The Formwork Experts.

Monotec combi plug 20

Art. n° 588929000

Test Report

water impermeability
AB 1331-5_en

TECHNICAL REPORT

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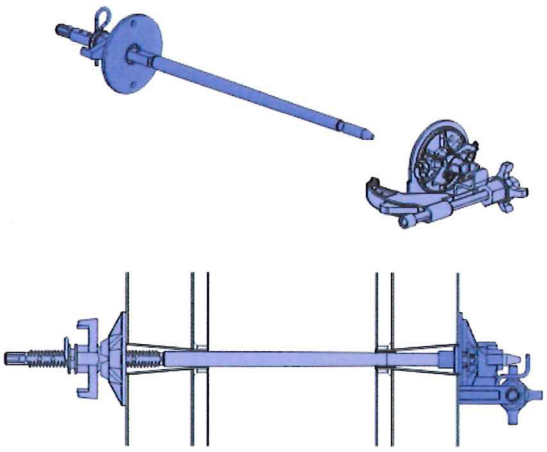
WATERTIGHT FORM-TIES
ANCHOR SYSTEM "MONOTEC"
APPLICATION SETUP "COMBI PLUG"



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

PÖYRY
Engineering balanced sustainability™

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

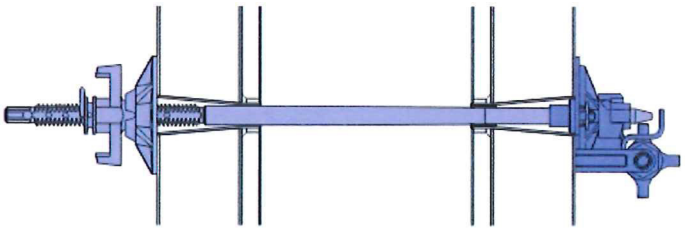
- Casting of the test walls and assembly of the tested form-ties took place at the MVA Strass laboratory (see photo documentation in attachment 1). Concrete production was performed by an ÖNORM B4710 certified batching plant. After hardening of the concrete the samples including the form-ties have been 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 (combi-plug) as well as on three additional samples without form-ties (combi plug).

2.1 Tested Form-ties

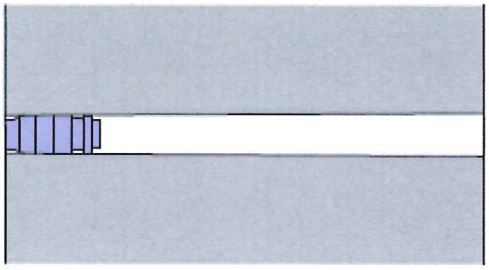
DOKA Anchor System Monotec, Monotec combi-plug

Scheme of the clamping point



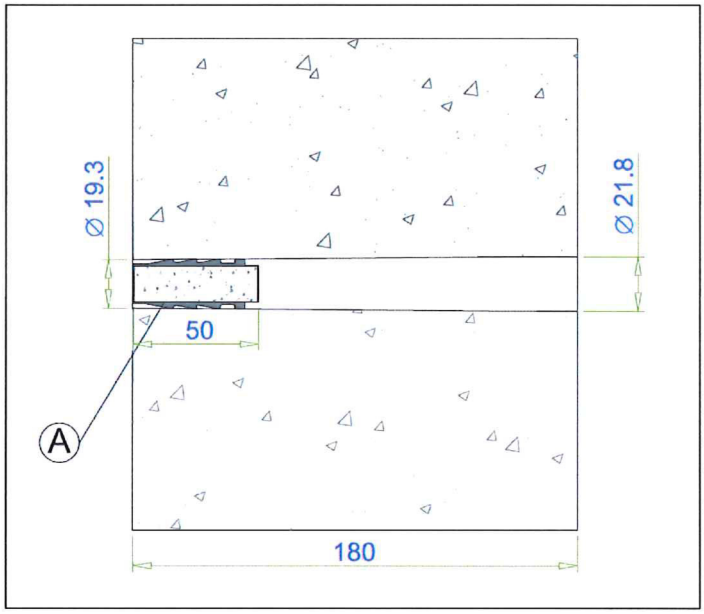
Plug

Scheme of the sealing set-up



Installation and use:
see Doka Technical Method Statements

Scheme of the samples



A … Monotec combi-plug

Monotec Anchor system – Application setup Monotec clamping point, sealed with Monotec Combi-Plug (Fibre Concrete with silicone-rubber)

2.2 Concrete

The concrete mix design represents 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/m³
Puzzolan	Fly Ash acc. to EN 450, k=0.4	60 kg/m³
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 ±5°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.

Additional the following visual evaluation was performed:

- location stability of the Monotec combi-plug
- detection of water passing through the sample or through the opening in the concrete

3.2 Water penetration of comparator samples without form-ties

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

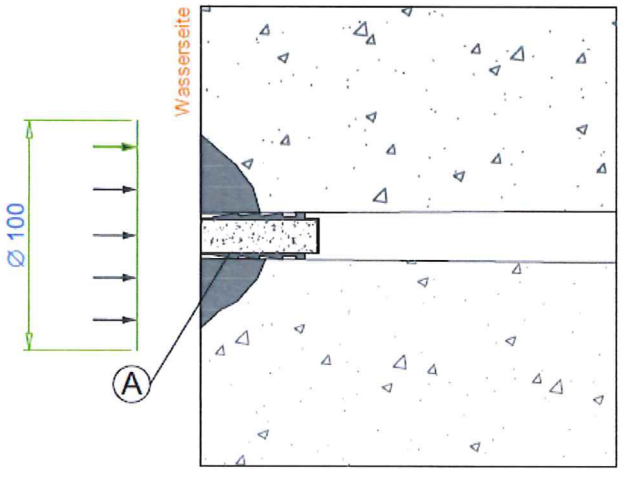
Average of three samples **26 mm**

3.3 Water penetration of test samples – sealing system DOKA Anchor System Monotec, Monotec combi-plug

No water leakage could be detected at the samples surfaces. All plugs remained at their initial position during the test period.

Schematic drawing of the water penetration into the test samples

sample 8a3



A … Monotec combi-plug

4 CONCLUSION

At all tested specimens, equipped with Doka Monotec combi-plug, neither a water leakage at the sample surfaces nor a change in the position of the plugs could be detected during and after test execution.

Materialversuchsanstalt Strass
Pöyry Infra GmbH

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Project Manager

ATTACHEMENT 1 – PHOTO DOCUMENTATION

A1 – Casting of the test walls, assembly of the form-ties

A2 – Concrete placement

A3 – Core drilling of the specimen

A4 – Sample Preparation

A5 – Test procedure – samples at the test apparatus – 5 bar water pressure

A6 – Testing of the samples - splitting