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Business Division V – Civil and underground engineering

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Working Group 5.1 - Structural Sealing

Examination report UB 5.1/12-637

of 24 May 2013

1st Copy

Subject: Application-technical test for watertightness of a distance tube
sealed with a RONDO MINI

Client: MASTERTEC GmbH & Co. KG
Gewerbegebiet Unterhaid
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96173 Oberhaid, Germany

Person responsible: Dipl.-Ing. Jüling

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1 Scope of tasks

On behalf of *MASTERTEC GmbH & Co. KG*, the impermeability of a distance tube sealed with the *RONDO MINI* sealing collar when installed in a concrete component made from concrete with a high penetration resistance to pressurised water is to be verified by means of an application-technical examination.

2 Object of the examination

The *RONDO MINI* consists of differently coloured mounting parts designed as a collar, which are placed over distance tubes made from fibre cement or plastic, and which are, as a rule, intended to be positioned in the middle of the component cross-section at risk of penetration. The mounting parts have a disc-shaped central section, which should have the effect of extending the flow path of the pressurised water and thus ensure the impermeability of distance tubes in concrete or reinforced concrete components.

The plastic fastening straps to be fastened to the collar on both sides of the disc should be tightened firmly using pliers in order to rule out the possibility of water passing between the distance tubes and the *RONDO MINI*.

The client provided a fibre cement distance tube equipped with a *RONDO MINI 40*, a *RONDO MINI 40* with 2 plastic fastening straps and a plastic wall sleeve equipped with a *RONDO MINI 26* for the examination, see Annex 1, Figures 1 to 3. The surface of the *RONDO MINI* in contact with the distance tubes is almost planar. While the *RONDO MINI 26* and the *RONDO MINI 40* have inner diameters of approx. 26 mm and 38 mm respectively, the discs have outer diameters of approx. 83 mm and 87 mm. When measured along the tubular axis, both sealing collars are approx. 28 mm long.

3 Test specimens and test procedure

For the functional test, a cubic specimen with an edge length of 0.3 m is produced from C 25/30 concrete, which has a maximum grain size of 16 mm according to DIN 1045-1¹ and a high resistance to the penetration of water as per DIN 1045-2². The specimen acts as a reconstruction of a 0.3 m thick section of concrete wall which is penetrated horizontally by the *RONDO MINI*. In this installation situation, the water stop is in a vertical position.

¹ DIN 1045-1: Concrete, reinforced concrete and prestressed concrete structures; Part 1: Design and construction; Edition 08/2008

² DIN 1045-2: Concrete, reinforced concrete and prestressed concrete structures; Part 2: Concrete - Specification, properties, production and conformity, rules of application for DIN EN 206-1; Edition 08/2008



In place of the two distance tubes submitted by the client, the *RONDO MINI* 40 fastened to a fibre cement distance tube is subjected to an impermeability test.

To this end, the tube is enveloped in a water-permeable sleeve on one side of the circumferential seal in order to ensure that the water is transported as far as the sealing collar, see Annex 1, Figure 4. Testing commences three weeks after concreting. For this purpose, the specimen is rotated so that the distance tube is in a vertical position with the enveloped section at the top and thus arranged on the side of the water supply. At this end, two sealing plugs made from fibre cement are glued into the distance tube in order to rule out the possibility of water passing through the sleeve. A pressure chamber is fixed in place and sealed around the top of the specimen so that the distance tube and the surrounding part of the concrete surface are located within the chamber. This chamber facilitates applying pressurised water up to the desired water pressure level of 3 bar.

The impingement with pressurised water is effected by increasing the test pressure by 0.5 bar every day until the end pressure of 3 bar is reached. This water pressure is sustained for a period of 28 days. The test is passed if no water emerges at the other end of the distance tube during the examination period.

4 Test results and evaluation

At no point did any water emerge at the bottom of the test specimen during the 28-day application of water pressure at 3 bar. The *RONDO MINI* meets the requirements of the utility class A for the wear classes 1 and 2 in accordance with the WU guideline³. In addition to firmly tightening the plastic fastening straps using pliers, the professional installation of the prefabricated sealing element in accordance with the manufacturer's instructions and the use of concrete with a high resistance to the penetration of water are prerequisites for the watertightness of the *RONDO MINI* in concrete and reinforced concrete components.

Leipzig, dated 24 May 2013



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³ Directive of the German Committee for Reinforced Concrete (Deutscher Ausschuss für Stahlbeton - DAfStb) on water-impermeable concrete structures (WU-Richtlinie), published November 2003



Figure 1:
RONDO MINI 40 on a fibre cement
distance tube



Figure 2: ibidem - individual components



Figure 3: *RONDO MINI 26* with a plastic distance tube



Figure 4:
Fibre cement distance tube enveloped
in a water-permeable sleeve on one side
up to the sealing collar to ensure trans-
portation of the water