

## TEST REPORT

Date of issue: 08.10.2015

Work order Number: 22563-01/15

Submitted by: PENETRON HELLAS SA

Address: 52A Thrakomakedonon, 13679 Acharne

Project: -

Data of specimens: 22563-09 with Penetron Admix (R:09.07.2015)  
 22563-05 witness, without Penetron Admix (R:09.07.2015)

Casting Date: 09.07.2015

Manufacturer of concrete: -

Reception Date: 23.06.2015

Origin of sample: Laboratory concrete samples

Date of production of concrete - specimens: 09.07.2015

Date of start of the test: 01.09.2015

Concrete class: C20/25 with maximum aggregate size 31,5mm

Concrete mix design: -

Cement: CEM IV 32,5 LAFARGE

Origin of samples: LAFARGE Quarry

Shape and size of specimens: cubic specimen with dimensions 150x150x150mm

Curing conditions: The specimens were cured in water tank at temperature  $20 \pm 2$  °C

Direction of application of water pressure  
 Deviation from the standard test method: Placed on the bottom perpendicular to the casting direction  
 The applied pressure and the duration of the test is as it is described below, instead of  $5 \pm 0.5$  bar for (72±2)h cited in the standard test method.  
**Depth of penetration of water under pressure EAOT EN12390.08:2009**

**Requested Test: Internal instructions of PENETRON firm focused on PENETRON ADMIX**

## DESCRIPTION OF TEST METHOD

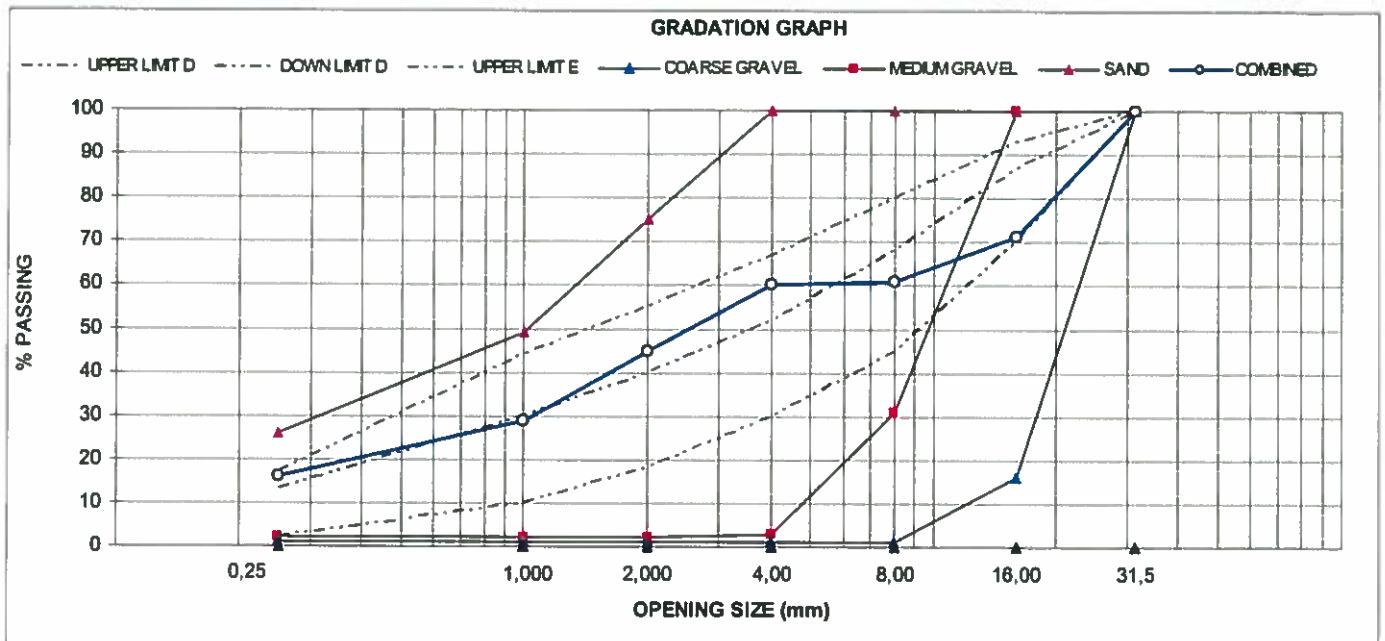
Initially, we produced the cubic specimens with dimensions 150x150x150mm, without the addition of PENETRON ADMIX, according to the below concrete mix design (composition based on 1m<sup>3</sup>):

Cement type CEM IV 32,5	280 kg
Coarse gravel	650 kg
Medium gravel	120 kg
Sand	1108 kg
Water	189 kg
PLASTIMENT 20R	1,26 kg
VISCOCRETE 350	1,68 kg

For the production of the concrete specimens with PENETRON ADMIX, we followed the above concrete mix design, with the addition of 2,24 Kg PENETRON ADMIX on 1m<sup>3</sup>.

The grain size distribution analysis of each aggregate and their specific gravity and water absorption are the following:

Sieves	Sieve opening size (mm)	Coarse gravel	Medium gravel	Sand
31,5	31,5	100	100	100
16	16,0	16	100	100
8	8,0	1	31	100
4	4,0	1	3	100
2	2,0	1	2	75
1	1,0	1	2	49
0,25	0,25	1	2	26
0,075	0,075	0,6	2,0	18



	COARSE GRAVEL	MEDIUM GRAVEL	SAND
Apparent particle density	2,71	2,71	2,70
Particle density on an oven-dried density	2,68	2,66	2,66
Particle density on a saturated and surface-dried basis	2,69	2,68	2,68
Water absorption, %	0,3	0,6	0,6

The mean value of the compressive strength at 28 days of the cubic specimens with dimensions 150x150x150mm was 29,7 MPa for the specimens without PENETRON ADMIX and 30,8 MPa for the specimens with PENETRON ADMIX.

According to EN 12390-8:2009, immediately after the specimen is de-moulded, the surface that is going to be exposed to water pressure is roughened with a wire brush. The water pressure mustn't be applied to a trowelled surface of the specimen. The specimens are cured under water in accordance with the procedures given in EN 12390-2. The test of water penetration shall be started when the specimen is at least 28 years old.

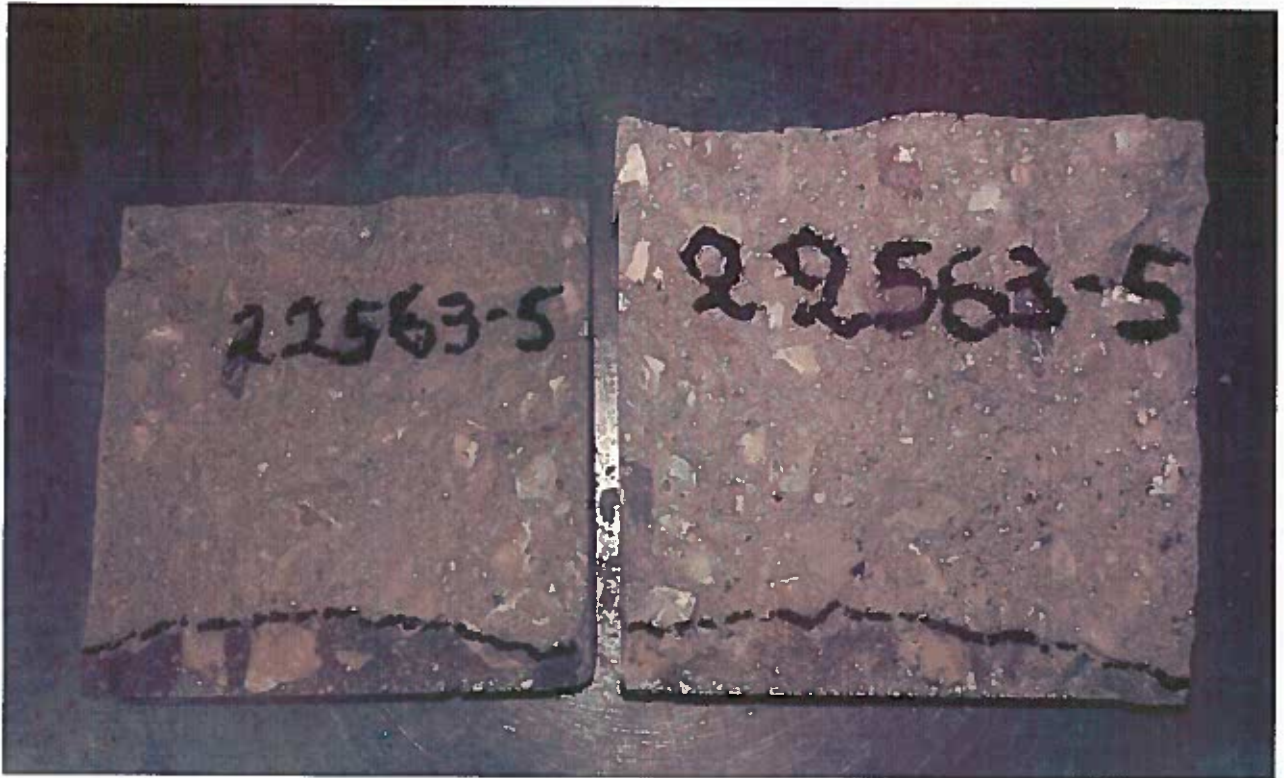
The specimens are positioned on the rubber gaskets, in the apparatus of water penetration, centered in such way that the surface we had roughened be exposed to water pressure. The manometer is adjusted in order to indicate 1 bar during the first and the second day, 3 bar during the third day and 7 bar from the fourth to the seventh day. After the first week, visual observation of the water penetration in the specimen is taken place. After the specimens have dried, the above procedure is repeated for a total of four weeks. At the end of each week we observe the water penetration in each specimen. After the end of the test, we remove the specimens from the apparatus and we wipe the face on which the water pressure has been applied so that we remove the excess water. The specimens are splitted in half, perpendicularly to the face on which the water pressure was applied. We place the face of the specimens exposed to water pressure on the bottom and as soon as the split face has dried to such extent that the water pressure front can be clearly seen, we mark the water front of the specimen. In the end, we mark the maximum depth of penetration.

## RESULTS

	With Penetron		Without Penetron	
	Average depth of water penetration mm	Maximum value of depth penetration mm	Average depth of water penetration mm	Maximum value of depth penetration mm
<b>after the end of the fourth week</b>	<b>0</b> 22563-09 Specimen	<b>0</b> 22563-09 Specimen	<b>18</b> 22563-05 Specimen	<b>23</b> 22563-05 Specimen



PHOTOGRAPHIC PRESENTATION



Picture 1. 22563-05 specimen (Witness) – After the end of the 4<sup>th</sup> week



Picture 2. 22563-09 specimen (With PENETRON ADMIX) – After the end of the 4<sup>th</sup> week

**REMARKS**

1. The sample's description, stated in the present report, is made by the client
2. The present report cannot be reproduced, except in full and with the written approval of the laboratory
3. The test results relate only to the prepared sample which was tested out.

Laboratory Director

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## TEST REPORT

Date of issue: 11.06.2015

Work order Number: 22231-01/15

Submitted by: PENETRON HELLAS SA

Address: 52A Thrakomakedonon, 13679 Acharne

Project: -

Data of specimens: 22231-01 with Penetron Admix (R:23.03.2015)  
 22231-07 witness, without Penetron Admix (R:23.03.2015)

Casting Date: 23.03.2015

Manufacturer of concrete: -

Reception Date: 16.03.2015

Origin of sample: Laboratory concrete samples

Date of production of concrete - specimens: 23.03.2015

Date of start of the test: 05.05.2015

Concrete class: C30/37 with maximum aggregate size 31,5mm

Concrete mix design: -

Cement: CEM II/B-M(P-L) 32,5N CHALIPS

Origin of samples: CHALIPS Quarry

Shape and size of specimens: cubic specimen with dimensions 150x150x150mm

Curing conditions: The specimens were cured in water tank at temperature  $20 \pm 2$  °C for 42 days

Direction of application of water pressure  
 Deviation from the standard test method: Placed on the bottom perpendicular to the casting direction  
 The applied pressure and the duration of the test is as it is described below, instead of  $5 \pm 0.5$  bar for (72+2)h cited in the standard test method.  
**Depth of penetration of water under pressure ΕΛΟΤ EN12390.08:2009**

**Requested Test: Internal instructions of PENETRON firm focused on PENETRON ADMIX**

## DESCRIPTION OF TEST METHOD

Initially, we produced the cubic specimens with dimensions 150x150x150mm, without the addition of PENETRON ADMIX, according to the below concrete mix design (composition based on 1m<sup>3</sup>):

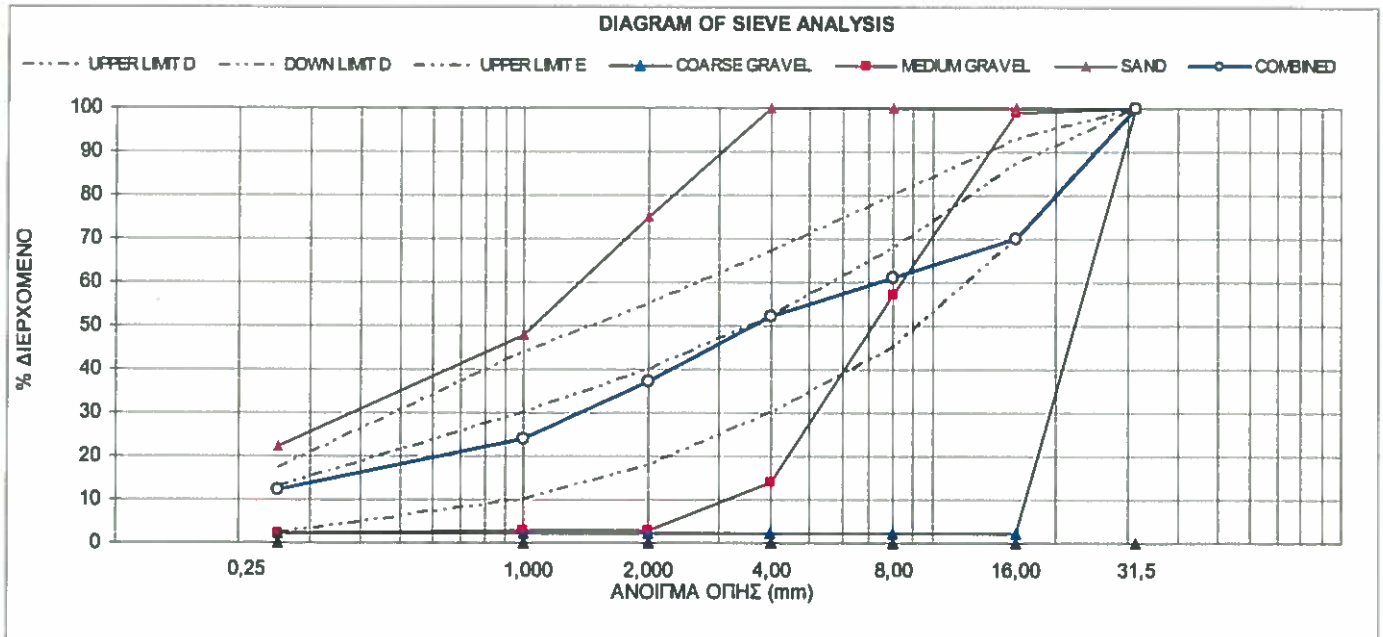
Cement type CEM II/B-M(P-L) 32,5N	350 kg
Coarse gravel	546 kg
Medium gravel	401 kg
Sand	874 kg
Water	186 kg
PLASTIMENT 20R	0,7 kg
VISCOCRETE TECHNO 40	1,75 kg

For the production of the concrete specimens with PENETRON ADMIX, we followed the above concrete mix design, with the addition of 2,8 Kg PENETRON ADMIX on 1m<sup>3</sup>.

The grain size distribution analysis of each aggregate and their specific gravity and water absorption are the following:

Sieves	Sieve opening size (mm)	Coarse gravel	Medium gravel	Sand
31,5	31,5	100	100	100
16	16,0	9	99	100
8	8,0	2	57	100
4	4,0	2	14	100
2	2,0	2	3	75
1	1,0	2	3	48
0,25	0,25	2	2	22
0,075	0,075	1,0	0,9	13





	COARSE GRAVEL	MEDIUM GRAVEL	SAND
Apparent specific gravity	2,69	2,71	2,71
Bulk specific gravity	2,63	2,63	2,59
Saturated-surface-dry specific gravity	2,65	2,66	2,63
Absorption, %	0,8	1,1	1,7

The mean value of the compressive strength of the cubic specimens with dimensions 150x150x150mm was 50,7 MPa for the specimens without PENETRON ADMIX and 50,8 MPa for the specimens with PENETRON ADMIX.

According to EN 12390-8:2009, immediately after the specimen is de-moulded, the surface that is going to be exposed to water pressure is roughened with a wire brush. The water pressure mustn't be applied to a trowelled surface of the specimen. The specimens are cured under water in accordance with the procedures given in EN 12390-2. The test of water penetration shall be started when the specimen is at least 28 years old.

The specimens are positioned on the rubber gaskets, in the apparatus of water penetration, centered in such way that the surface we had roughened be exposed to water pressure. The manometer is adjusted in ordered to indicate 1 bar during the first and the second day, 3 bar during the third day and 7 bar from the forth to the seventh day. After the first week, visual observation of the water penetration in the specimen is taken place. After the specimens have dried, the above procedure is repeated for a total of four weeks. At the end of each week we observe the water penetration in each specimen. After the end of the test, we remove the specimens from the apparatus and we wipe the face on which the water pressure has been applied so that we remove the excess water. The specimens are splitted in half, perpendicularly to the face on which the water pressure was applied. We place the face of the specimens exposed to water pressure on the bottom and as soon as the split face has dried to such extent that the water pressure front can be clearly seen, we mark the water front of the specimen. In the end, we mark the maximum depth of penetration.

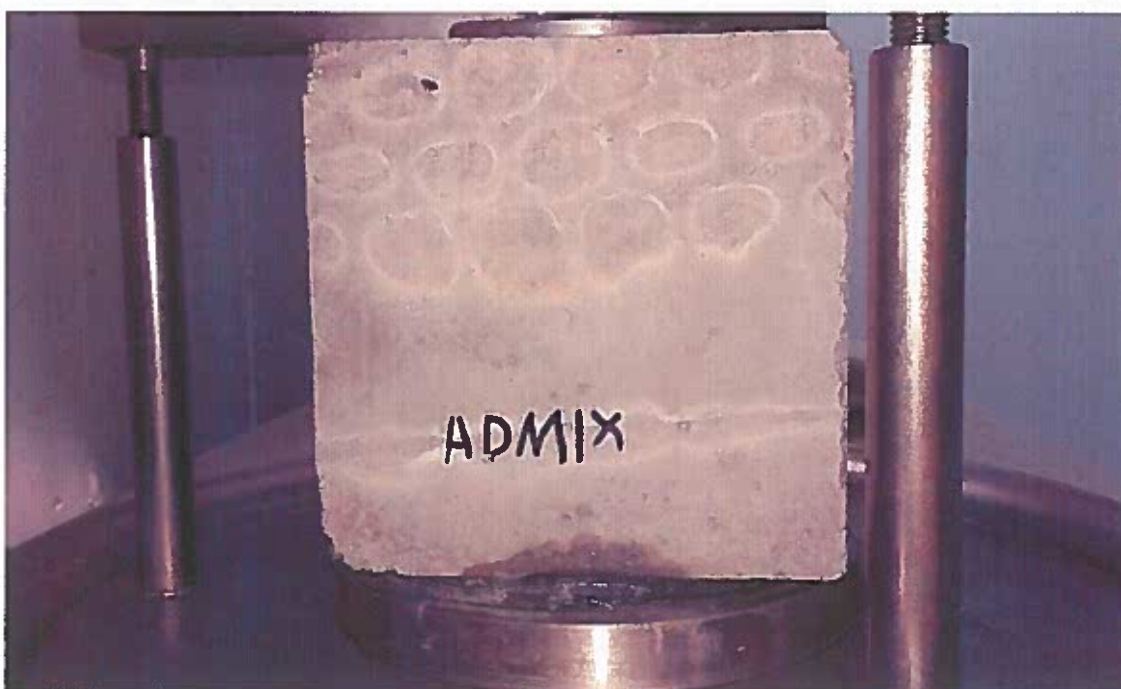
## RESULTS

	With Penetron		Without Penetron	
	Average depth of water penetration mm	Maximum value of depth penetration mm	Average depth of water penetration mm	Maximum value of depth penetration mm
after the end of the forth week	0 22231-01 Specimen	0 22231-01 Specimen	15 22231-07 Specimen	20 22231-07 Specimen

### PHOTOGRAPHIC PRESENTATION



Picture 1. 22231-07 specimen (Witness)



Picture 2. 22231-01 specimen (With PENETRON ADMIX) – After the end of the 2<sup>nd</sup> week



Picture 3. 22231-01 specimen (With PENETRON ADMIX) – After the end of the 4<sup>th</sup> week



Picture 4. 22231-01 specimen (With PENETRON ADMIX) – After the end of the 4<sup>th</sup> week –  
Generation of crystals





Picture 5. 22231-07 specimen (Witness) – After the end of the 4<sup>th</sup> week



Picture 6. 22231-01 specimen (With PENETRON ADMIX) – After the end of the 4<sup>th</sup> week



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