

The Formwork Experts.

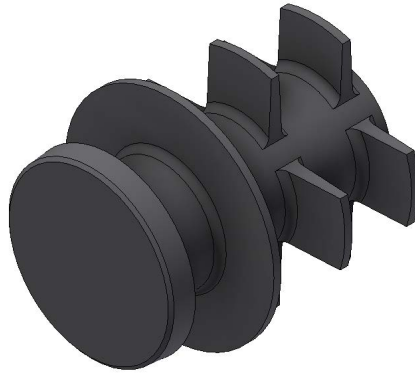
Monotec plug

Art. n° 588935000

Test Report

water impermeability

1331-4_en



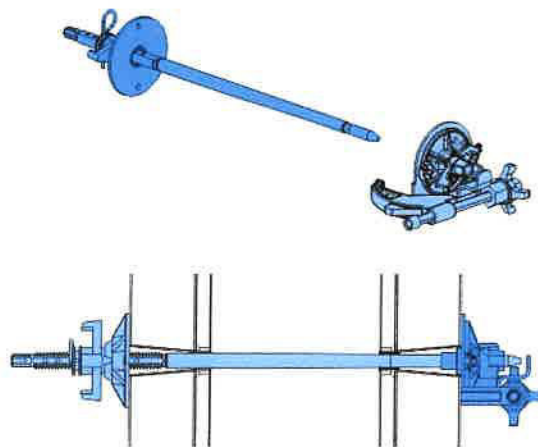
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WATERTIGHT FORM-TIES
ANCHOR SYSTEM “MONOTEC”
APPLICATION SETUP FOR “WATERTIGHT CLOSURE”



LABORATORY TEST REPORT – WATER TIGHTNESS
(CASTING AND TEST DATE: JANUARY TO MAY 2012)

THIS REPORT MAY ONLY BE PUBLISHED IN FULL LENGTH (10 PAGES INCLUDING FRONT PAGE).
TEST RESULTS ONLY SHOW THE PROPERTIES OF THOSE TESTED SPECIMEN DESCRIBED WITHIN THIS REPORT.

1 GENERAL

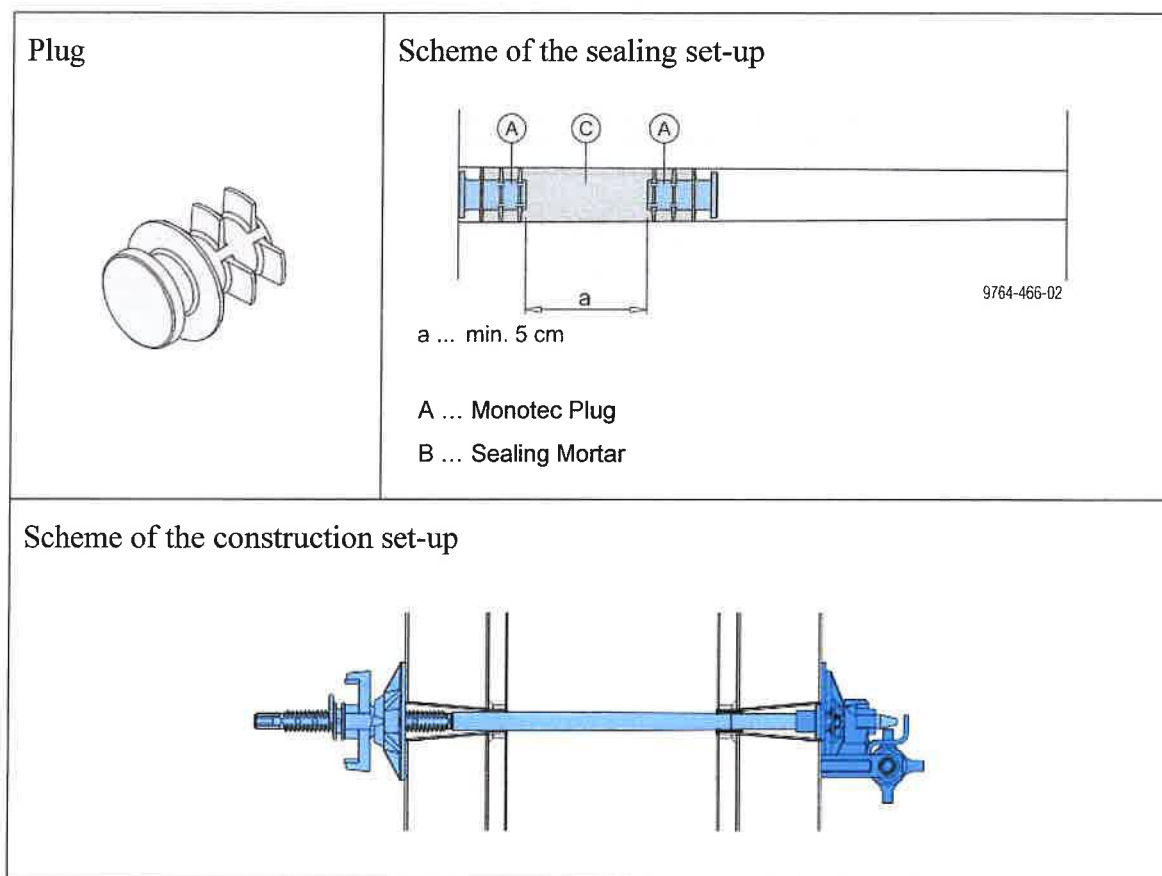
The laboratory „Materialversuchsanstalt (MVA) Strass“ of Pöyry Infra GmbH Austria was assigned on 22nd November 2011 by the client „Doka Industrie GmbH“, order number NB-00345549, to perform tests regarding the water tightness of form-ties.

2 PROCEDURE

- Casting of the test walls and assembly of the tested form-ties took place at the MVA Strass laboratory (see photo documentation in attachment 1). Concrete production was performed by an ÖNORM B4710 certified batching plant. After hardening of the concrete the samples including the form-ties have been extracted by means of core drilling with a diameter of Ø 150 mm (see photo documentation in attachment 1).
- Determination of the water penetration depth on three samples for each type of form-tie as well as on three additional samples without form-ties.

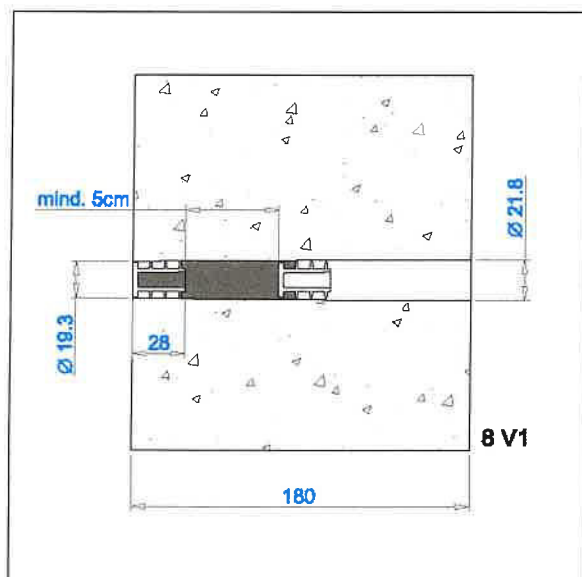
2.1 Tested Form-ties

DOKA Anchor System Monotec, Monotec Plug, "M-Bed-Expanding Sealing Mortar", Reuss-Seifert GmbH, application setup for "watertight closure"



Installation and use:
see Doka Technical Method Statement TR 944

Scheme of the samples



2.2

Concrete

The concrete mix design corresponds to a concrete class C25/30/XC4/XF3/F3 according to EN 206.

All mix design components (raw materials) are CE certified.

Mix Design

Cement	CEM I 42.5 R SR, 0% C3A	305 kg/m ³
Puzzolan	Fly Ash acc. to EN 450, k=0.4	60 kg/m ³
Water / (Cement + k × Fly Ash) - ratio		0.50

Compressive strength, concrete age of 28 days, according to EN 12390-3:

Average of three samples **46.2 MPa**

3

TEST RESULTS

3.1

Sampling

After drilling of the samples (age of concrete was 28 days) the specimen have been stored under water ($20 \pm 5^\circ\text{C}$) in accordance with EN 12390-2. Specimen preparation and testing have been performed based on EN 12390-8. A water pressure of 500 ± 50 kPa (5.0 ± 0.5 bar) has been applied to the samples (minimum 28 days old) for 72 ± 2 hours. Samples have then been split rectangular to the area where the water pressure has been applied (deviating from the regulations of EN 12390-8 this area did not face

downwards due to the embedded form-ties). The water penetration was then marked at the samples testing area and the maximum penetration depth was evaluated and noted.

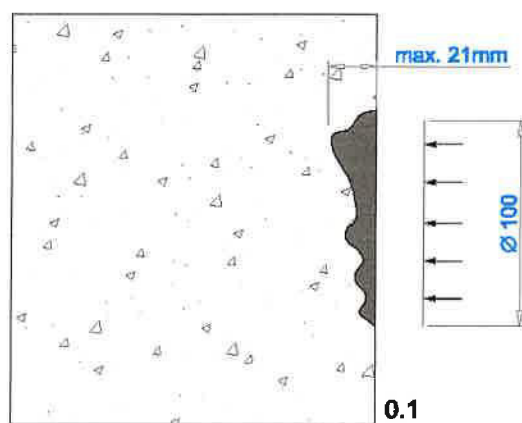
3.2 Water penetration of comparator samples without form-ties

Maximum water penetration depth, age of 28 days, based on EN 12390-8

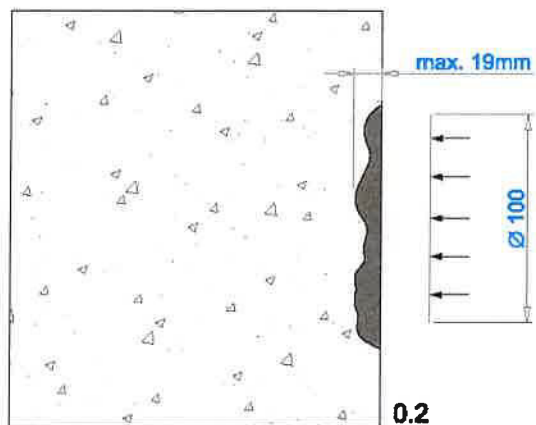
Average of three samples **26 mm**

Schematic drawing of the water penetration into the test samples

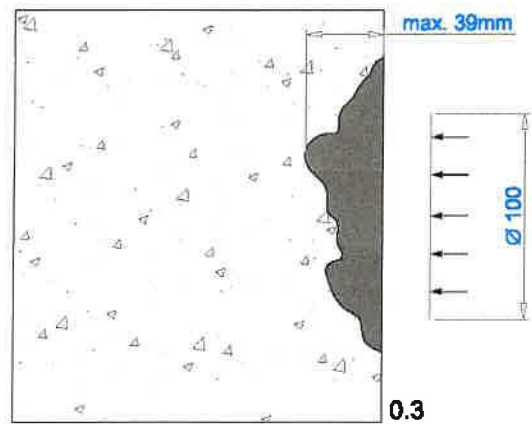
Sample 0.1



Sample 0.2



Sample 0.3

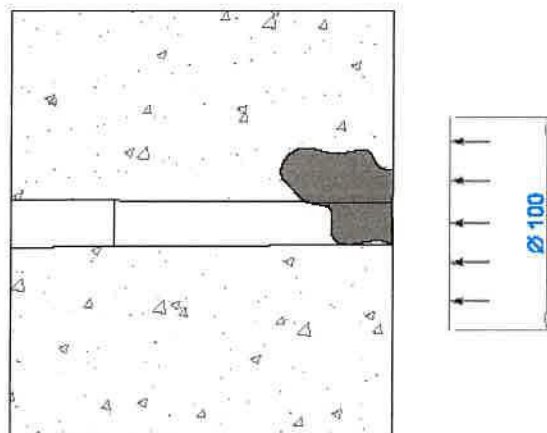


3.3 Water penetration of test samples – sealing system DOKA Anchor System Monotec, Monotec Plug, application setup for “watertight closure”

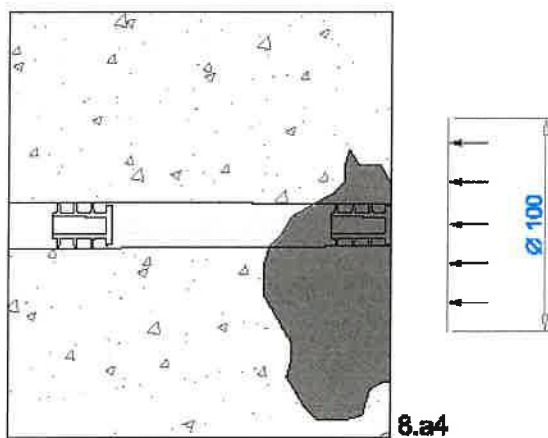
Schematic drawing of the water penetration into the test samples

Sample 8.a4

Side a

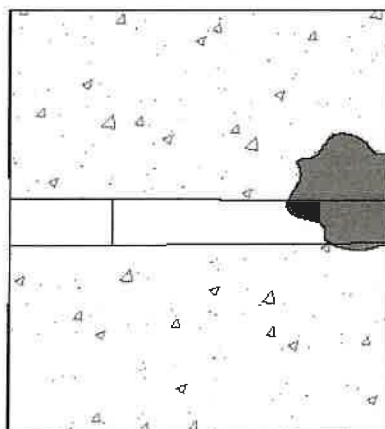


Side b

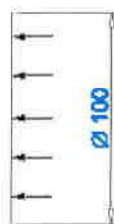
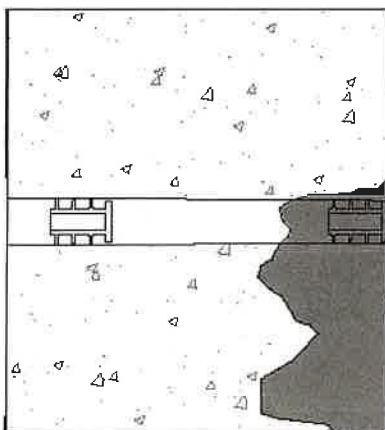


Sample 8.b3

Side a



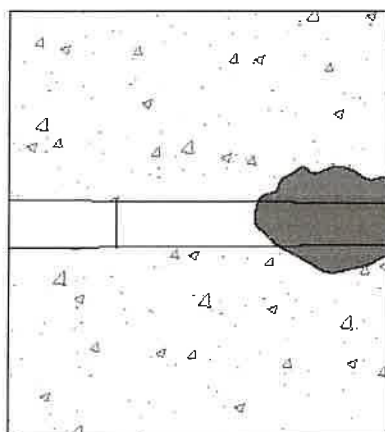
Side b



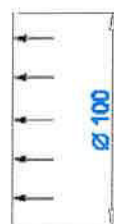
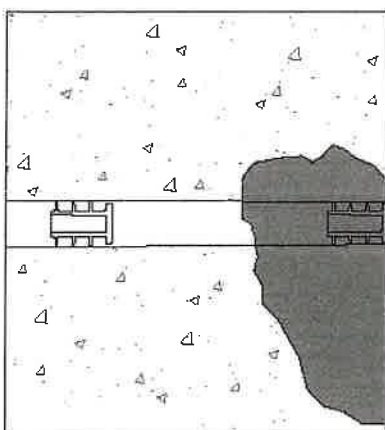
8.b3

Sample 8.b4

Side a



Side b



8.b4

The differing appearance of water on both sides of the split sample was caused by water that remained in the plug and was spilled irregularly during splitting.

4

CONCLUSION

For the samples with sealing system “DOKA Anchor System Monotec”, Monotec Plug, application setup for “watertight closure”, no passing of water thru the sealed anchor hole could be observed at the opposite side of the test area.

Materialversuchsanstalt Strass

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Laboratory Engineer