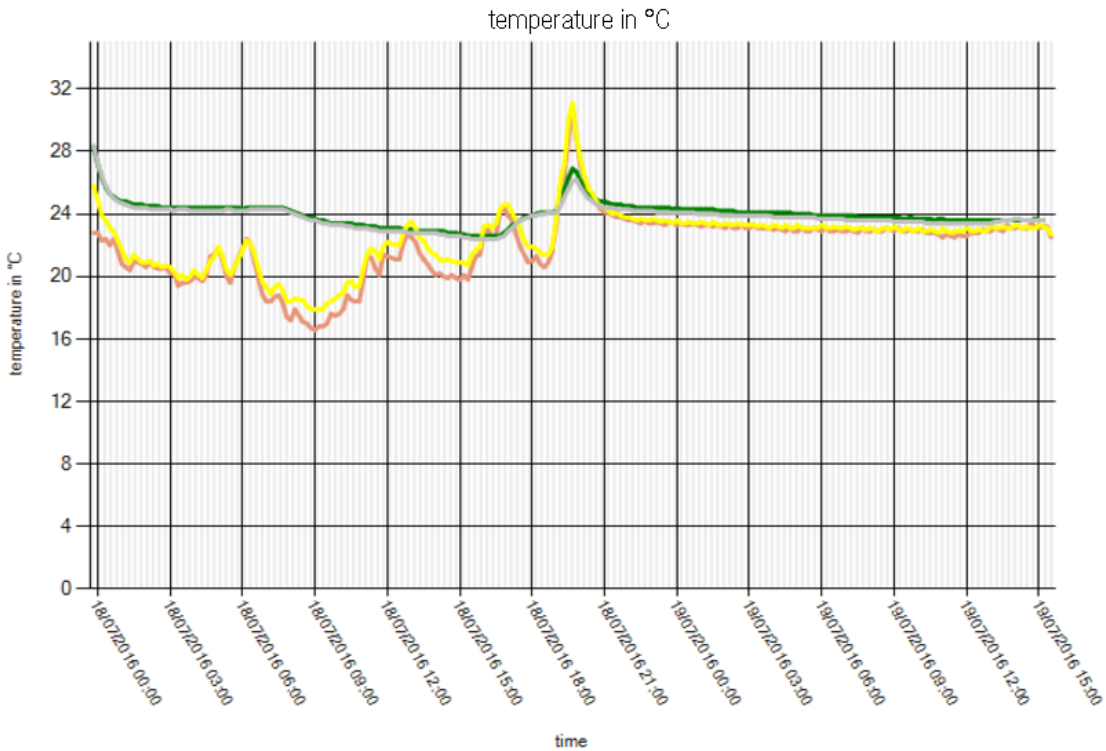
Description:
DMBD C40/20 (65%GGBS) 0.40 Curing tank final version 1.50

C-value:	1.50
a constant:	1.00
standard deviation:	1.94 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Water Tank Cubes C40/20 - High G
Time period:
from: 7/17/2016 23:41
to: 7/19/2016 15:30
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement Temperature evolution

Mix-design A. C40/20, high GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View	Sensors
☑	044315 - T2
☑	159546 - T3

concrete properties:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

DMBD C40/20 (65%GGBS no MS) 0.40 C-Value 1.50 june 2016

Description:

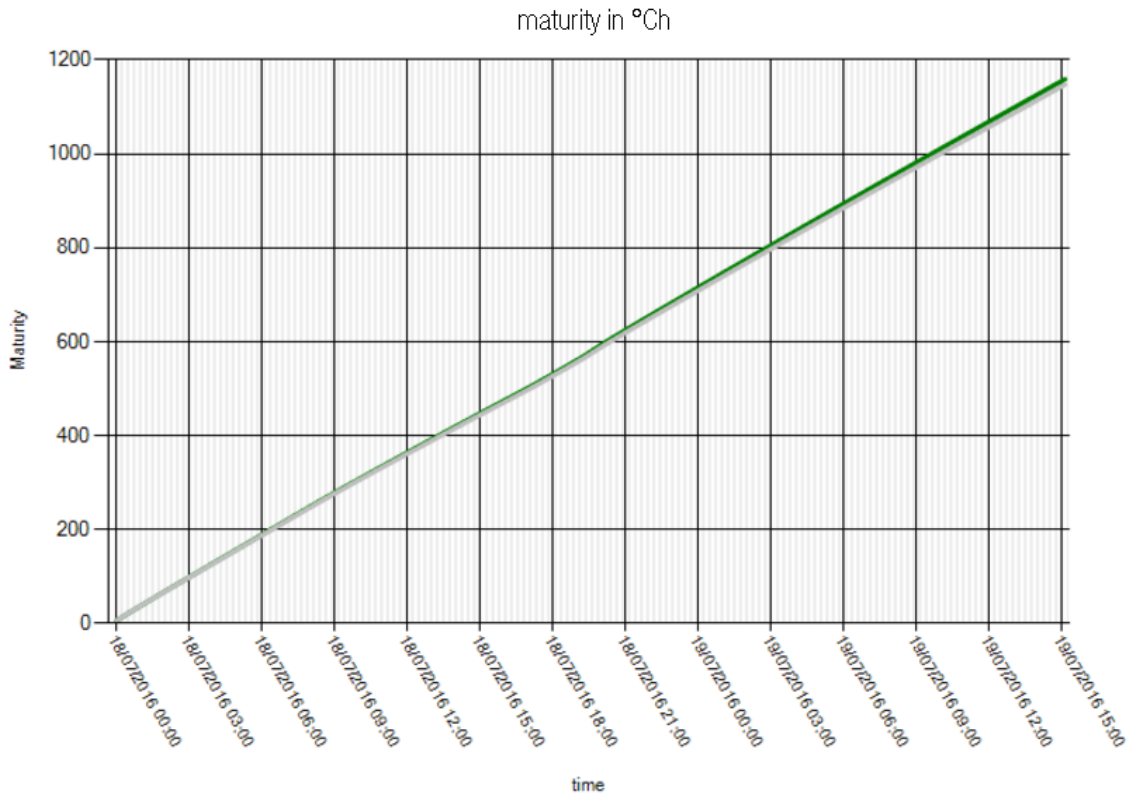
DMBD C40/20 (65%GGBS) 0.40 Curing tank final version 1.50

C-value:	1.50
a constant:	1.00
standard deviation:	1.94 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Water Tank Cubes C40/20 - High G
Time period:
from: 7/17/2016 23:41
to: 7/19/2016 15:30
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement
Maturity gain

Mix-design B. C45/20, low GGBS 20 kg MS. Slab floor Slab sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.1
Locations:
Dubai Hills
part:
Floor slabs
View Sensors
- 869792 - Concrete
- 400366 - Concrete

Measurements outside area correlation curve

concrete properties:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

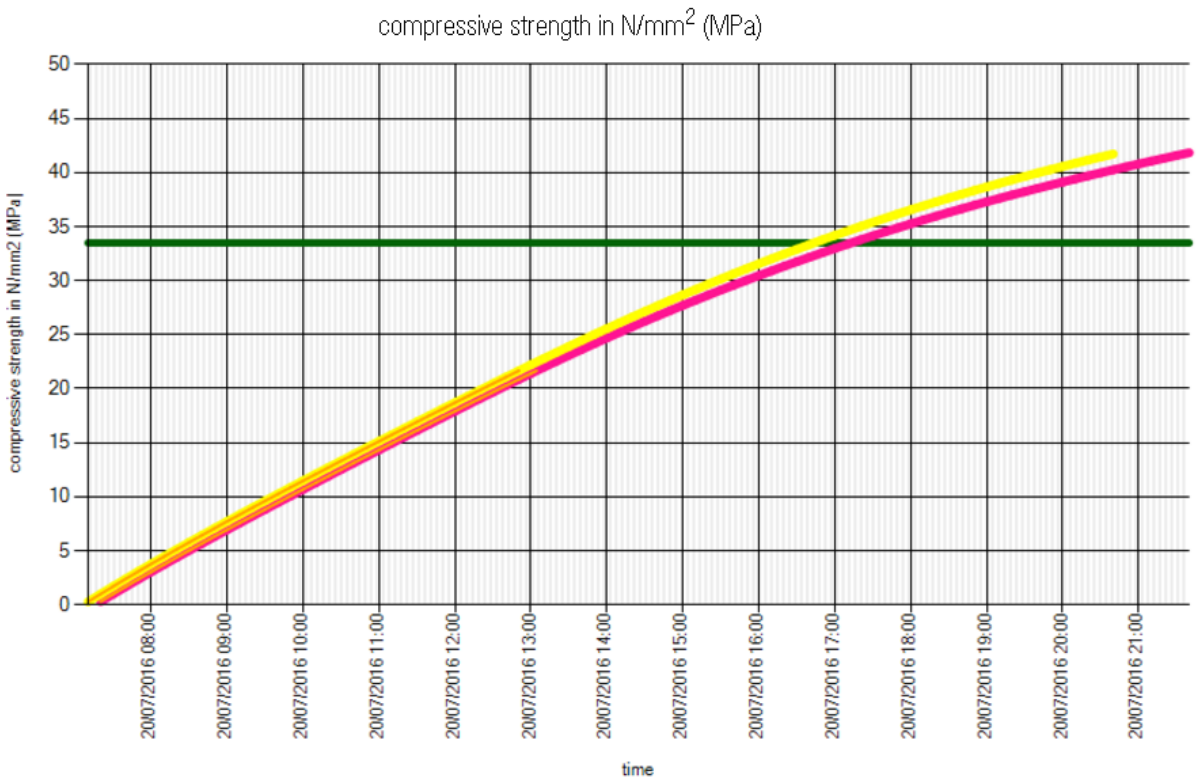
Description:
DMBD C45/20 (36%GGBS 20kg MS) Calibration box final version

C-value:	1.35
a constant:	1.00
standard deviation:	1.95 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
19-07-2016 - Building A 1.1, 8th Floor - C45/20 - l
Time period:
from: 7/19/2016 22:37
to: 7/26/2016 07:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement Strength gain

Mix-design B. C45/20, low GGBS 20 kg MS. Slab floor Slab sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.1
Locations:
Dubai Hills
part:
Floor slabs
View Sensors
- 869792 - Ambient Temperature
- 869792 - Concrete
- 400366 - Ambient Temperature
- 400366 - Concrete

concrete properties:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

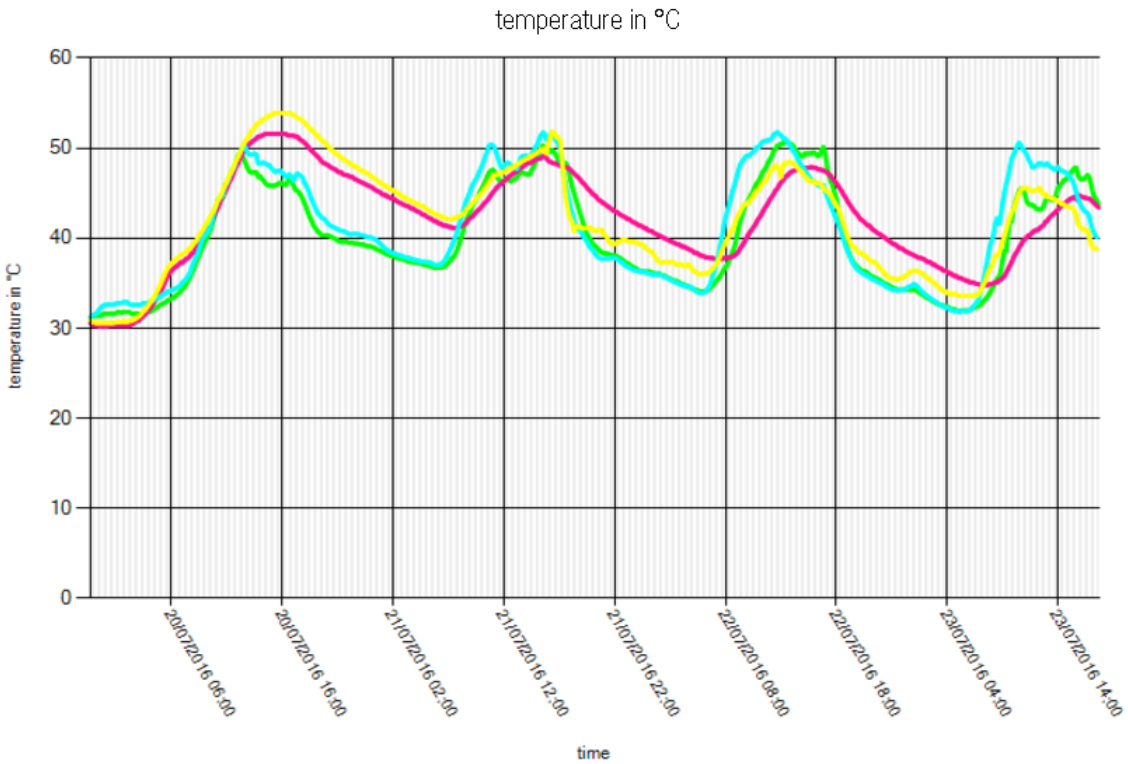
Description:
DMBD C45/20 (36%GGBS 20kg MS) Calibration box final version

C-value:	1.35
a constant:	1.00
standard deviation:	1.95 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
19-07-2016 - Building A 1.1, 8th Floor - C45/20 - I
Time period:
from: 7/19/2016 22:37
to: 7/26/2016 07:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement Temperature evolution

Mix-design B. C45/20, low GGBS 20 kg MS. Slab floor Slab sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.1
Locations:
Dubai Hills
part:
Floor slabs
View Sensors
- 869792 - Concrete
- 400366 - Concrete

concrete properties:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

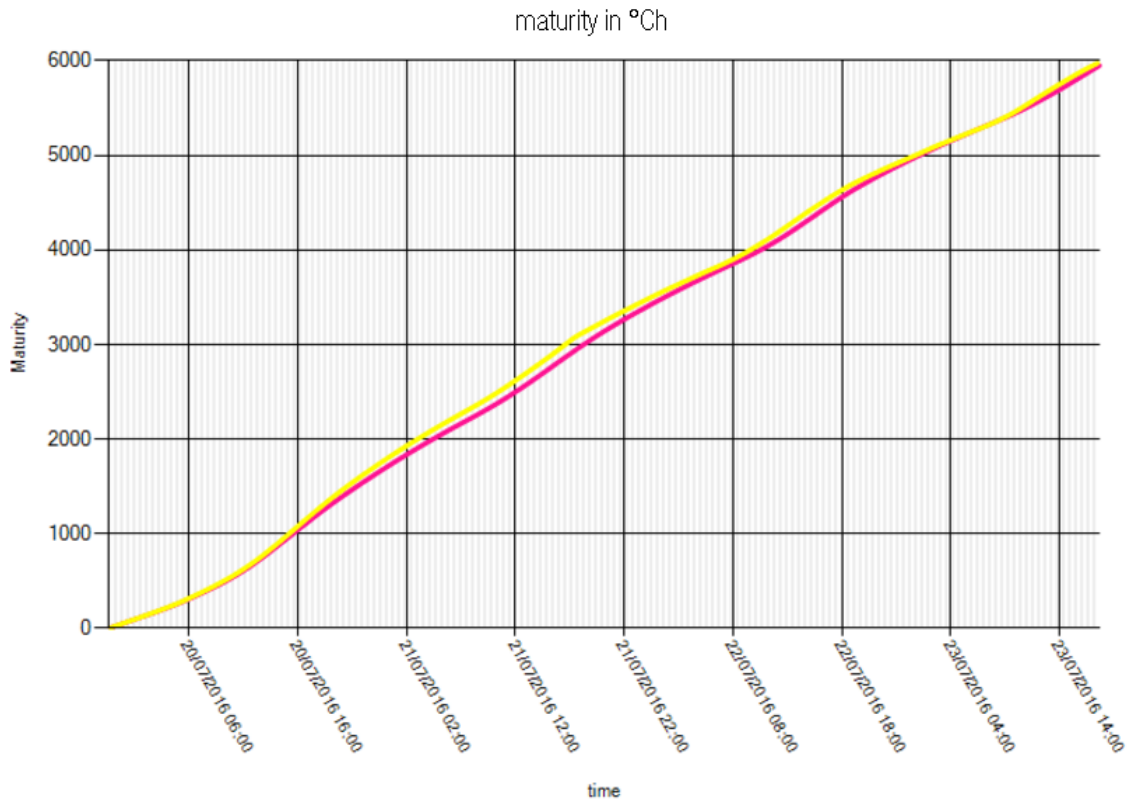
Description:
DMBD C45/20 (36%GGBS 20kg MS) Calibration box final version

C-value:	1.35
a constant:	1.00
standard deviation:	1.95 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
19-07-2016 - Building A 1.1, 8th Floor - C45/20 - I
Time period:
from: 7/19/2016 22:37
to: 7/26/2016 07:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement Maturity gain

Mix-design B. C45/20, low GGBS 20 kg MS. Slab floor Slab sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.1
Locations:
Dubai Hills
part:
Floor slabs
View Sensors
175930 - LO2
396093 - LO3
Measurements outside area correlation curve

concrete properties:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

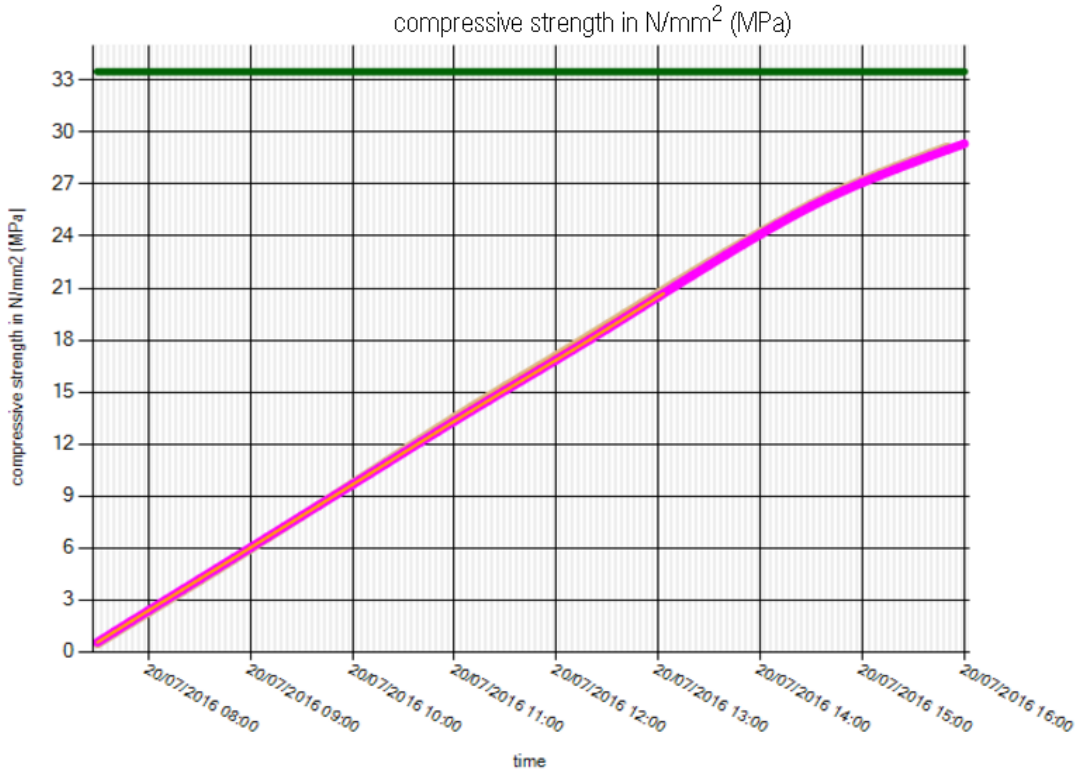
Description:
DMBD C45/20 (36%GGBS 20kg MS) Calibration box final version

C-value:	1.35
a constant:	1.50
standard deviation:	1.95 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
19-07-2016 - Outside Cubes - C45/20 - Low GGBS
Time period:
from: 7/19/2016 22:36
to: 7/20/2016 16:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement Strength gain

Mix-design B. C45/20, low GGBS 20 kg MS. Slab floor Slab sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.1
Locations:
Dubai Hills
part:
Floor slabs
View Sensors
- 175930 - Ambient Temperature
- 175930 - LO2
- 396093 - Ambient Temperature
- 396093 - LO3

concrete properties:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

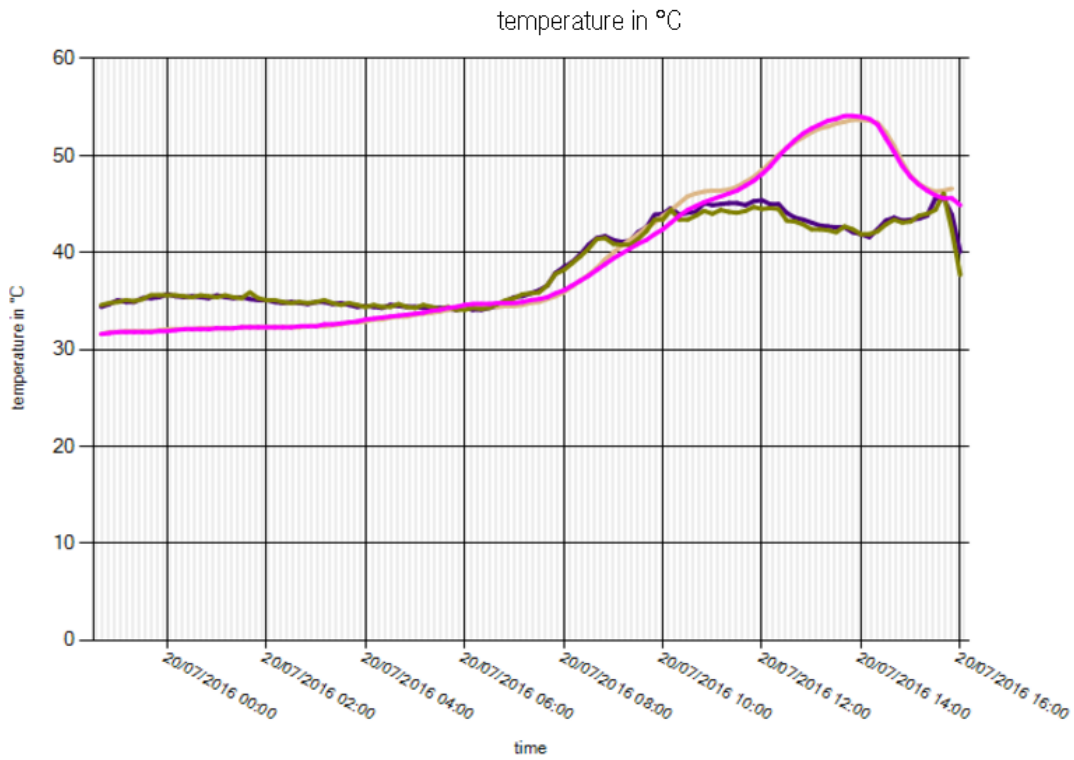
Description:
DMBD C45/20 (36%GGBS 20kg MS) Calibration box final version

C-value:	1.35
a constant:	1.50
standard deviation:	1.95 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
19-07-2016 - Outside Cubes - C45/20 - Low GGBS
Time period:
from: 7/19/2016 22:36
to: 7/20/2016 16:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement Temperature evolution

Mix-design B. C45/20, low GGBS 20 kg MS. Slab floor Slab sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.1
Locations:
Dubai Hills
part:
Floor slabs

View	Sensors
☑	175930 - LO2
☑	396093 - LO3

concrete properties:

DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:

DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:

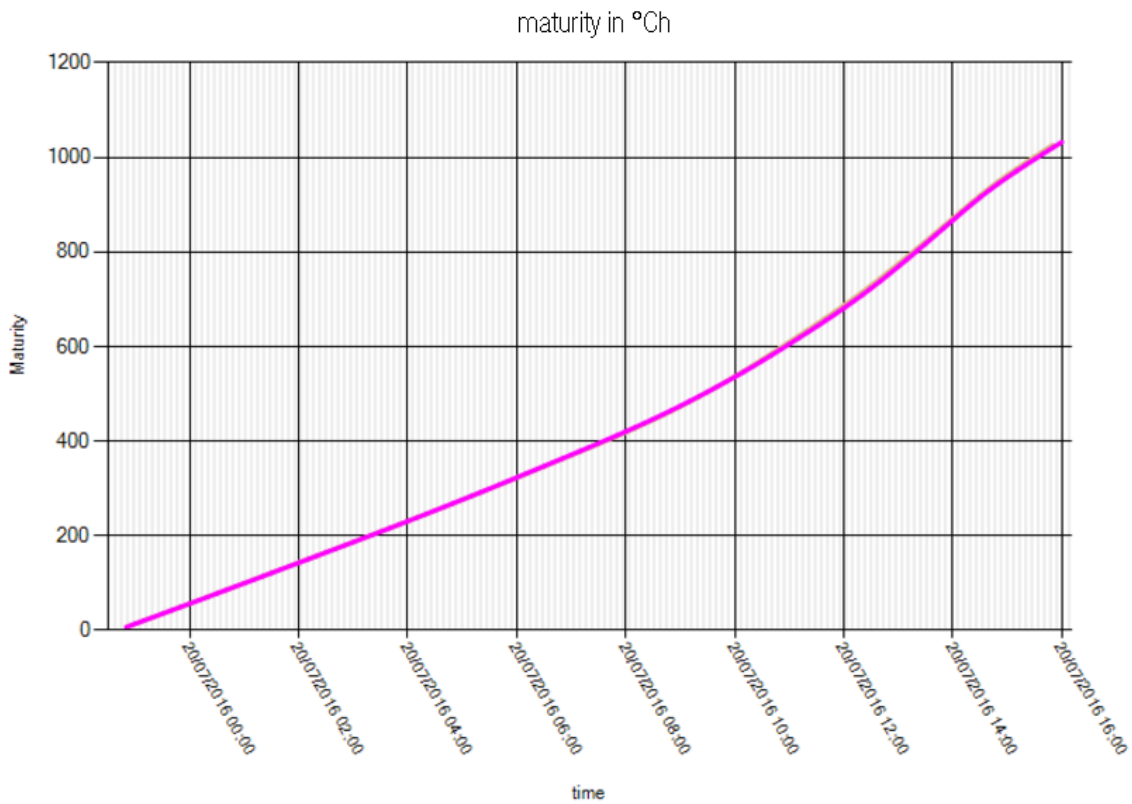
DMBD C45/20 (36%GGBS 20kg MS) Calibration box final version

C-value:	1.35
a constant:	1.50
standard deviation:	1.95 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
19-07-2016 - Outside Cubes - C45/20 - Low GGBS
Time period:
from: 7/19/2016 22:36
to: 7/20/2016 16:00
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement
Maturity gain

Mix-design B. C45/20, low GGBS 20 kg MS. Slab floor Slab sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.1
Locations:
Dubai Hills
part:
Floor slabs

View Sensors
- 175625 - LT2
- 175674 - LT3

Measurements outside area correlation curve

concrete properties:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

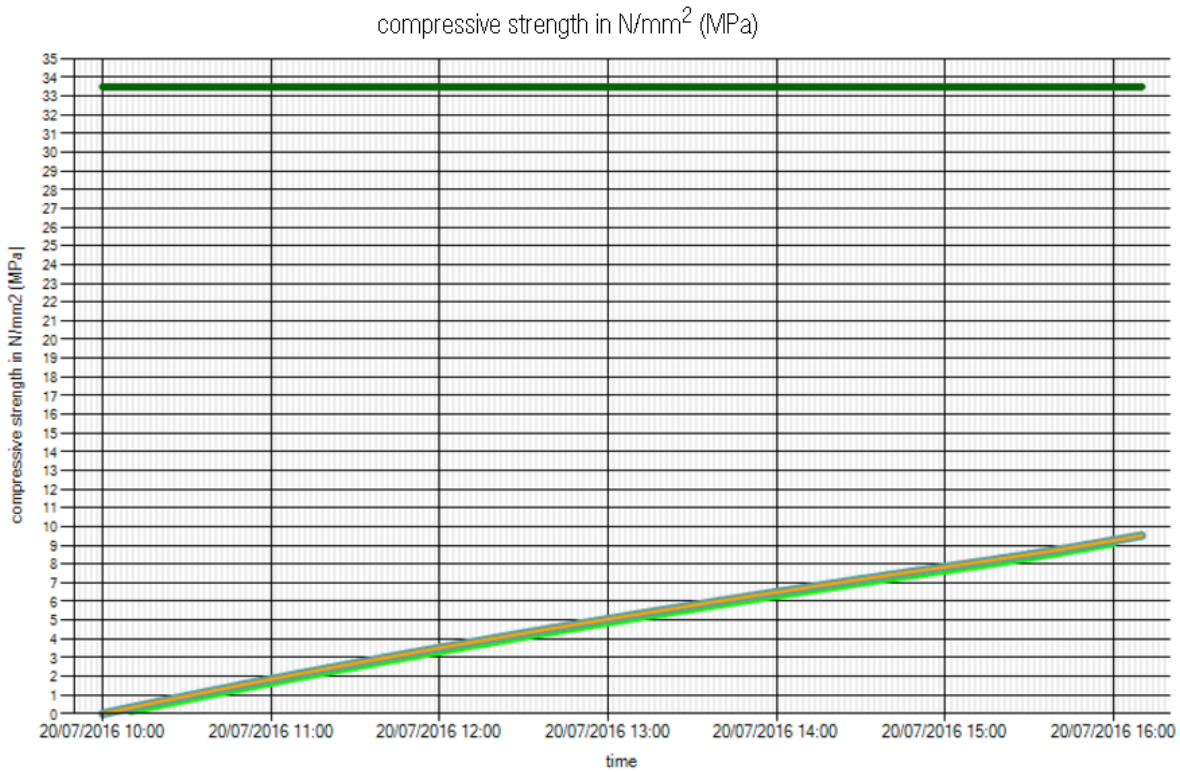
Description:
DMBD C45/20 (36%GGBS 20kg MS) Curing tank final version

C-value:	1.35
a constant:	1.50
standard deviation:	1.97 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
19-07-2016 - Water Tank Cubes - C45/20 - Low G
Time period:
from: 7/19/2016 21:27
to: 7/22/2016 14:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement Strength gain

Mix-design B. C45/20, low GGBS 20 kg MS. Slab floor Slab sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.1
Locations:
Dubai Hills
part:
Floor slabs
View Sensors
- 175625 - Ambient Temperature
- 175625 - LT2
- 175674 - Ambient Temperature
- 175674 - LT3

concrete properties:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:
DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

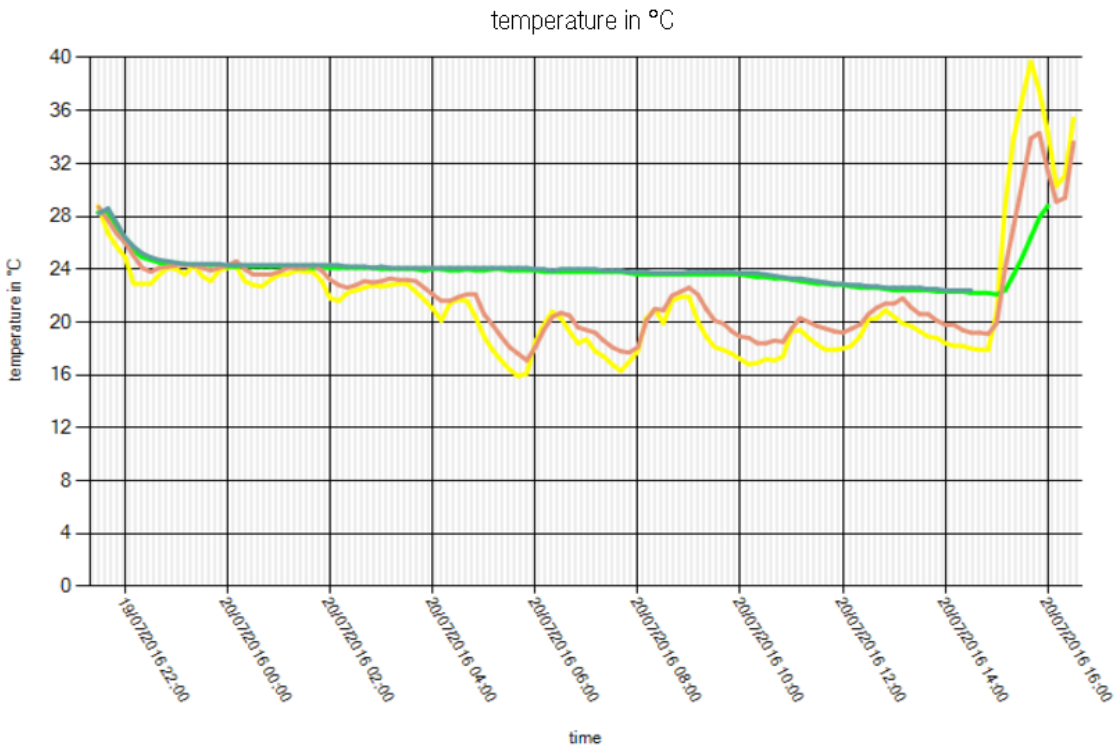
Description:
DMBD C45/20 (36%GGBS 20kg MS) Curing tank final version

C-value:	1.35
a constant:	1.50
standard deviation:	1.97 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
19-07-2016 - Water Tank Cubes - C45/20 - Low G
Time period:
from: 7/19/2016 21:27
to: 7/20/2016 16:30
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement Temperature evolution

Mix-design B. C45/20, low GGBS 20 kg MS. Slab floor Slab sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.1
Locations:
Dubai Hills
part:
Floor slabs

View	Sensors
☑	175625 - LT2
☑	175674 - LT3

concrete properties:

DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:

DMBD C45/20 (36%GGBS 20kg MS) C-Value 1.35_june 28_2016

Description:

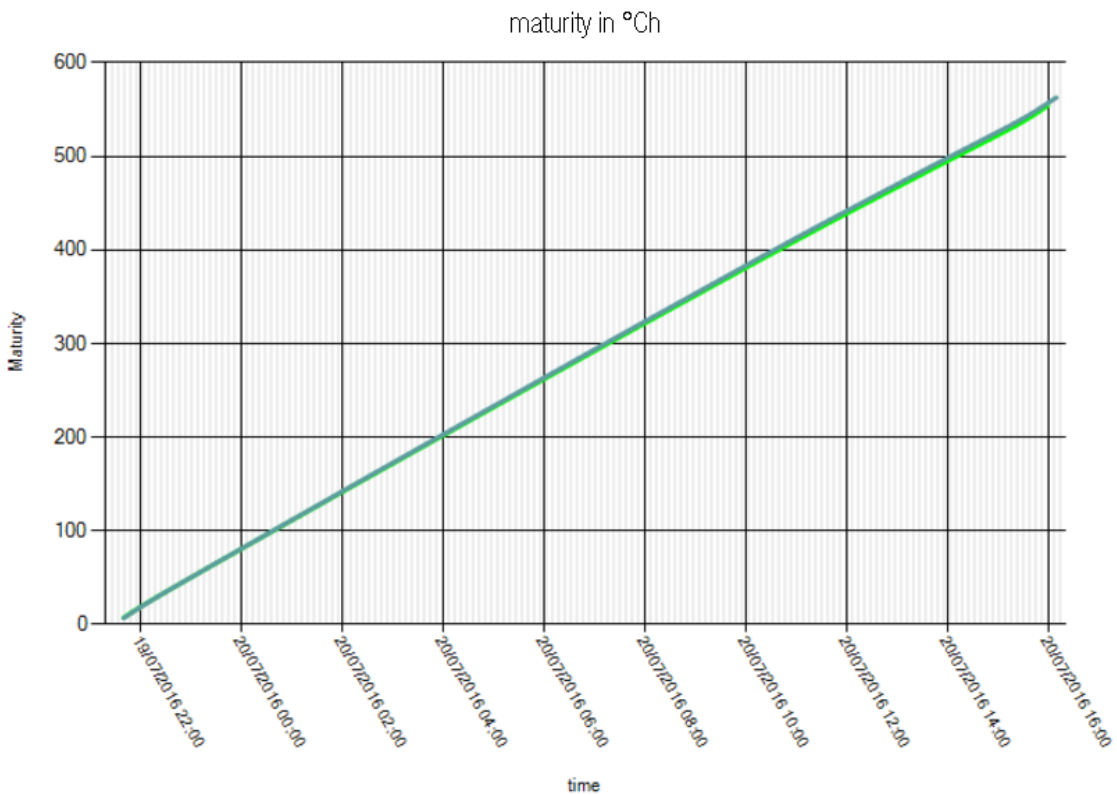
DMBD C45/20 (36%GGBS 20kg MS) Curing tank final version

C-value:	1.35
a constant:	1.50
standard deviation:	1.97 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
19-07-2016 - Water Tank Cubes - C45/20 - Low G
Time period:
from: 7/19/2016 21:27
to: 7/20/2016 16:30
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement
Maturity gain

Mix-design C. C40/20, low GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View Sensors

- 175948 - Cable Sensor
- 175948 - Wall Panel
- 646714 - Wall Panel
- 414813 - Cable Sensor

Measurements outside area correlation curve

concrete properties:

DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:

DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:

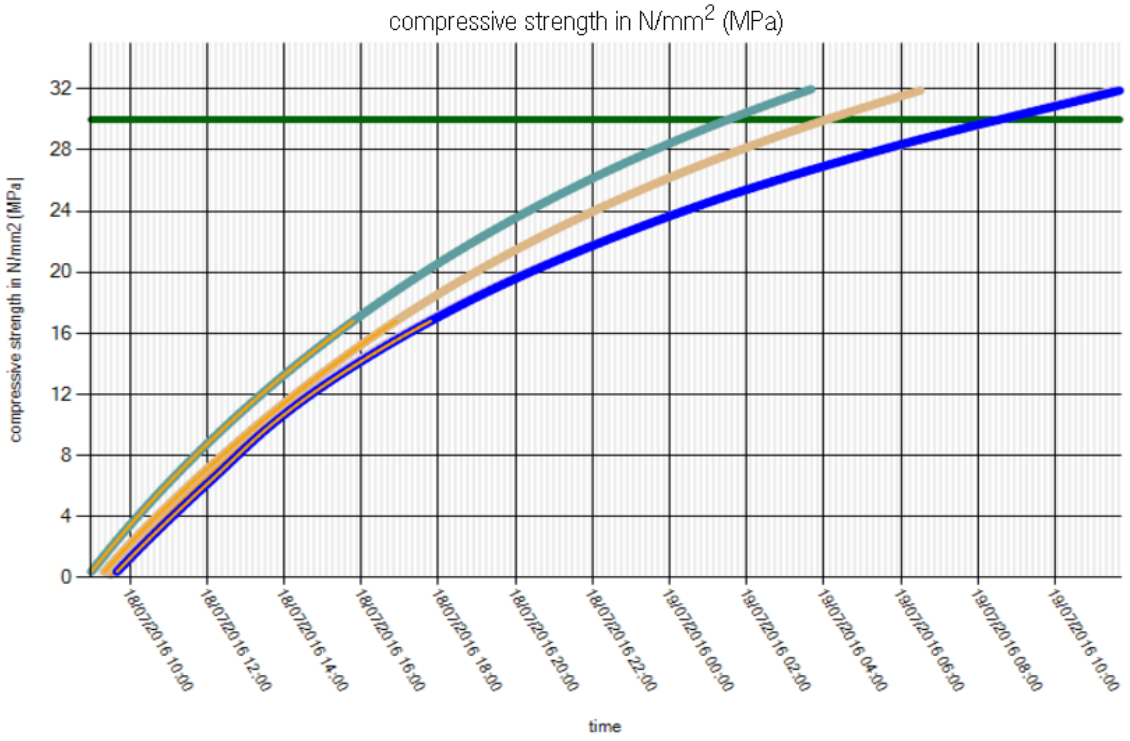
DMBD C40/20 (36%GGBS) 0.40 Calibration boxes final version 1.35

C-value:	1.35
a constant:	1.00
standard deviation:	1.84 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Column C40/20 - Low GGBS
Time period:
from: 7/17/2016 23:46
to: 7/21/2016 13:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement Strength gain

Mix-design C. C40/20, low GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns
View Sensors

- 175948 - Cable Sensor
- 175948 - Wall Panel
- 646714 - Ambient temperature
- 646714 - Wall Panel
- 414813 - Ambient temperature
- 414813 - Cable Sensor

concrete properties:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

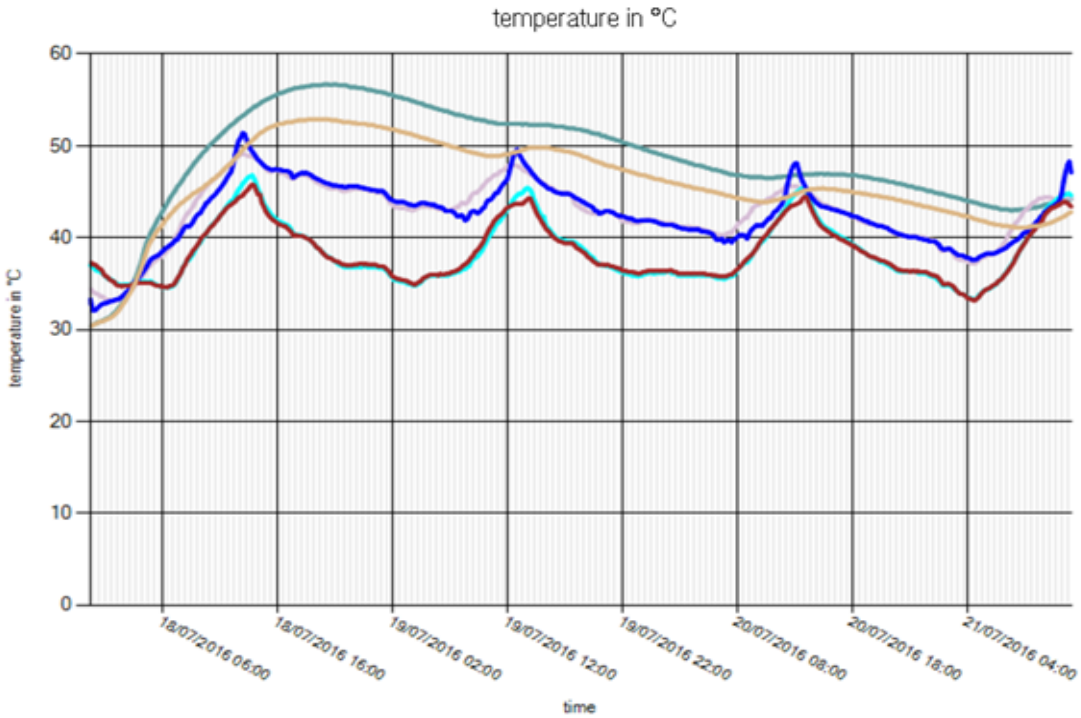
Description:
DMBD C40/20 (36%GGBS) 0.40 Calibration boxes final version 1.35

C-value:	1.35
a constant:	1.00
standard deviation:	1.84 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Column C40/20 - Low GGBS
Time period:
from: 7/17/2016 23:46
to: 7/21/2016 13:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement Temperature gain

Mix-design C. C40/20, low GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns
View Sensors
- 175948 - Cable Sensor
- 175948 - Wall Panel
- 646714 - Wall Panel
- 414813 - Cable Sensor

concrete properties:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

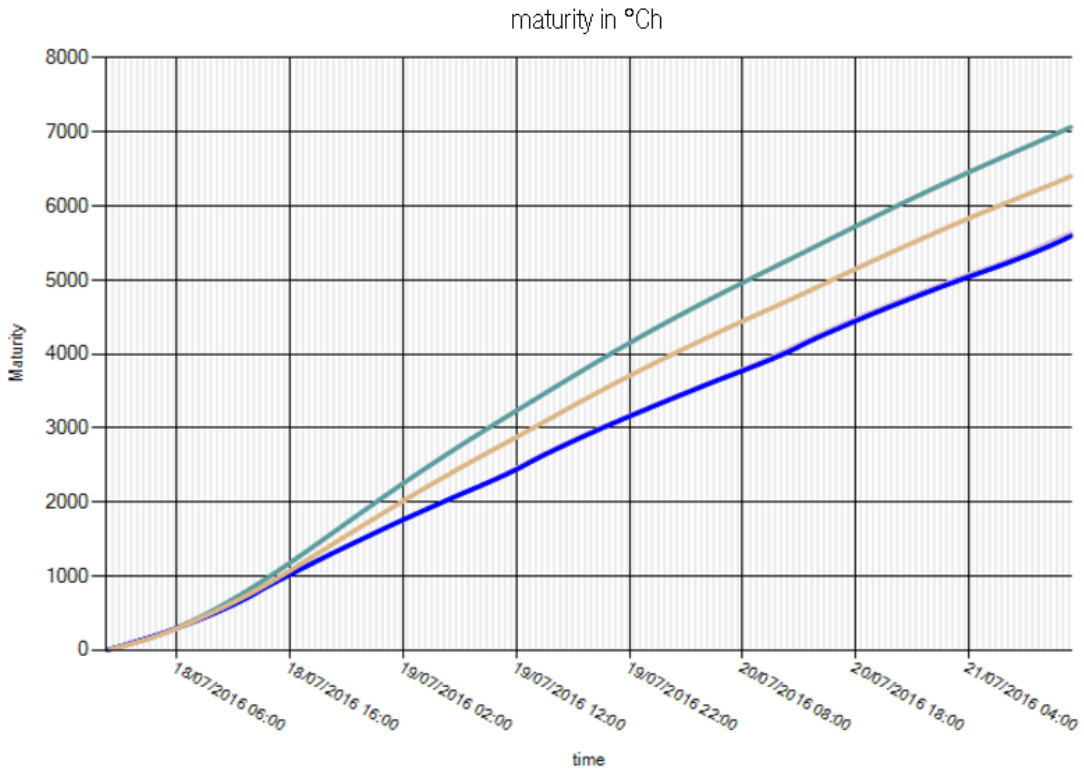
Description:
DMBD C40/20 (36%GGBS) 0.40 Calibration boxes final version 1.35

C-value:	1.35
a constant:	1.00
standard deviation:	1.84 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Column C40/20 - Low GGBS
Time period:
from: 7/17/2016 23:46
to: 7/21/2016 13:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement
Maturity gain

Mix-design C. C40/20, low GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View	Sensors
☑	175674 - O3
☑	175930 - O2

Measurements outside area correlation curve

concrete properties:

DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:

DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:

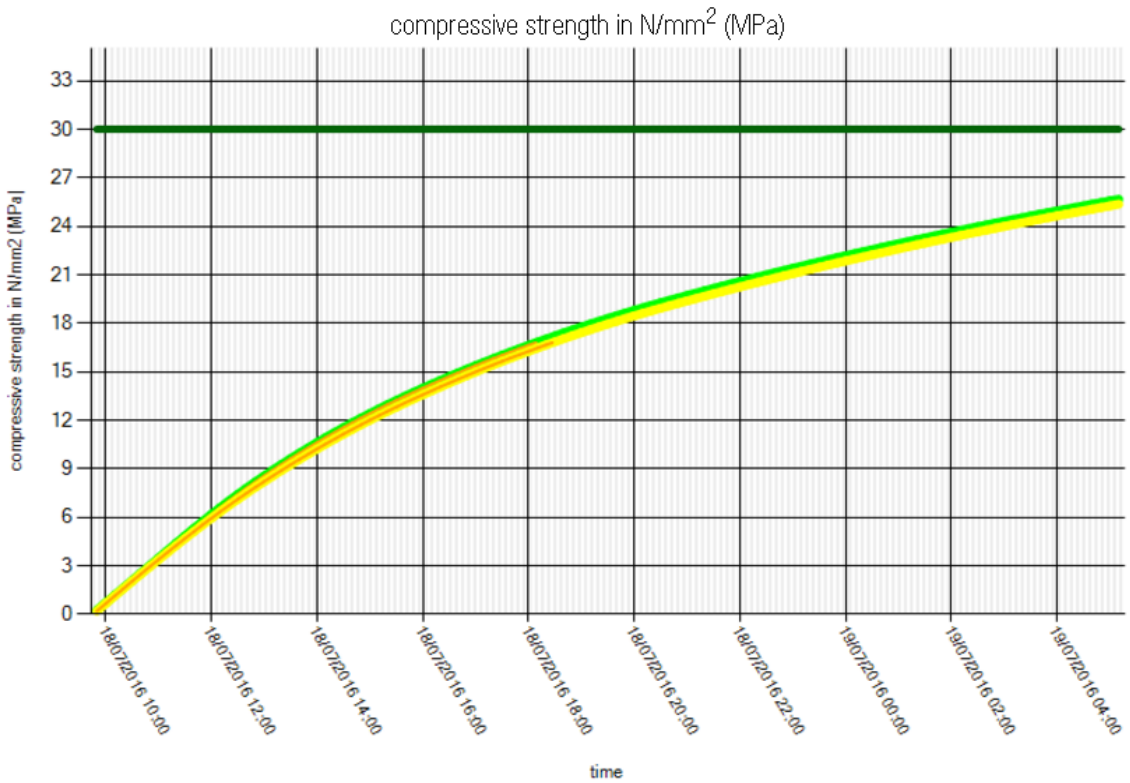
DMBD C40/20 (36%GGBS) 0.40 Calibration boxes final version 1.35

C-value:	1.35
a constant:	1.00
standard deviation:	1.84 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Outside Cubes C40/20 - Low GGBS
Time period:
from: 7/17/2016 23:21
to: 7/19/2016 05:10
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement Strength gain

Mix-design C. C40/20, low GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns
View Sensors
- 175674 - Ambient Temperature
- 175674 - O3
- 175930 - Ambient Temperature
- 175930 - O2

concrete properties:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

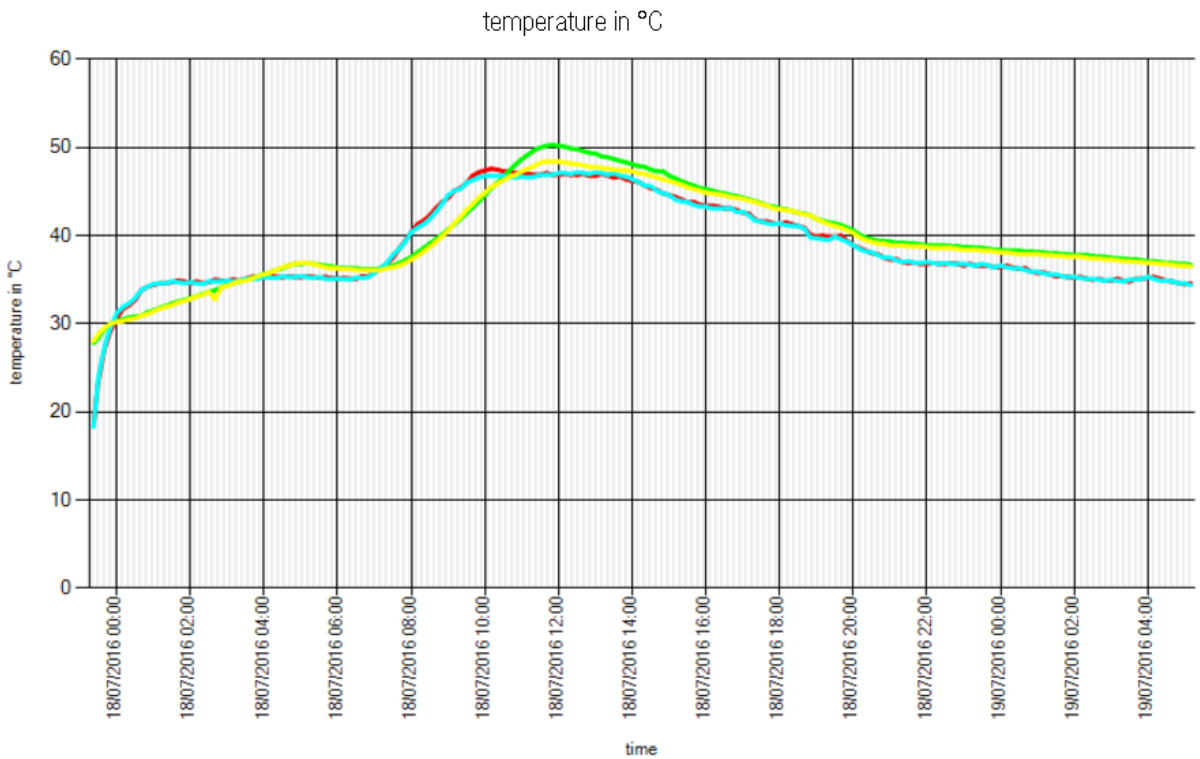
Description:
DMBD C40/20 (36%GGBS) 0.40 Calibration boxes final version 1.35

C-value:	1.35
a constant:	1.00
standard deviation:	1.84 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Outside Cubes C40/20 - Low GGBS
Time period:
from: 7/17/2016 23:21
to: 7/19/2016 05:10
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement Temperature evolution

Mix-design C. C40/20, low GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View	Sensors
☑	175674 - O3
☑	175930 - O2

concrete properties:

DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:

DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:

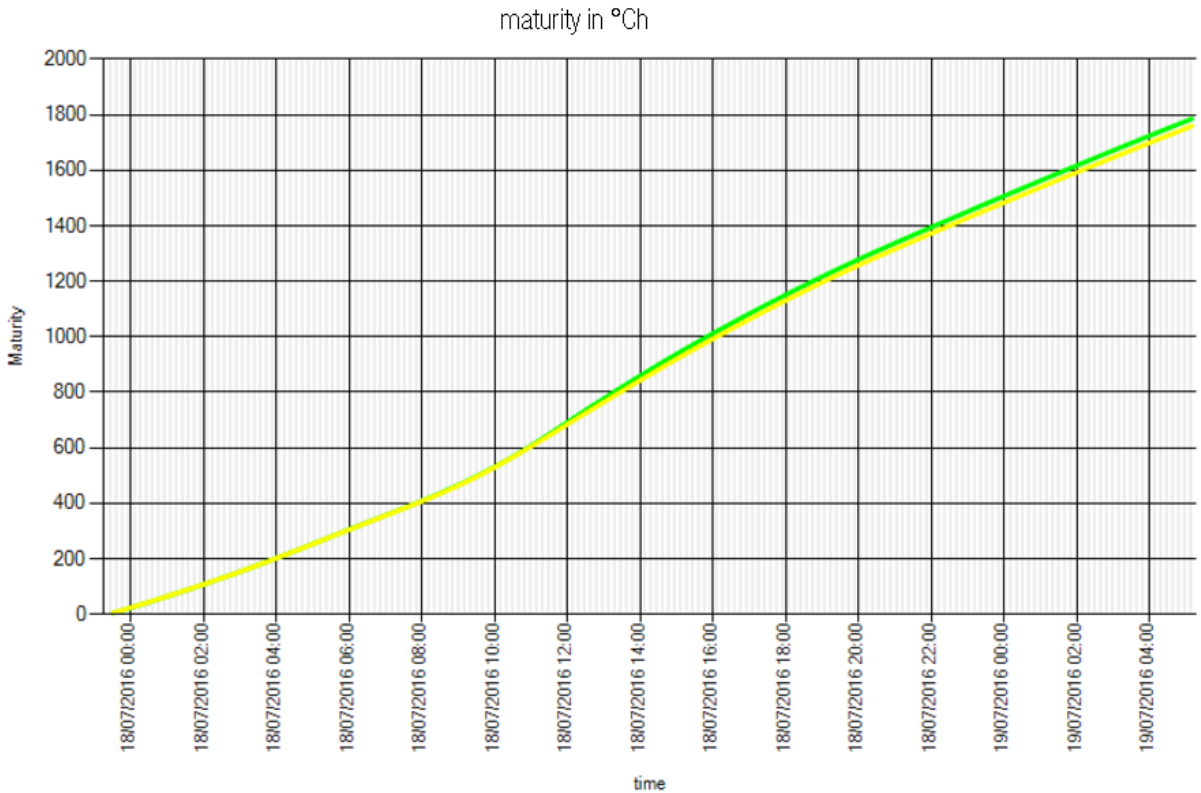
DMBD C40/20 (36%GGBS) 0.40 Calibration boxes final version 1.35

C-value:	1.35
a constant:	1.00
standard deviation:	1.84 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Outside Cubes C40/20 - Low GGBS
Time period:
from: 7/17/2016 23:21
to: 7/19/2016 05:10
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement
Maturity gain

Mix-design C. C40/20, low GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View Sensors
- 175625 - T2
- 396093 - T3

Measurements outside area correlation curve

concrete properties:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

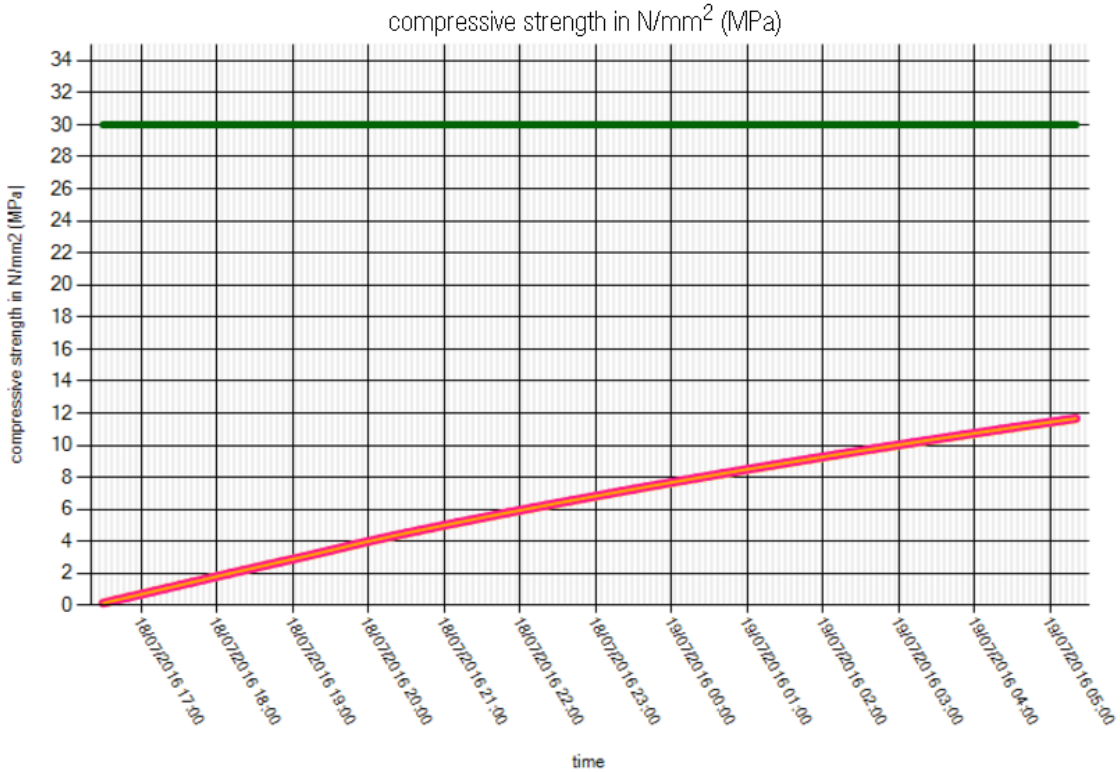
Description:
DMBD C40/20 (36%GGBS) 0.40 Calibration boxes final version 1.35

C-value:	1.35
a constant:	1.00
standard deviation:	1.84 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Water Tank Cubes C40/20 - Low G
Time period:
from: 7/17/2016 23:14
to: 7/19/2016 05:30
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement Strength gain

Mix-design C. C40/20, low GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns
View Sensors
- 175625 - Ambient Temperature
- 175625 - T2
- 396093 - Ambient Temperature
- 396093 - T3

concrete properties:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:
DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

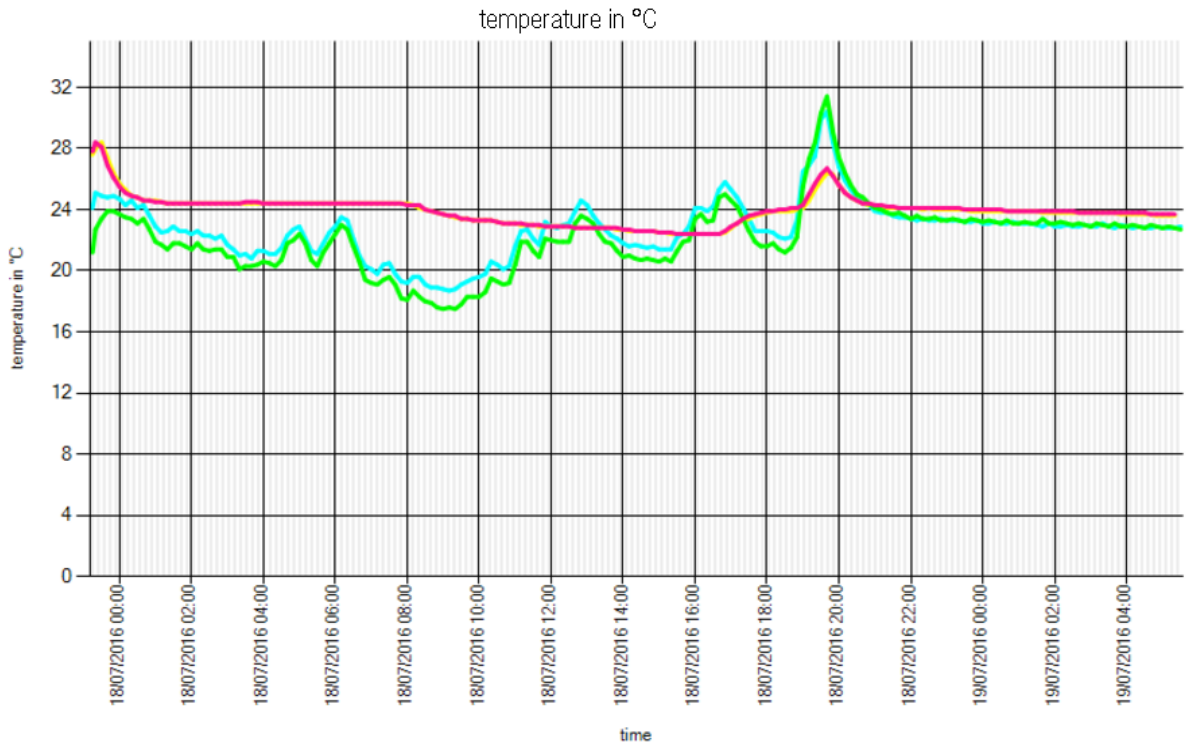
Description:
DMBD C40/20 (36%GGBS) 0.40 Calibration boxes final version 1.35

C-value:	1.35
a constant:	1.00
standard deviation:	1.84 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Water Tank Cubes C40/20 - Low G
Time period:
from: 7/17/2016 23:14
to: 7/19/2016 05:30
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement
Temperature evolution

Mix-design C. C40/20, low GGBS no MS. Vertical Column Both cable sensor and wall panel sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Zone - 10 Columns B1 To Ground
Locations:
Dubai Hills
part:
Columns

View	Sensors
☑	175625 - T2
☑	396093 - T3

concrete properties:

DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:

DMBD C40/20 (36%GGBS no MS) 0.40 C-Value 1.35_june 2016

Description:

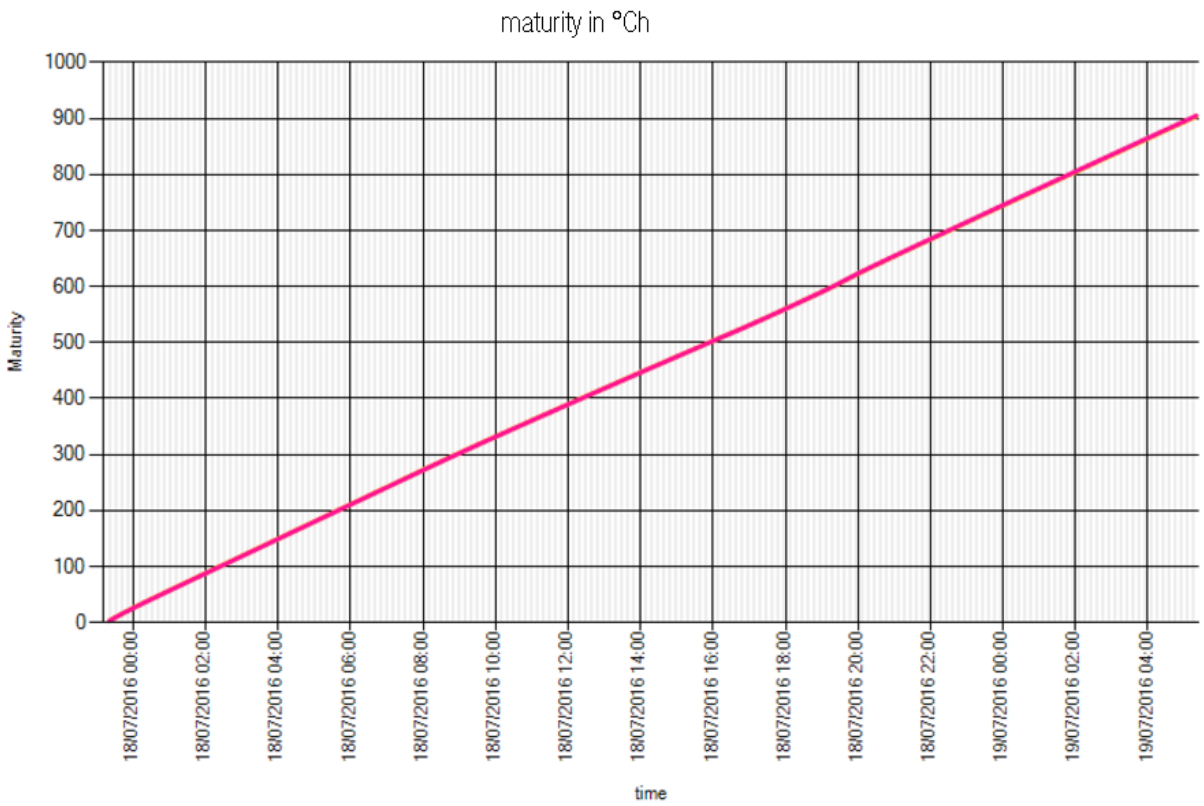
DMBD C40/20 (36%GGBS) 0.40 Calibration boxes final version 1.35

C-value:	1.35
a constant:	1.00
standard deviation:	1.84 MPa (N/mm^2)
target value:	30.00 MPa (N/mm^2)

Measurement:
17-07-2016 - Water Tank Cubes C40/20 - Low G
Time period:
from: 7/17/2016 23:14
to: 7/19/2016 05:30
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement
Maturity gain

Mix-design D. C45/20, high GGBS 20 KG MS. Slab floor Slab floor sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.2
Locations:
Dubai Hills
part:
Floor slabs

View Sensors	Status
876656 - Concrete	
403832 - Concrete	

Measurements outside area correlation curve

concrete properties:
DMBD C45/20 (68%GGBS 20kg MS)

Description:
DMBD C45/20 (68%GGBS 20kg MS)

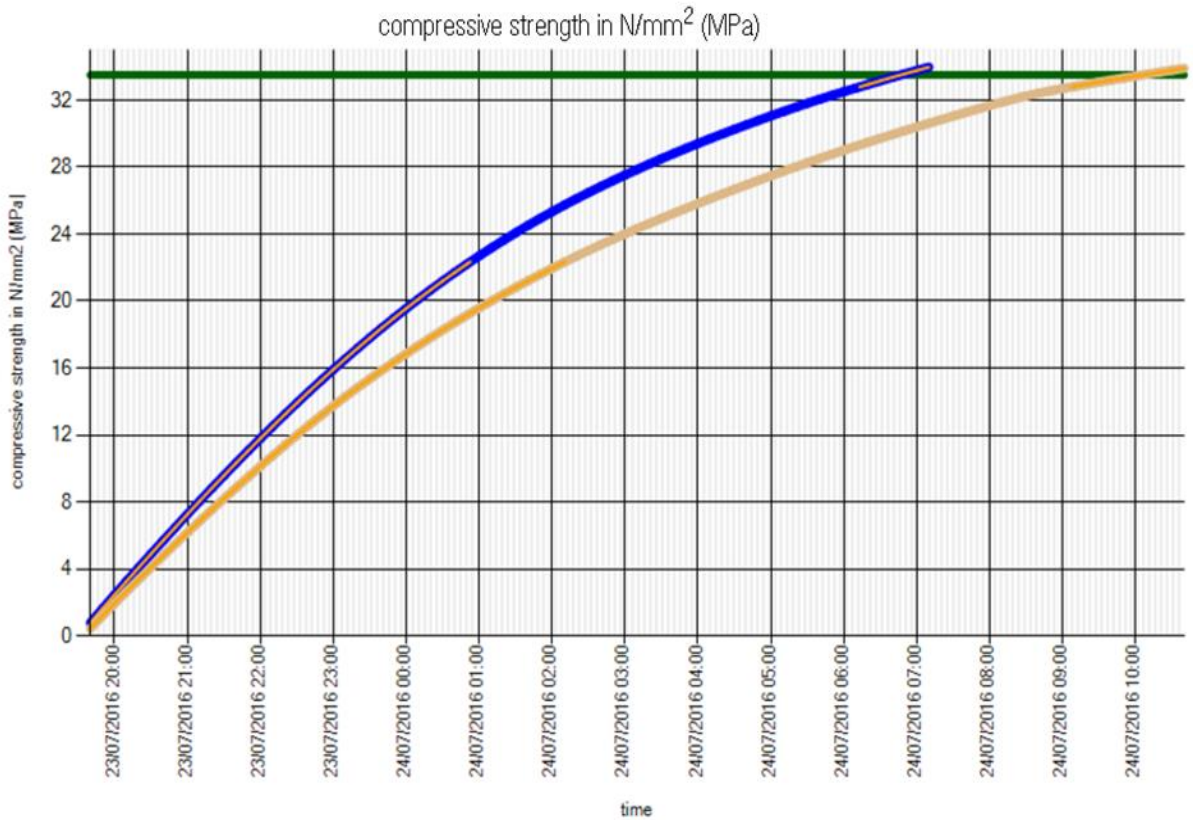
Description:
DMBD C45/20 (68%GGBS 20kg MS) calibration box

C-value:	1.50
a constant:	2.00
standard deviation:	1.86 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
23-07-2016 - Building A1.2,
Time period:
from: 7/23/2016 10:00
to: 7/30/2016 02:59
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement Strength gain

Mix-design D. C45/20, high GGBS 20 KG MS. Slab floor Slab floor sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.2
Locations:
Dubai Hills
part:
Floor slabs

View Sensors	Status
☑ 876656 - Ambient temperature	
☑ 876656 - Concrete	
☑ 403832 - Ambient temperature	
☑ 403832 - Concrete	

concrete properties:
DMBD C45/20 (68%GGBS 20kg MS)

Description:
DMBD C45/20 (68%GGBS 20kg MS)

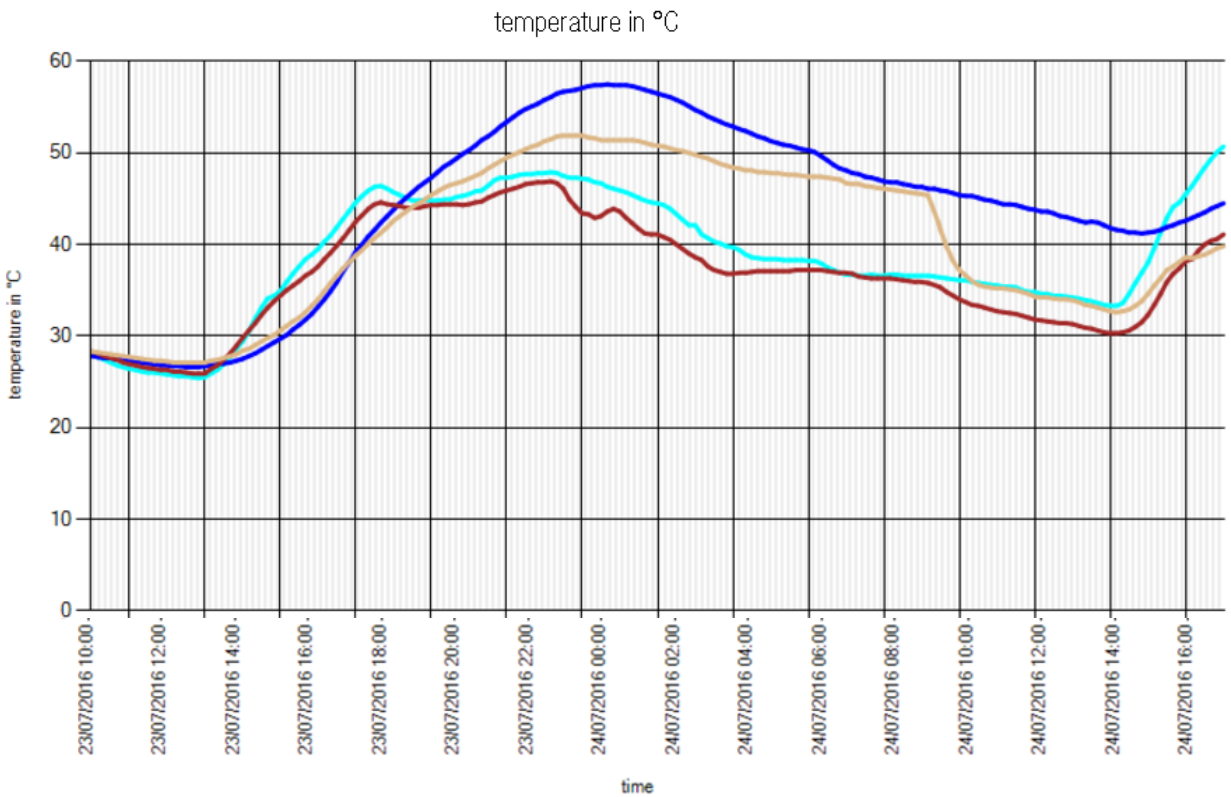
Description:
DMBD C45/20 (68%GGBS 20kg MS) calibration box

C-value:	1.50
a constant:	2.00
standard deviation:	1.86 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
23-07-2016 - Building A1.2,
Time period:
from: 7/23/2016 10:00
to: 7/24/2016 16:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement Temperature evolution

Mix-design D. C45/20, high GGBS 20 KG MS. Slab floor Slab floor sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.2
Locations:
Dubai Hills
part:
Floor slabs

View Sensors	Status
☑ 876656 - Concrete	
☑ 403832 - Concrete	

concrete properties:
DMBD C45/20 (68%GGBS 20kg MS)

Description:
DMBD C45/20 (68%GGBS 20kg MS)

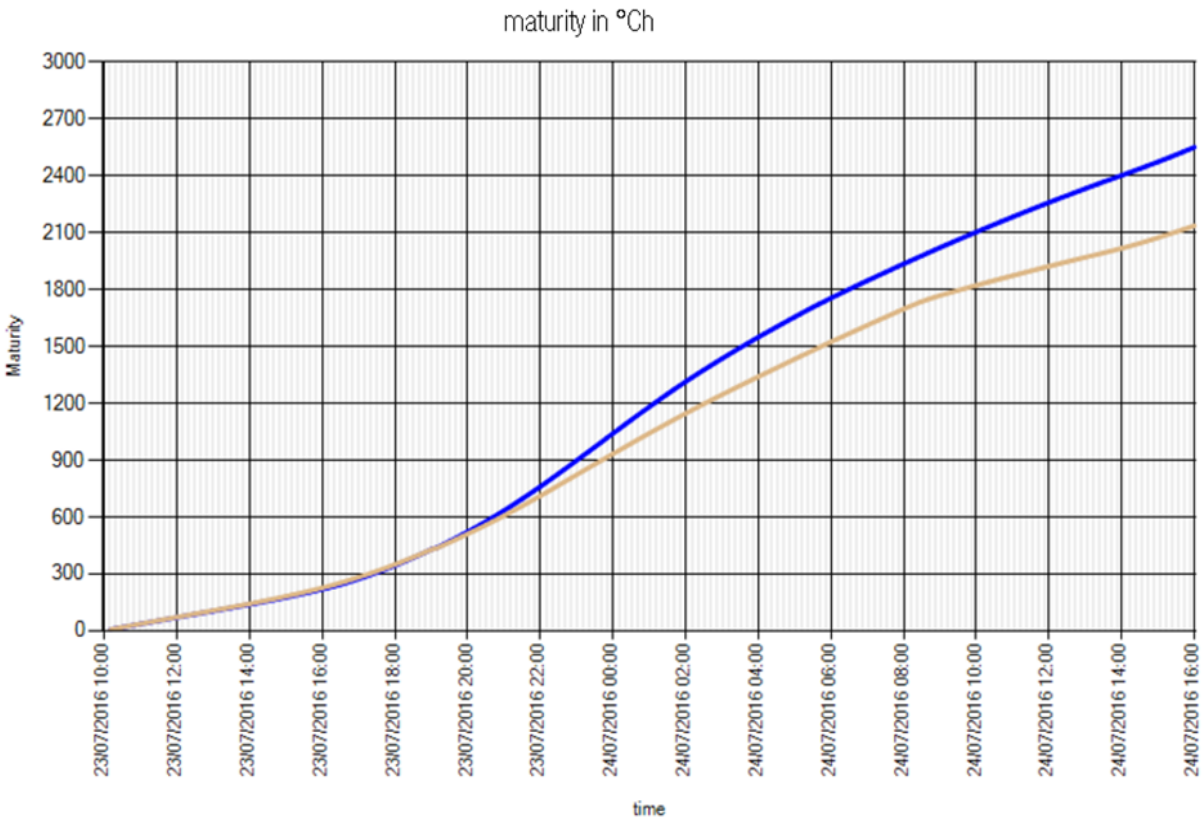
Description:
DMBD C45/20 (68%GGBS 20kg MS) calibration box

C-value:	1.50
a constant:	2.00
standard deviation:	1.86 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
23-07-2016 - Building A1.2,
Time period:
from: 7/23/2016 10:00
to: 7/24/2016 16:00
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



IN-PLACE measurement
Maturity gain

Mix-design D. C45/20, high GGBS 20 KG MS. Slab floor Slab floor sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.2
Locations:
Dubai Hills
part:
Floor slabs

View Sensors
- 159546 - O3
- 175930 - O4

Measurements outside area correlation curve

concrete properties:
DMBD C45/20 (68%GGBS 20kg MS) june_2016

Description:
DMBD C45/20 (68%GGBS 20kg MS) june_2016

Description:
DMBD C45/20 (68%GGBS 20kg MS) Outside cubes

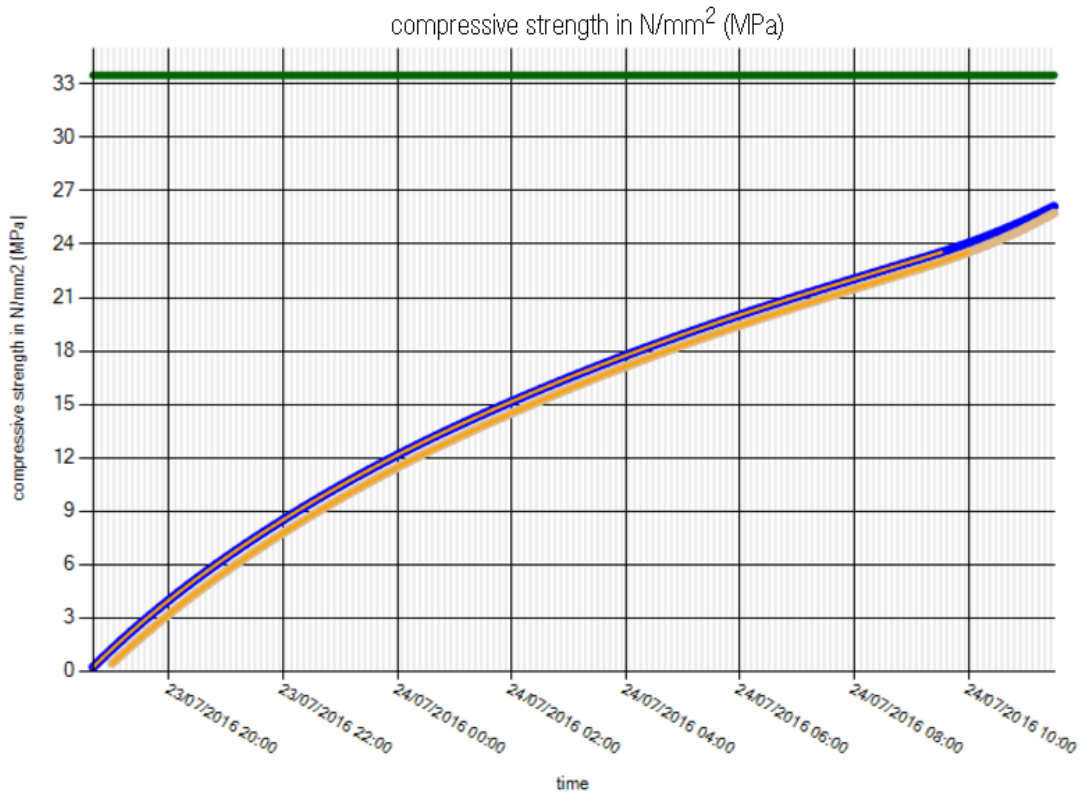
C-value:	1.50
a constant:	1.50
standard deviation:	2.01 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
23-07-2016 - Outside Cubes C45/20 - High GGB

Time period:
from: 7/23/2016 09:50
to: 7/24/2016 11:30
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement Strength gain

Mix-design D. C45/20, high GGBS 20 KG MS. Slab floor Slab floor sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.2
Locations:
Dubai Hills
part:
Floor slabs
View Sensors
- 159546 - Ambient temperature
- 159546 - O3
- 175930 - Ambient temperature
- 175930 - O4

concrete properties:
DMBD C45/20 (68%GGBS 20kg MS) june_2016

Description:
DMBD C45/20 (68%GGBS 20kg MS) june_2016

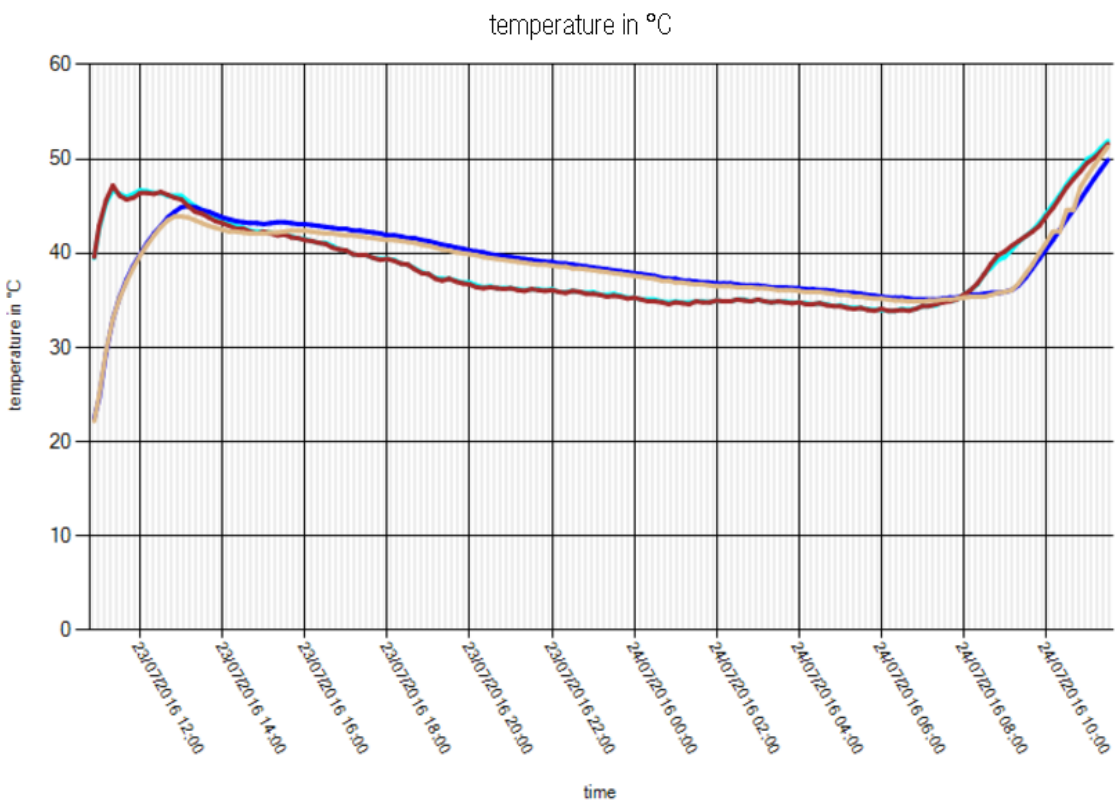
Description:
DMBD C45/20 (68%GGBS 20kg MS) Outside cubes

C-value:	1.50
a constant:	1.50
standard deviation:	2.01 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
23-07-2016 - Outside Cubes C45/20 - High GGBS
Time period:
from: 7/23/2016 09:50
to: 7/24/2016 11:30
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement Temperature evolution

Mix-design D. C45/20, high GGBS 20 KG MS. Slab floor Slab floor sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.2
Locations:
Dubai Hills
part:
Floor slabs

View	Sensors
☑	159546 - O3
☑	175930 - O4

concrete properties:
DMBD C45/20 (68%GGBS 20kg MS) june_2016

Description:
DMBD C45/20 (68%GGBS 20kg MS) june_2016

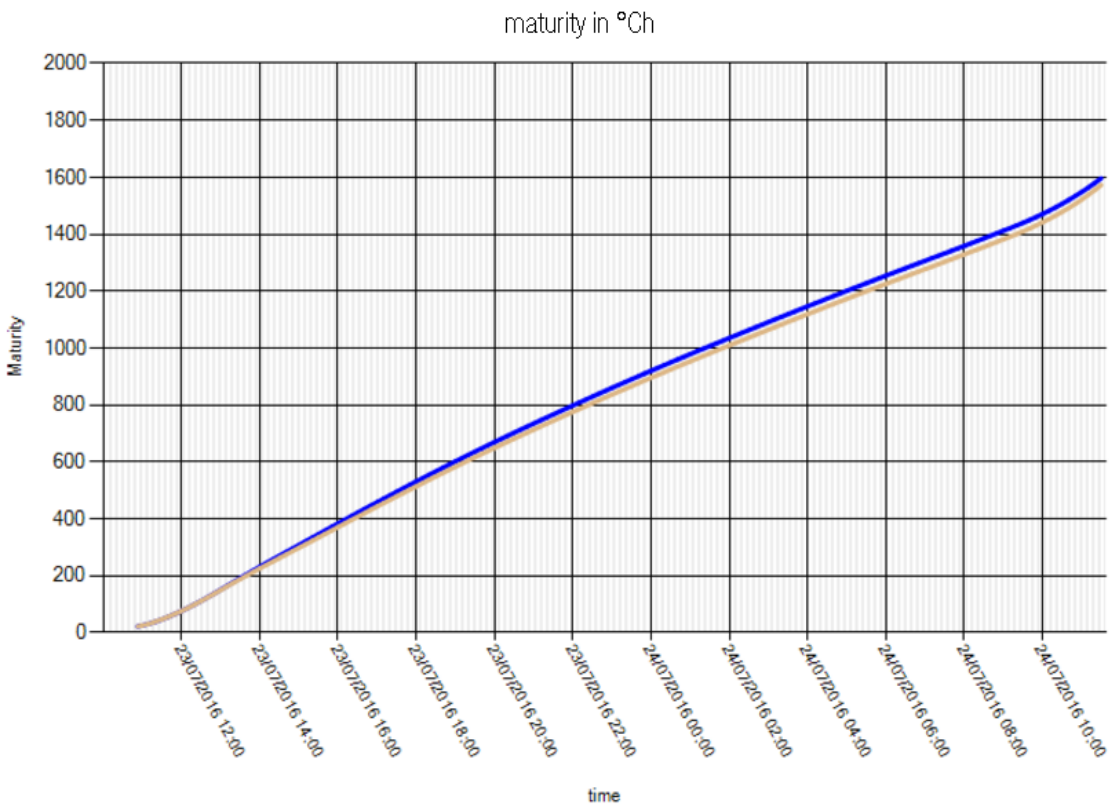
Description:
DMBD C45/20 (68%GGBS 20kg MS) Outside cubes

C-value:	1.50
a constant:	1.50
standard deviation:	2.01 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
23-07-2016 - Outside Cubes C45/20 - High GGBS
Time period:
from: 7/23/2016 09:50
to: 7/24/2016 11:30
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



OUTDOOR measurement
Maturity gain

Mix-design D. C45/20, high GGBS 20 KG MS. Slab floor Slab floor sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.2
Locations:
Dubai Hills
part:
Floor slabs

View	Sensors
☑	175625 - O4
☑	175674 - T3

Measurements outside area correlation curve

concrete properties:
DMBD C45/20 (68%GGBS 20kg MS)

Description:
DMBD C45/20 (68%GGBS 20kg MS)

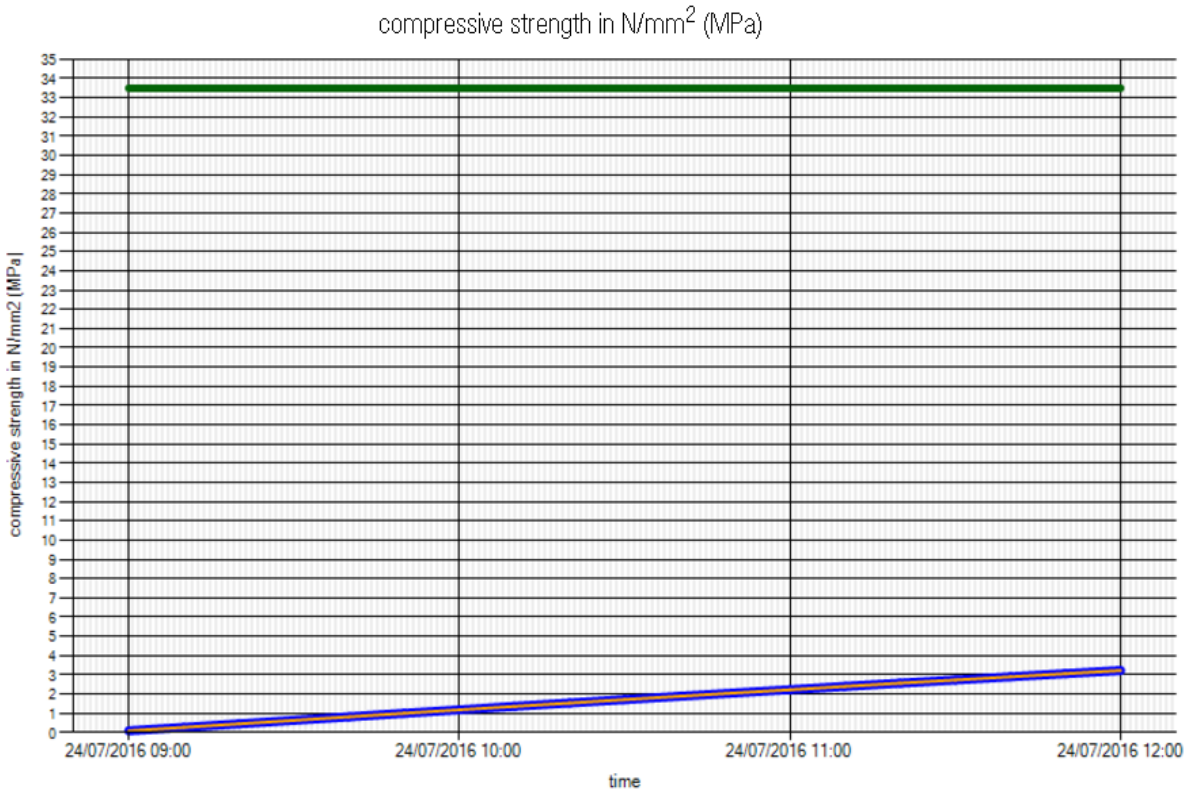
Description:
DMBD C45/20 (68%GGBS 20kg MS) 0.35 33.5MPa Curing tank

C-value:	1.50
a constant:	1.50
standard deviation:	1.97 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
23-07-2016 - Water Tank Cubes C45/20 - High G
Time period:
from: 7/23/2016 10:10
to: 7/24/2016 12:30
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement Strength gain

Mix-design D. C45/20, high GGBS 20 KG MS. Slab floor Slab floor sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.2
Locations:
Dubai Hills
part:
Floor slabs
View Sensors
- 175625 - Ambient temperature
- 175625 - O4
- 175674 - Ambient temperature
- 175674 - T3

concrete properties:
DMBD C45/20 (68%GGBS 20kg MS)

Description:
DMBD C45/20 (68%GGBS 20kg MS)

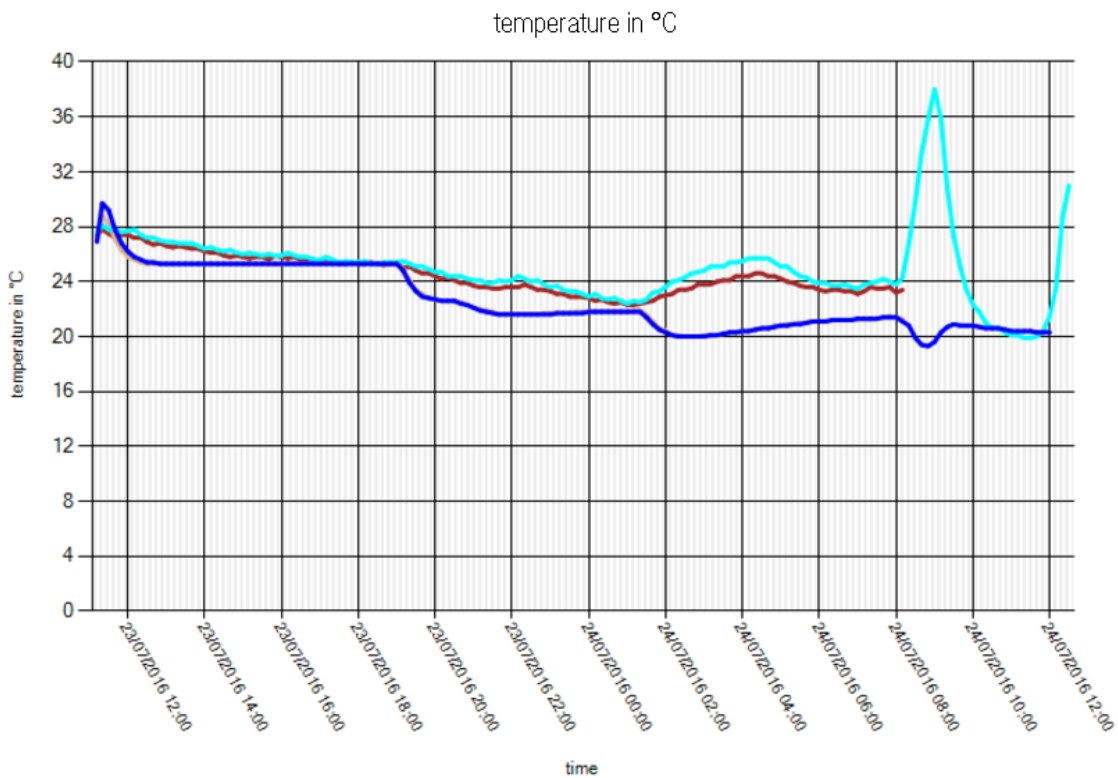
Description:
DMBD C45/20 (68%GGBS 20kg MS) 0.35 33.5MPa Curing tank

C-value:	1.50
a constant:	1.50
standard deviation:	1.97 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
23-07-2016 - Water Tank Cubes C45/20 - High G
Time period:
from: 7/23/2016 10:10
to: 7/24/2016 12:30
measurement completed:

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement Temperature evolution

Mix-design D. C45/20, high GGBS 20 KG MS. Slab floor Slab floor sensor

Projects:
340-046788 - AGCCIC - The Hills Project
structure:
Building A 1.2
Locations:
Dubai Hills
part:
Floor slabs

View	Sensors
☑	175625 - O4
☑	175674 - T3

concrete properties:
DMBD C45/20 (68%GGBS 20kg MS)

Description:
DMBD C45/20 (68%GGBS 20kg MS)

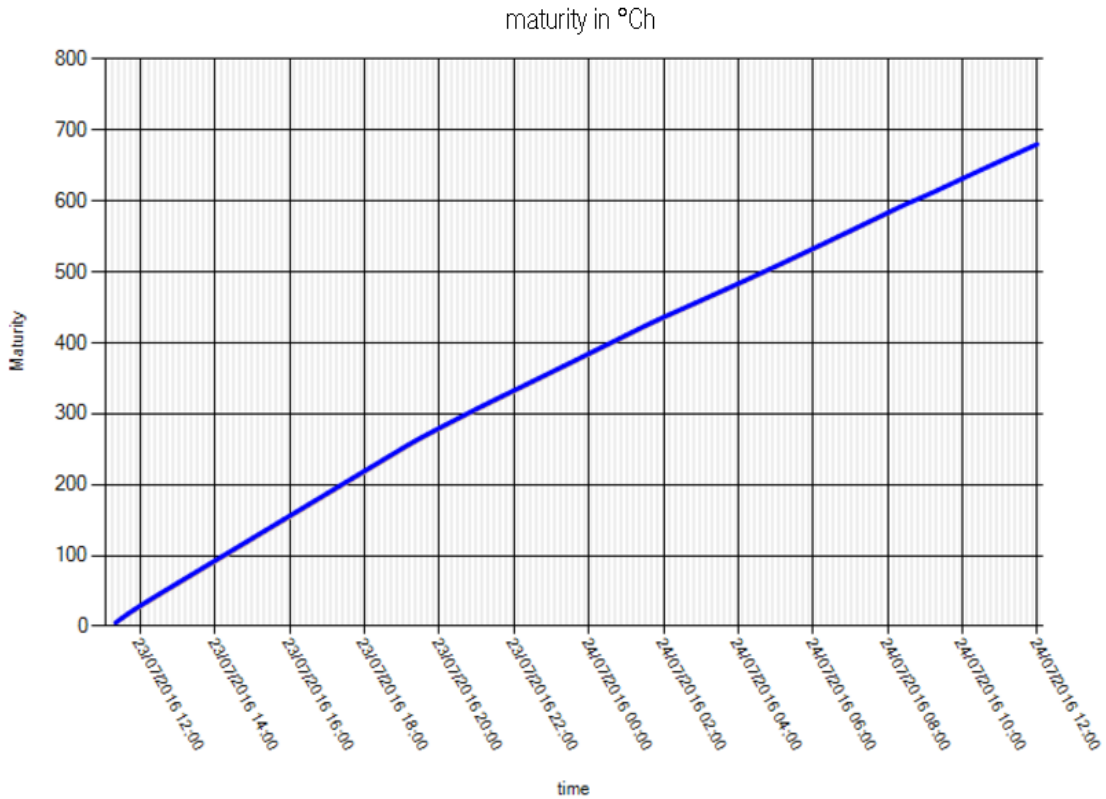
Description:
DMBD C45/20 (68%GGBS 20kg MS) 0.35 33.5MPa Curing tank

C-value:	1.50
a constant:	1.50
standard deviation:	1.97 MPa (N/mm^2)
target value:	33.50 MPa (N/mm^2)

Measurement:
23-07-2016 - Water Tank Cubes C45/20 - High G
Time period:
from: 7/23/2016 10:10
to: 7/24/2016 12:30
measurement completed: ☑

compressive strength | temperature | maturity | correlation curve | data | Appendix

refresh graph Print



WATERTANK measurement
Maturity gain

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The Formwork Experts.

Measurement results VERIFICATION AND DEMONSTRATION as part of TA 157-2016 Concremote – July 2016

Appendix 2

Mix-design A C40/20 high GGBS no Microsilica

Arab Center

Report on compressive strength of concrete cubes

Arab Center المركز العربي
For Engineering Studies للدراسات الهندسية

Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	Report No.	: ARC16032303
Contractor	: DOKA	Date Reported	: 20-07-16
Consultant	: DAR CONSULTANT	Request No.	: AQC16032303
Project No.	: 1178	Sample No.	: ASC16032303
Project Name	: Hills Development Buildings Project		
Structure Reference	: COLUMN ZONE-10 B1 TO GROUND		

Source of Material	: READY MIX BETON	No. of Cubes Tested	: 1
Place of Sampl./Cast.	: Site	Nominal Size	: 150 x 150 x 150 mm
Date of Sampling	: 17-07-16 Time : 23:20	Method of Compaction	: MANUAL
Date of Casting	: 17-07-16 Time : 23:20	Equip.of Compaction	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	Sampled By	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	Cubes Prepared By	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	Sampling Certificate No.	: N.P.

Sample Rcvd. Date	: 19-07-16 Time : 08:00	Dimensions	: Checked
Condition of Cube	: Good	Volume Determination	: By Calculation
Removal of Fins	: Nil	Actual Test Age (Days)	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	Rqrd Test Age (Days)	: 2
Moisture Condition	: Moist	Sample Brought In By	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	Date Tested	: 19-07-16
Test Method Var.	: Nil	Tested By	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	HO3	150	150	150	8.204	2430	688	30.5	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (15:08)

Spec. Strength (N/mm²) : C40/20-HIGH GGBS

Notes : The test results represent the submitted sample only.

0001116515.

Eng. Harees Sulaiman
Laboratory Supervisor

Arab Center المركز العربي
For Engineering Studies للدراسات الهندسية

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هاتف : ٨٨٥٦٤٦٦-٤-٩٧١+
فاكس : ٨٨٥٦٤٦٠-٤-٩٧١+
البريد الإلكتروني : aces3@emirates.net.ae
موقع الإنترنت : www.aces-int.com

ACCREDITED Testing Laboratory
DAC LB-006
ISO 9001 BUREAU VERITAS Certification
*IND 10. 1102A

*Reported tests/services are carried out under the controls established by a Bureau Veritas Certification approved management system that conforms with ISO 9001 :2008

Arab Center المركز العربي
For Engineering Studies للدراسات الهندسية

Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	Report No.	: ARC16031763
Contractor	: DOKA	Date Reported	: 20-07-16
Consultant	: DAR CONSULTANT	Request No.	: AQC16031763
Project No.	: 1178	Sample No.	: ASC16031763
Project Name	: Hills Development Buildings Project		
Structure Reference	: COLUMN ZONE-10 B1 TO GROUND		

Source of Material	: READY MIX BETON	No. of Cubes Tested	: 1
Place of Sampl./Cast.	: Site	Nominal Size	: 150 x 150 x 150 mm
Date of Sampling	: 17-07-16 Time : 23:20	Method of Compaction	: MANUAL
Date of Casting	: 17-07-16 Time : 23:20	Equip.of Compaction	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	Sampled By	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	Cubes Prepared By	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	Sampling Certificate No.	: N.P.

Sample Rcvd. Date	: 19-07-16 Time : 08:00	Dimensions	: Checked
Condition of Cube	: Good	Volume Determination	: By Calculation
Removal of Fins	: Nil	Actual Test Age (Days)	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	Rqrd Test Age (Days)	: 2
Moisture Condition	: Moist	Sample Brought In By	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	Date Tested	: 19-07-16
Test Method Var.	: Nil	Tested By	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	HO2	150	150	150	8.326	2470	717	32.0	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TEST (15:04)

Spec. Strength (N/mm²) : C40/20-HIGH GGBS

Notes : The test results represent the submitted sample only.

0001115530.

Eng. Harees Sulaiman
Laboratory Supervisor

Arab Center المركز العربي
For Engineering Studies للدراسات الهندسية

P.O. Box : 60823, Dubai - UAE
Tel. : +971-4-8856466
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E-mail : aces3@emirates.net.ae
Website : www.aces-int.com

ص.ب. : ٦٠٨٢٣، دبي - ا.ع.م.
هاتف : ٨٨٥٦٤٦٦-٤-٩٧١+
فاكس : ٨٨٥٦٤٦٠-٤-٩٧١+
البريد الإلكتروني : aces3@emirates.net.ae
موقع الإنترنت : www.aces-int.com

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DAC LB-006
ISO 9001 BUREAU VERITAS Certification
*IND 10. 1102A

Arab Center المركز العربي
For Engineering Studies للدراسات الهندسية

Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	Report No.	: ARC16032301
Contractor	: DOKA	Date Reported	: 20-07-16
Consultant	: DAR CONSULTANT	Request No.	: AQC16032301
Project No.	: 1178	Sample No.	: ASC16032301
Project Name	: Hills Development Buildings Project		
Structure Reference	: COLUMN ZONE-10 B1 TO GROUND		

Source of Material	: READY MIX BETON	No. of Cubes Tested	: 1
Place of Sampl./Cast.	: Site	Nominal Size	: 150 x 150 x 150 mm
Date of Sampling	: 17-07-16 Time : 23:20	Method of Compaction	: MANUAL
Date of Casting	: 17-07-16 Time : 23:20	Equip.of Compaction	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	Sampled By	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	Cubes Prepared By	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	Sampling Certificate No.	: N.P.

Sample Rcvd. Date	: 19-07-16 Time : 08:00	Dimensions	: Checked
Condition of Cube	: Good	Volume Determination	: By Calculation
Removal of Fins	: Nil	Actual Test Age (Days)	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	Rqrd Test Age (Days)	: 2
Moisture Condition	: Moist	Sample Brought In By	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	Date Tested	: 19-07-16
Test Method Var.	: Nil	Tested By	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	HT2	150	150	150	8.419	2490	367	16.5	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (15:19)

Spec. Strength (N/mm²) : C40/20-HIGH GGBS

Notes : The test results represent the submitted sample only.

0001116513.

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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	Report No.	: ARC16032302
Contractor	: DOKA	Date Reported	: 20-07-16
Consultant	: DAR CONSULTANT	Request No.	: AQC16032302
Project No.	: 1178	Sample No.	: ASC16032302
Project Name	: Hills Development Buildings Project		
Structure Reference	: COLUMN ZONE-10 B1 TO GROUND		

Source of Material	: READY MIX BETON	No. of Cubes Tested	: 1
Place of Sampl./Cast.	: Site	Nominal Size	: 150 x 150 x 150 mm
Date of Sampling	: 17-07-16 Time : 23:20	Method of Compaction	: MANUAL
Date of Casting	: 17-07-16 Time : 23:20	Equip.of Compaction	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	Sampled By	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	Cubes Prepared By	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	Sampling Certificate No.	: N.P.

Sample Rcvd. Date	: 19-07-16 Time : 08:00	Dimensions	: Checked
Condition of Cube	: Good	Volume Determination	: By Calculation
Removal of Fins	: Nil	Actual Test Age (Days)	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	Rqrd Test Age (Days)	: 2
Moisture Condition	: Moist	Sample Brought In By	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	Date Tested	: 19-07-16
Test Method Var.	: Nil	Tested By	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	HT3	150	150	150	8.671	2570	379	17.0	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (15:21)

Spec. Strength (N/mm²) : C40/20-HIGH GGBS

Notes : The test results represent the submitted sample only.

0001116514.

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Appendix 2

Mix-design B C45/20 low GGBS 20 kg Microsilica

Arab Center

Report on compressive strength of concrete cubes

Arab Center المركز العربي
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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	Report No.	: ARC16032297
Contractor	: DOKA	Date Reported	: 22-07-16
Consultant	: DAR CONSULTANT	Request No.	: AQC16032297
Project No.	: 1178	Sample No.	: ASC16032297
Project Name	: Hills Development Buildings Project		
Structure Reference	: BUILDING A 1.1, 8TH FLOOR SLAB		

Source of Material	: READY MIX BETON	No. of Cubes Tested	: 1
Place of Sampl./Cast.	: Site	Nominal Size	: 150 x 150 x 150 mm
Date of Sampling	: 19-07-16 Time : 21:30	Method of Compaction	: MANUAL
Date of Casting	: 19-07-16 Time : 21:30	Equip.of Compaction	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	Sampled By	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	Cubes Prepared By	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	Sampling Certificate No.	: N.P.

Sample Rcvd. Date	: 20-07-16 Time : 15:30	Dimensions	: Checked
Condition of Cube	: Good	Volume Determination	: By Calculation
Removal of Fins	: Nil	Actual Test Age (Days)	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	Rqrd Test Age (Days)	: 2
Moisture Condition	: Moist	Sample Brought In By	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	Date Tested	: 21-07-16
Test Method Var.	: Nil	Tested By	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	LO2	150	150	150	8.434	2500	721	32.0	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (16:04)

Spec. Strength (N/mm²) : C45/20-LOW GGBS

Notes : The test results represent the submitted sample only.

0001116509.

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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	**Report No.**	: ARC16032298
Contractor	: DOKA	**Date Reported**	: 22-07-16
Consultant	: DAR CONSULTANT	**Request No.**	: AQC16032298
Project No.	: 1178	**Sample No.**	: ASC16032298
Project Name	: Hills Development Buildings Project		
Structure Reference	: BUILDING A 1.1, 8TH FLOOR SLAB		

Source of Material	: READY MIX BETON	**No. of Cubes Tested**	: 1
Place of Sampl./Cast.	: Site	**Nominal Size**	: 150 x 150 x 150 mm
Date of Sampling	: 19-07-16 **Time** : 21:30	**Method of Compaction**	: MANUAL
Date of Casting	: 19-07-16 **Time** : 21:30	**Equip.of Compaction**	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	**Sampled By**	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	**Cubes Prepared By**	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	**Sampling Certificate No.**	: N.P.

Sample Rcvd. Date	: 20-07-16 **Time** : 15:30	**Dimensions**	: Checked
Condition of Cube	: Good	**Volume Determination**	: By Calculation
Removal of Fins	: Nil	**Actual Test Age (Days)**	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	**Rqrd Test Age (Days)**	: 2
Moisture Condition	: Moist	**Sample Brought In By**	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	**Date Tested**	: 21-07-16
Test Method Var.	: Nil	**Tested By**	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	LO3	150	150	150	8.432	2500	705	31.5	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (16:07)

Spec. Strength (N/mm²) : C45/20-LOW GGBS

Notes : The test results represent the submitted sample only.

0001116510.

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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	Report No.	: ARC16032300
Contractor	: DOKA	Date Reported	: 22-07-16
Consultant	: DAR CONSULTANT	Request No.	: AQC16032300
Project No.	: 1178	Sample No.	: ASC16032300
Project Name	: Hills Development Buildings Project		
Structure Reference	: BUILDING A 1.1, 8TH FLOOR SLAB		

Source of Material	: READY MIX BETON	No. of Cubes Tested	: 1
Place of Sampl./Cast.	: Site	Nominal Size	: 150 x 150 x 150 mm
Date of Sampling	: 19-07-16 Time : 21:27	Method of Compaction	: MANUAL
Date of Casting	: 19-07-16 Time : 21:27	Equip.of Compaction	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	Sampled By	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	Cubes Prepared By	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	Sampling Certificate No.	: N.P.

Sample Rcvd. Date	: 20-07-16 Time : 15:30	Dimensions	: Checked
Condition of Cube	: Good	Volume Determination	: By Calculation
Removal of Fins	: Nil	Actual Test Age (Days)	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	Rqrd Test Age (Days)	: 2
Moisture Condition	: Moist	Sample Brought In By	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	Date Tested	: 21-07-16
Test Method Var.	: Nil	Tested By	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	LT3	150	150	150	8.518	2520	275	12.0	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (16:13)

Spec. Strength (N/mm²) : C45/20-LOW GGBS

Notes : The test results represent the submitted sample only.

0001116512.

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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	Report No.	: ARC16032299
Contractor	: DOKA	Date Reported	: 22-07-16
Consultant	: DAR CONSULTANT	Request No.	: AQC16032299
Project No.	: 1178	Sample No.	: ASC16032299
Project Name	: Hills Development Buildings Project		
Structure Reference	: BUILDING A 1.1, 8TH FLOOR SLAB		

Source of Material	: READY MIX BETON	No. of Cubes Tested	: 1
Place of Sampl./Cast.	: Site	Nominal Size	: 150 x 150 x 150 mm
Date of Sampling	: 19-07-16 Time : 21:27	Method of Compaction	: MANUAL
Date of Casting	: 19-07-16 Time : 21:27	Equip.of Compaction	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	Sampled By	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	Cubes Prepared By	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	Sampling Certificate No.	: N.P.

Sample Rcvd. Date	: 20-07-16 Time : 15:30	Dimensions	: Checked
Condition of Cube	: Good	Volume Determination	: By Calculation
Removal of Fins	: Nil	Actual Test Age (Days)	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	Rqrd Test Age (Days)	: 2
Moisture Condition	: Moist	Sample Brought In By	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	Date Tested	: 21-07-16
Test Method Var.	: Nil	Tested By	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	LT2	150	150	150	8.661	2570	280	12.5	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (16:11)

Spec. Strength (N/mm²) : C45/20-LOW GGBS

Notes : The test results represent the submitted sample only.

0001116511.

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Appendix 2

Mix-design C C40/20 low GGBS no Microsilica

Arab Center

Report on compressive strength of concrete cubes

Arab Center المركز العربي
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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	**Report No.**	: ARC16031725
Contractor	: DOKA	**Date Reported**	: 20-07-16
Consultant	: DAR CONSULTANT	**Request No.**	: AQC16031725
Project No.	: 1178	**Sample No.**	: ASC16031725
Project Name	: Hills Development Buildings Project		
Structure Reference	: COLUMN ZONE-10 B1 TO GROUND		

Source of Material	: READY MIX BETON	**No. of Cubes Tested**	: 1
Place of Sampl./Cast.	: Site	**Nominal Size**	: 150 x 150 x 150 mm
Date of Sampling	: 17-07-16 **Time** : 23:20	**Method of Compaction**	: MANUAL
Date of Casting	: 17-07-16 **Time** : 23:20	**Equip.of Compaction**	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	**Sampled By**	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	**Cubes Prepared By**	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	**Sampling Certificate No.**	: N.P.

Sample Rcvd. Date	: 18-07-16 **Time** : 19:45	**Dimensions**	: Checked
Condition of Cube	: Good	**Volume Determination**	: By Calculation
Removal of Fins	: Nil	**Actual Test Age (Days)**	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	**Rqrd Test Age (Days)**	: 2
Moisture Condition	: Moist	**Sample Brought In By**	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	**Date Tested**	: 19-07-16
Test Method Var.	: Nil	**Tested By**	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	LO2	150	150	150	8.605	2550	719	32.0	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (5:11 AM)

Spec. Strength (N/mm²) : C40/20-LOW GGBS

Notes : The test results represent the submitted sample only.

0001115447.

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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	**Report No.**	: ARC16032306
Contractor	: DOKA	**Date Reported**	: 20-07-16
Consultant	: DAR CONSULTANT	**Request No.**	: AQC16032306
Project No.	: 1178	**Sample No.**	: ASC16032306
Project Name	: Hills Development Buildings Project		
Structure Reference	: COLUMN ZONE-10 B1 TO GROUND		

Source of Material	: READY MIX BETON	**No. of Cubes Tested**	: 1
Place of Sampl./Cast.	: Site	**Nominal Size**	: 150 x 150 x 150 mm
Date of Sampling	: 17-07-16 **Time** : 23:20	**Method of Compaction**	: MANUAL
Date of Casting	: 17-07-16 **Time** : 23:20	**Equip.of Compaction**	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	**Sampled By**	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	**Cubes Prepared By**	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	**Sampling Certificate No.**	: N.P.

Sample Rcvd. Date	: 18-07-16 **Time** : 19:45	**Dimensions**	: Checked
Condition of Cube	: Good	**Volume Determination**	: By Calculation
Removal of Fins	: Nil	**Actual Test Age (Days)**	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	**Rqrd Test Age (Days)**	: 2
Moisture Condition	: Moist	**Sample Brought In By**	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	**Date Tested**	: 19-07-16
Test Method Var.	: Nil	**Tested By**	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	LO3	150	150	150	8.570	2540	683	30.5	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (5:12 AM)

Spec. Strength (N/mm²) : C40/20-LOW GGBS

Notes : The test results represent the submitted sample only.

0001116518.

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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	**Report No.**	: ARC16031724
Contractor	: DOKA	**Date Reported**	: 20-07-16
Consultant	: DAR CONSULTANT	**Request No.**	: AQC16031724
Project No.	: 1178	**Sample No.**	: ASC16031724
Project Name	: Hills Development Buildings Project		
Structure Reference	: COLUMN ZONE-10 B1 TO GROUND		

Source of Material	: READY MIX BETON	**No. of Cubes Tested**	: 1
Place of Sampl./Cast.	: Site	**Nominal Size**	: 150 x 150 x 150 mm
Date of Sampling	: 17-07-16 **Time** : 23:20	**Method of Compaction**	: MANUAL
Date of Casting	: 17-07-16 **Time** : 23:20	**Equip.of Compaction**	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	**Sampled By**	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	**Cubes Prepared By**	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	**Sampling Certificate No.**	: N.P.

Sample Rcvd. Date	: 18-07-16 **Time** : 19:45	**Dimensions**	: Checked
Condition of Cube	: Good	**Volume Determination**	: By Calculation
Removal of Fins	: Nil	**Actual Test Age (Days)**	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	**Rqrd Test Age (Days)**	: 2
Moisture Condition	: Moist	**Sample Brought In By**	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	**Date Tested**	: 19-07-16
Test Method Var.	: Nil	**Tested By**	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	LT1	150	150	150	8.584	2540	362	16.0	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (5:16 AM)

Spec. Strength (N/mm²) : C40/20-LOW GGBS

Notes : The test results represent the submitted sample only.

0001115446.

Eng. Harees Sulaiman
Laboratory Supervisor

Arab Center المركز العربي للدراسات الهندسية For Engineering Studies

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Arab Center المركز العربي
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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	**Report No.**	: ARC16032304
Contractor	: DOKA	**Date Reported**	: 20-07-16
Consultant	: DAR CONSULTANT	**Request No.**	: AQC16032304
Project No.	: 1178	**Sample No.**	: ASC16032304
Project Name	: Hills Development Buildings Project		
Structure Reference	: COLUMN ZONE-10 B1 TO GROUND		

Source of Material	: READY MIX BETON	**No. of Cubes Tested**	: 1
Place of Sampl./Cast.	: Site	**Nominal Size**	: 150 x 150 x 150 mm
Date of Sampling	: 17-07-16 **Time** : 23:20	**Method of Compaction**	: MANUAL
Date of Casting	: 17-07-16 **Time** : 23:20	**Equip.of Compaction**	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	**Sampled By**	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	**Cubes Prepared By**	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	**Sampling Certificate No.**	: N.P.

Sample Rcvd. Date	: 18-07-16 **Time** : 19:45	**Dimensions**	: Checked
Condition of Cube	: Good	**Volume Determination**	: By Calculation
Removal of Fins	: Nil	**Actual Test Age (Days)**	: 2
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	**Rqrd Test Age (Days)**	: 2
Moisture Condition	: Moist	**Sample Brought In By**	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	**Date Tested**	: 19-07-16
Test Method Var.	: Nil	**Tested By**	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	LT2	150	150	150	8.580	2540	355	16.0	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TESTING (5:17 AM)

Spec. Strength (N/mm²) : C40/20-LOW GGBS

Notes : The test results represent the submitted sample only.

0001116516.

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Appendix 2

Mix-design D C45/20 high GGBS 20 kg Microsilica

Arab Center

Report on compressive strength of concrete cubes

Arab Center المركز العربي
For Engineering Studies للدراسات الهندسية

Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	**Report No.**	: ARC16032520
Contractor	: DOKA	**Date Reported**	: 25-07-16
Consultant	: DAR CONSULTANT	**Request No.**	: AQC16032520
Project No.	: 1178	**Sample No.**	: ASC16032520
Project Name	: Hills Development Buildings Project		
Structure Reference	: BUILDING A 2.3 PODIUM SLAB		

Source of Material	: READY MIX BETON	**No. of Cubes Tested**	: 1
Place of Sampl./Cast.	: Site	**Nominal Size**	: 150 x 150 x 150 mm
Date of Sampling	: 23-07-16 **Time** : 10:50	**Method of Compaction**	: MANUAL
Date of Casting	: 23-07-16 **Time** : 10:50	**Equip.of Compaction**	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	**Sampled By**	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	**Cubes Prepared By**	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	**Sampling Certificate No.**	: N.P.

Sample Rcvd. Date	: 24-07-16 **Time** : 09:15	**Dimensions**	: Checked
Condition of Cube	: Good	**Volume Determination**	: By Calculation
Removal of Fins	: Nil	**Actual Test Age (Days)**	: 1
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	**Rqrd Test Age (Days)**	: 1
Moisture Condition	: Moist	**Sample Brought In By**	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	**Date Tested**	: 24-07-16
Test Method Var.	: Nil	**Tested By**	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	HO4	150	150	150	8.465	2510	670	30.0	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TEST (11:49)

Spec. Strength (N/mm²) : C45/20 HIGH GGBS

Notes : The test results represent the submitted sample only.

0001116883.

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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	**Report No.**	: ARC16032519
Contractor	: DOKA	**Date Reported**	: 25-07-16
Consultant	: DAR CONSULTANT	**Request No.**	: AQC16032519
Project No.	: 1178	**Sample No.**	: ASC16032519
Project Name	: Hills Development Buildings Project		
Structure Reference	: BUILDING A 2.3 PODIUM SLAB		

Source of Material	: READY MIX BETON	**No. of Cubes Tested**	: 1
Place of Sampl./Cast.	: Site	**Nominal Size**	: 150 x 150 x 150 mm
Date of Sampling	: 23-07-16 **Time** : 10:50	**Method of Compaction**	: MANUAL
Date of Casting	: 23-07-16 **Time** : 10:50	**Equip.of Compaction**	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	**Sampled By**	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	**Cubes Prepared By**	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	**Sampling Certificate No.**	: N.P.

Sample Rcvd. Date	: 24-07-16 **Time** : 09:15	**Dimensions**	: Checked
Condition of Cube	: Good	**Volume Determination**	: By Calculation
Removal of Fins	: Nil	**Actual Test Age (Days)**	: 1
Curing/Storage (Lab)	: BS 1881:P 111;1983 (Amd. 9387-97)	**Rqrd Test Age (Days)**	: 1
Moisture Condition	: Moist	**Sample Brought In By**	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	**Date Tested**	: 24-07-16
Test Method Var.	: Nil	**Tested By**	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	HO3	150	150	150	8.372	2480	691	30.5	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TEST (11:45)

Spec. Strength (N/mm²) : C45/20 HIGH GGBS

Notes : The test results represent the submitted sample only.

0001116881.

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Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	Report No.	: ARC16032522
Contractor	: DOKA	Date Reported	: 25-07-16
Consultant	: DAR CONSULTANT	Request No.	: AQC16032522
Project No.	: 1178	Sample No.	: ASC16032522
Project Name	: Hills Development Buildings Project		
Structure Reference	: BUILDING A 2.3 PODIUM SLAB		

Source of Material	: READY MIX BETON	No. of Cubes Tested	: 1
Place of Sampl./Cast.	: Site	Nominal Size	: 150 x 150 x 150 mm
Date of Sampling	: 23-07-16 Time : 10:50	Method of Compaction	: MANUAL
Date of Casting	: 23-07-16 Time : 10:50	Equip.of Compaction	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	Sampled By	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	Cubes Prepared By	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	Sampling Certificate No.	: N.P.

Sample Rcvd. Date	: 24-07-16 Time : 09:15	Dimensions	: Checked
Condition of Cube	: Good	Volume Determination	: By Calculation
Removal of Fins	: Nil	Actual Test Age (Days)	: 1
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	Rqrd Test Age (Days)	: 1
Moisture Condition	: Moist	Sample Brought In By	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	Date Tested	: 24-07-16
Test Method Var.	: Nil	Tested By	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	HT2	150	150	150	8.318	2460	149	6.5	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TEST (11:52)

Spec. Strength (N/mm²) : C45/20 HIGH GGBS

Notes : The test results represent the submitted sample only.

0001116885.

Eng. Harees Sulaiman
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For Engineering Studies للدراسات الهندسية

Report on Compressive Strength of Concrete Cubes

Owner	: AL GHANDI & CCIC	**Report No.**	: ARC16032523
Contractor	: DOKA	**Date Reported**	: 25-07-16
Consultant	: DAR CONSULTANT	**Request No.**	: AQC16032523
Project No.	: 1178	**Sample No.**	: ASC16032523
Project Name	: Hills Development Buildings Project		
Structure Reference	: BUILDING A 2.3 PODIUM SLAB		

Source of Material	: READY MIX BETON	**No. of Cubes Tested**	: 1
Place of Sampl./Cast.	: Site	**Nominal Size**	: 150 x 150 x 150 mm
Date of Sampling	: 23-07-16 **Time** : 10:50	**Method of Compaction**	: MANUAL
Date of Casting	: 23-07-16 **Time** : 10:50	**Equip.of Compaction**	: COMPACTING BAR
Sampling Method	: BS 1881:1983 PT 101 Amd. 6728-91	**Sampled By**	: CONTRACTOR'S REP.
Curing/Storage (Site)	: N.P.	**Cubes Prepared By**	: CONTRACTOR'S REP.
Certificate Attached	: Sampling(NP), Making(NP), Curing(NP)	**Sampling Certificate No.**	: N.P.

Sample Rcvd. Date	: 24-07-16 **Time** : 09:15	**Dimensions**	: Checked
Condition of Cube	: Good	**Volume Determination**	: By Calculation
Removal of Fins	: Nil	**Actual Test Age (Days)**	: 1
Curing/Storage (Lab)	: BS 1881:P 111:1983 (Amd. 9387-97)	**Rqrd Test Age (Days)**	: 1
Moisture Condition	: Moist	**Sample Brought In By**	: CONTRACTOR'S REP.
Test Method	: BS 1881:1983 PT 116 Amd. 6720-91	**Date Tested**	: 24-07-16
Test Method Var.	: Nil	**Tested By**	: Harold

Spec. No.	Client Cube Reference	Dimensions (mm) L	W	H	Mass as Received (kg)	Density as Received (kg/m³)	Max. Load at Failure (kN)	Comp. Strength (N/mm²)	Type of Fracture
1	HT3	150	150	150	8.496	2520	147	6.5	Satisfactory

Remarks : Dimensions of cubes (Spec# 1) were within 1% of nominal size.
TIME OF TEST (11:55)

Spec. Strength (N/mm²) : C45/20 HIGH GGBS

Notes : The test results represent the submitted sample only.

0001116886.

Eng. Harees Sulaiman
Laboratory Supervisor

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حكومة دبي
GOVERNMENT OF DUBAI

بلدية دبي
DUBAI MUNICIPALITY

CERTIFICATE OF TECHNICAL APPROVAL

Dubai Central Laboratory Department (DCLD) of Dubai Municipality,
hereby award this certificate to :

DOKA GULF FZE

For the product(s)

CONCREMOTE

(As per the attached details)

Manufactured by :
DOKA INDUSTRIES GmbH
at Factory of
BAS Research &Technology –Venlo, the Netherlands

ENGR. AMIN AHMMED MOHAMMAD
Director, Dubai Central Laboratory Department
Dubai Municipality

TA Certificate No.: 157
Valid Until : 13-11-2017

DCL
TECHNICAL APPROVAL
TAC -157
Concremote Sensor

Current Issue Date: 14-11-2016
Original Issue Date:14-11-2016

The above product(s) have been assessed and found fit for their intended use, provided they are used according to the supplier instructions.

The attached details bearing the same Certificate No. forms an integral part of this certificate.
This certificate is subject to the Terms and Conditions of the technical approval system

F-RS-007

1) **The company:** Doka Gulf FZE

2) **Product trade name:** "Concremote"

3) **Manufacturers:** Doka Industries GmbH

4) **Factory**: BAS Research & Technology located in Venlo City, Netherlands

5) **Product Description:** :"Concremote" is a digital temperature measurement system, GPRS network based, which provides real-time insight in the temperature profile of early age , Concremote determines the actual compressive strength gain of the concrete structure by converting concrete maturity. Concremote is an alternative to early age laboratory and field cured test specimens,

6) **Product Intended use:** The products is intended to be used for estimation of early age concrete strength based on the maturity concept for various structural elements

7) **Product identification**

Concremote slab sensor shall be identified as follows

- The letters ""Concremote""
- DCL TA mark –DCL -157
- Running number

8) **Product characteristics**

Remote digital temperature sensor devices specially designed for usage in and on wet concrete.

- GSM GPRS machine to machine communication between sensor and data server via internet data protocol
- Robust construction site capable outer form and battery. Operating climatological conditions minus 50 Celsius up to plus 95 Celsius.
- Sensor measures concrete and outdoor temperature every 10 minutes including unique time-stamp and sensor identification number. The measurement data are submitted every 60 minutes (6 measurement results) to central located data server facility.
- Data server facility is located in Amsterdam the Netherlands at a special data service provider. In case data server facility in Amsterdam cannot be reached a fallback data server facility in Venlo (150 kilometer away from Amsterdam facility) is active.
- In case sensors are not successful in transferring measurement data each sensor includes a memory function with a capacity of minimum 3 days of measurement results. Sensor will automatically retry to connect to data server facility every 60 minutes.

- Sensors are activated at job-site by placement (slab-floor sensor) or connecting plug to outer form once concrete has been placed.
- After receiving measurement results, sensor ID and time-stamp data is processed. Maturity results are defined and corresponding compressive strength to maturity is computed. Concremote software uses NEN 5970 weighted maturity method to define (cumulated) maturity

9) Tests conducted

The calibration for each concrete mix design shall be conducted as per Doka Concremote procedures. Concrete technologists from Doka shall simulate expected compressive strength gain per curing regime and ensure that a certified laboratory will test specimens at correct timings. After acceptance of the test results Concremote concrete technology center defines the correlation curves of maturity and strength.

10) Scope of approval

The Concremote slab sensor approved for determines the actual compressive strength using the weighted maturity method)

Exclusions:

- Types other than "Concremote slab sensor" shall not be covered in the scope of this approval.

11) Conditions of Approval

a) This approval is granted only to Doka Gulf FZE, no other company, firm or person may hold or claim any entitlement to this technical approval.

b) This Technical Approval will remain valid for the period shown on the Approval Certificate provided that:

   i) The characteristics of the product are unchanged,

   ii) Surveillance checking and/or testing by Dubai Municipality shows compliance with the requirements of this technical approval.

c) In granting this technical approval, Dubai Municipality makes no representation as to:

   i) The presence or absence of patent or similar rights subsisting in "Concremote slab sensor ",

   ii) The legal right of Doka Gulf *FZE to* market in the emirate of Dubai.

d) The Technical Approval shall not be used in such manner as to bring Dubai Municipality into disrepute and Doka Gulf FZE shall not make any statement which Dubai Municipality may consider as misleading.

e) Surveillance

   i) Inspection and testing
   Dubai Municipality maintains the right to inspect the product at any time without prior notice and to collect samples from the product available at client's stores, warehouses or at any building site within Dubai Emirate, for the purpose of verification and/or testing.

   ii) Declarations of shipments
   Doka shall keeps records of all deliveries to customers in Dubai. These records shall be open to examination by Dubai Central Laboratory personnel.

iii) Cost of sampling and testing
Doka Gulf FZE shall bear the cost of all surveillance visits, sampling and testing of the product either at Dubai Central Laboratory or at any other laboratory approved by Dubai Central Laboratory. The testing laboratory may be any local, regional or international laboratory.

iv) TA mark shown in the following image shall be part of the labeling/marking of each sensor to show the required basic information in Arabic and/or English language

v) Failing to satisfy the conditions of this Technical Approval Certificate may be grounds for terminating the Technical Approval.

12) Disclaimer

a) The Dubai Municipality - Dubai Central Laboratory Department shall not be held liable for installation and use the product in the site.

b) The Dubai Municipality - Dubai Central Laboratory Department shall not be held liable for any action (legal or otherwise) raised by any party on matters resulting from implementation of the technical approval.