

Nevoga GmbH.
Znaimer Strasse 4
83395 Freilassing
Germany



(Logo) City of Vienna
Municipal Authorities of the City of Vienna
MUNICIPAL DEPARTMENT (MA) 39
Inspections, Monitoring and
Certifications office of the City of Vienna
Testing and Research Institute (VFA) –
Building Engineering Laboratories
Address: Rinnböckstrasse 15
A-1000 Vienna
Tel: (+43 1) 79514-8039
Fax: (+43 1) 79514-99-8039
E-mail: post@ma39-wien.gv.at
Internet: www.ma39.wien.at

MA 39 – VFA 2013-0044.01

Vienna, 21 June 2013

(Stempel) MUNICIPAL DEPARTMENT 39
VIENNA

Inspection Report

Plastic Spacers (DL40/200 Rebar Spacers)

Client: Nevoga GmbH

Assignment date: 4 April 2013

Test material: Plastic Spacers (DL40/200 Rebar Spacers); the test material was supplied by the client

Test routine: In accordance with the DBV leaflet: 'Spacers acc. to Eurocode 2' [*Abstandhalter nach Eurocode 2*] (wording from January 2011).

Frost/thaw testing
Determination of water penetration depth

Kuh This report comprises 4 pages and 1 annex (3 pages).

Tests refer exclusively to the test objects. All pages of the report have been stamped with the official seal of the City of Vienna. Publication and excerpts require written permission from department MA 39. Please observe the currently applicable General Terms and Conditions of Business of department MA 39 as displayed in the Internet at <http://www.ma39.wien.at>.

Certified in accordance with the requirements of ÖNORM EN ISO 9001:2008 and ÖNORM EN ISO 14001:2004 by Quality Austria.

Opening times: Mon. to Thurs.: 7.30am-3.30pm and Fri. 7.30am-1.30pm; VAT No. ATU 36801500
Bank account: Bank Austria, Account 51428007186, Sort Code 12000; IBAN: AT631200051428007; BIC: BKAUATWW, DVR: 0000191

M 39 – VFA 2013-0044.01	Inspections, Monitoring and Certifications office of the City of Vienna Municipal Department 39 Testing and Research Institute (VFA) – Building Engineering Laboratories	Page 2 / 4
----------------------------	---	------------

(Stempel) MUNICIPAL DEPARTMENT 39
VIENNA

1 General

1.1 Assignment

Nevoga GmbH assigned MA 39 with the inspection of plastic spacers (DL40/200 Rebar Spacers) in accordance with the DBV leaflet: 'Spacers acc. to Eurocode 2' [*Abstandhalter nach Eurocode 2*] (wording from January 2011).

1.2 Test material

On 4 April 2013, the client supplied plastic spacers (DL40/200 Rebar Spacers) to MA 39.

The spacers had a laying dimension of 40 mm.

For information regarding the appearance of the supplied test material, see the photographs in the attached annex.

1.3 Sample preparation

On 16 April 2013, six sample cubes were produced in the MA 39 laboratory, with a side length of 20 cm in accordance with Section A3.1 of the DBV leaflet: 'Spacers acc. to Eurocode 2'.

In deviation to the leaflet, polystyrene sheets were used in the cube moulds in place of plywood panels, and a reinforcement rod with a diameter of 8 mm with a spacer was placed inside (see Fig. No. 2013-0044-01-2).

The cube moulds were then filled with concrete with the quality C35/45/B4/F45/GK22.

Furthermore, one sample cube with a side length of 15 cm and one sample panel with the dimensions 20 cm x 20 cm x 10 cm were made for the purpose of determining the concrete compressive strength and water penetration depth.

The following values were obtained:

Concrete compressive strength: 61.7 N/mm² (test date 14 May 2013)

Water penetration depth: 7 mm (test period 13-27 May 2013)

The test objects used for determining the water penetration depth were stored under water until the test. The remaining test objects were stripped after 24 hours and then stored under water until the seventh day, and afterwards under room conditions.

M 39 – VFA 2013-0044.01	Inspections, Monitoring and Certifications office of the City of Vienna Municipal Department 39 Testing and Research Institute (VFA) – Building Engineering Laboratories	Page 3 / 4
----------------------------	---	------------

(Stempel) MUNICIPAL DEPARTMENT 39
VIENNA

2 Performance of the test

2.1 Alternating freeze/thaw testing

Three test objects containing concrete-embedded spacers were subjected to alternating freeze/thaw testing, commencing on 14 May 2013, in accordance with Section A3.2 of the DBV leaflet: 'Spacers acc. to Eurocode 2'.

The 56 freeze/thaw cycles were performed within 28 days at temperatures between +20°C and –20°C in accordance with ONR 23303 Issue 1, September 2010, Section 9.10 (Frost Class XF3), whereby in accordance with the DBV leaflet, the cube surface with the embedded spacer was submerged in deionised water to a depth of 10 mm during the test.

2.2 Determination of water penetration depth

Three test objects containing concrete-embedded spacers were subjected to water penetration depth testing in accordance with Section A3.3 of the DBV leaflet: 'Spacers acc. to Eurocode 2'.

The test was performed in accordance with DIN 1048-5, whereby the test objects were subjected to a water pressure of 5 bar over 3 days.

Test period: 13-16 May 2013.

3 Test results

3.1 Alternating freeze/thaw testing

Upon conclusion of the 56 freeze/thaw cycles, the test surfaces with the embedded spacers were subjected to a visual check.

No cracking of any kind was determined, only a slight amount of flaking.

Please see the photographs in the annex for the appearance of the test surfaces.

3.2 Determination of water penetration depth

After splitting the test objects, a water penetration depth of between 14 mm and 42 mm was determined.

M 39 – VFA 2013-0044.01	Inspections, Monitoring and Certifications office of the City of Vienna Municipal Department 39 Testing and Research Institute (VFA) – Building Engineering Laboratories	Page 4 / 4
----------------------------	---	------------

(Stempel) MUNICIPAL DEPARTMENT 39
VIENNA

In samples 1 and 3, water penetration was visible up to the reinforcement bar.

Please see the photographs in the annex for the appearance of the split surfaces.

Testing officer	Head of laboratory	Head of the Inspections, Monitoring and Certifications Dept.
<i>(Unterschrift)</i>	<i>(Unterschrift)</i>	<i>(Unterschrift)</i>
Ing. Herbert Kurz	Dipl. Ing. Andreas Tichy	Dipl. Ing. Georg Pommer
Techn. Amtsrat	Oberstadtbaurat	Senatsrat

(Stempel)
Inspections, Monitoring and Certifications office of the City of Vienna
Municipal Department 39
City of Vienna

<p>M 39 – VFA 2013-0044.01</p>	<p>Inspections, Monitoring and Certifications office of the City of Vienna Municipal Department 39 Testing and Research Institute (VFA) – Building Engineering Laboratories</p>	<p>Annex 1 Page 1 / 3</p>
------------------------------------	--	-------------------------------

(Stempel) MUNICIPAL DEPARTMENT 39
VIENNA

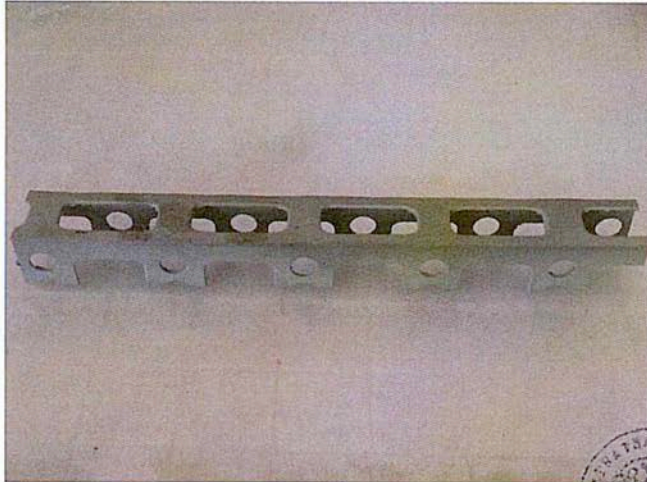


Photo No. 2013-0044-01-1

Plastic spacer (DL40/200
Rebar Spacer)

Condition upon delivery

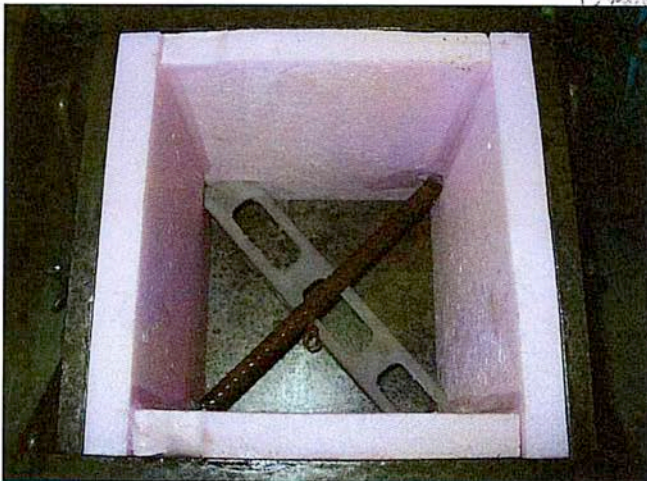


Photo No. 2013-0044-01-2

Cube mould with
reinforcement rod and spacer
placed inside



Photo No. 2013-0044-01-3

Freeze/thaw cycle testing

Sample 4 – after 56
freeze/thaw cycles

Slight flaking of the surface
can be determined, no
cracking.

<p>M 39 – VFA 2013-0044.01</p>	<p>Inspections, Monitoring and Certifications office of the City of Vienna Municipal Department 39 Testing and Research Institute (VFA) – Building Engineering Laboratories</p>	<p>Annex 1 Page 2 / 3</p>
------------------------------------	--	-------------------------------

(Stempel) MUNICIPAL DEPARTMENT 39
VIENNA



Photo No. 2013-0044-01-4

Freeze/thaw cycle testing

Sample 5 – after 56
freeze/thaw cycles

Slight flaking of the surface
can be determined, no
cracking.



Photo No. 2013-0044-01-5

Freeze/thaw cycle testing

Sample 6 – after 56
freeze/thaw cycles

Slight flaking of the surface
can be determined, no
cracking.



Photo No. 2013-0044-01-6

Test of water penetration
depth

Sample No. 1 –
Water penetration depth: 40
mm
(up to the reinforcement bar)

<p>M 39 – VFA 2013-0044.01</p>	<p>Inspections, Monitoring and Certifications office of the City of Vienna Municipal Department 39 Testing and Research Institute (VFA) – Building Engineering Laboratories</p>	<p>Annex 1 Page 3 / 3</p>
------------------------------------	--	-------------------------------

(Stempel) MUNICIPAL DEPARTMENT 39
VIENNA



Photo No. 2013-0044-01-7

Test of water penetration depth

Sample No. 2 –
Water penetration depth: 14 mm



Photo No. 2013-0044-01-8

Test of water penetration depth

Sample No. 3 –
Water penetration depth: 42 mm
(up to the reinforcement bar)