Hygiene-Institut des Ruhrgebiets
Institut für Umwelthygiene und Toxikologie
Direktor: Prof. Dr. rer. nat. L. Dunemann
Träger: Verein zur Bekämpfung der Volkskrankheiten im Ruhrkohlengebiet e.V.

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Reference-No.: **K-299791-18-Ko**
Contact person: Dr. Andreas Koch

Gelsenkirchen, 27.06.2018

TEST CERTIFICATE

according to the KTW Guideline
(issue date: 07.03.2016)

Product: **Drinking water installation, group 1, pipes made of polypropylene PP-R**
Reg.-No.: DW-8317BS0452, SKZ No 4441

Test specimen: pipes, Ø 20 x 3,4 mm, one layer, white (manufacturer's information)

Kind of test: Audit test 2018 (initial test: K-253129-15-Bs/st dated 04.02.2015)

The above mentioned product was tested according to the Guideline on the hygienic assessment of organic materials in contact with drinking water of the German Environment Agency. Pursuant to the test report-no.: **K-299791-18-Ko dated 27.06.2018 and K-253129-15-Bs/st dated 04.02.2015** the product meets the requirements for the product group:

pipes with DN < 80 mm in contact with cold water (23 °C) and warm water (60 °C).

All product groups for which the requirements are met are summarised on the back side.

The certificate is valid providing that the requirements, laid down in the Guideline regarding the testing of the microbial growth are fulfilled. This can be verified for the product f.e. with a valid test certificate according to the DVGW technical rule W 270.

This test certificate is valid beginning with the date of issue and is ending by **04.02.2020**. The test certificate may be extended for further five years, provided that the formulation, the relevant evaluation criteria (restrictions in the positive lists), the production process and the production place of the product have not changed.

The Director of the Hygiene-Institute
on behalf of

Dr. rer. nat. Andreas Koch
Head of the Dept. for water
hygienic material testing

HYGIENE-INSTITUT DES RUHRGEBIETS Institut für Umwelthygiene und Toxikologie

The assessment was based on the assumption that the used starting substances and monomers used to manufacture the product may completely known and no other substances are present in the product. The validity of this document expires in case of modifications in the composition of the product or the processing conditions. The results and evaluations refer to the groups of test items. This document may not be published without our written permission only complete and unchanged or duplicated.

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Reference-No.: **K-299791-18-Ko**
Contact person: Dr. Andreas Koch

Gelsenkirchen, 27.06.2018

TEST REPORT
according to the KTW-Guideline
(issue date: 07.03.2016)

Order of:	08.03.2018 (sampling record SKZ Würzburg GERMANY)
Field of application:	pipes with DN < 80 mm cold water (23 °C) and warm water (60 °C)
Product:	**Drinking water installation, group 1, pipes made of polypropylene PP-R** Reg.-No.: DW-8317BS0452, SKZ No 4441 (labeling: see sampling record)
Specimen:	pipes, Ø 20 x 3,4 mm, one layer, white (manufacturer's information)
Production Place:	+GF+ HAKAN PLASTIK Boru ve Profil San. Tic. A.Ş. Organize Sanayi Bölgesi Yünsa Yolu no. 11 59500 ÇERKEZKÖY / TEKIRDAĞ; TR
Date of receipt:	26.03.2018
Sampler:	transmitted by mail
Start of migration test:	29.05.2018
End of test:	22.06.2018

The Director of the Hygiene-Institute
on behalf of

Dr. rer. nat. Andreas Koch
Head of the Dept. for water
hygienic material testing

This test report consists of 3 pages.

The assessment was based on the assumption that the used starting substances and monomers used to manufacture the product may completely known and no other substances are present in the product. The validity of this document expires in case of modifications in the composition of the product or the processing conditions. The results and evaluations refer to the groups of test items. This document may not be published without our written permission only complete and unchanged or duplicated.

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-13042-02-00

test results cold water (23 °C)

Product: **Drinking water installation, group 1, pipes made of polypropylene PP-R;** Reg.-No.: DW-8317BS0452, SKZ No 4441 (labeling: see sampling record)
Specimen: pipes, Ø 20 x 3,4 mm, one layer, white (manufacturer's information)
Formulation: submitted and checked, RA 130 E white, (No. 8659)

Conversion factor: 20 (Pipes DN < 80 mm)
S/V-ratio migration test: 20,42 dm^2 / 0,64 dm^3 ≙ 31,91 dm^{-1}
S/V-ratio odour/flavour test: 20,42 dm^2 / 0,64 dm^3 ≙ 31,91 dm^{-1}

Parameter	Method	Test cycle / Result 1 4. day	2 7. day	3 10. day	**Requirements**
Colour	SOP 14.5, 2008-11	colorless	colorless	colorless	n.s.e..
Turbidity	SOP 14.5, 2008-11	clear	clear	clear	n.s.e..
Tendency to foam formation	SOP 14.5, 2008-11	none	none	none	n.s.e..
Threshold odour number (23°C)	DIN EN 1622, 2006-10	1-2 *)	1-2 *)	1	< 2
Threshold flavour number (23°C)	DIN EN 1622, 2006-10			1	< 2
Total organic carbon (TOC) CTap mg/l	DIN EN 1484, 1997-08	< 0,02	< 0,02	< 0,02	≤ 0,5
Formulation specific parameters with restrictions		no parameter with restrictions			Guidance Level passed

n.s.e..: not significant effected
*) tentative determination of Threshold odour number
1) Attached results are partially not accredited.

test results warm water (60 °C)

Product: **Drinking water installation, group 1, pipes made of polypropylene PP-R;** Reg.-No.: DW-8317BS0452, SKZ No 4441 (labeling: see sampling record)
Specimen: pipes, Ø 20 x 3,4 mm, one layer, white (manufacturer's information)
Formulation: submitted and checked, RA 130 E white, (No. 8659)

Conversion factor: 20 (Pipes DN < 80 mm)
S/V-ratio migration test: 20,42 dm^2 / 0,64 dm^3 ≙ 31,91 dm^{-1}
S/V-ratio odour/flavour test: 20,42 dm^2 / 0,64 dm^3 ≙ 31,91 dm^{-1}

Parameter	Method	Test cycle / Result 1 2. Day	2 3. Day	3 4. Day	6 9. Day	7 10. Day	**Requirements**
Colour	SOP 14.5, 2008-11	colorless	colorless	colorless	colorless	colorless	n.s.e.
Turbidity	SOP 14.5, 2008-11	clear	clear	clear	clear	clear	n.s.e.
Tendency to foam formation	SOP 14.5, 2008-11	none	none	none	none	none	n.s.e.
Threshold odour number (23°C)	DIN EN 1622, 2006-10	2 *)	2 *)	1-2 *)	1-2 *)	< 2	≤ 4
Threshold flavour number (23°C)	DIN EN 1622, 2006-10					< 2	≤ 4
Total organic carbon (TOC) CTap mg/l	SOP 14.5, 2008-11	0,23	0,18	0,15	0,11	0,12	≤ 0,5
Formulation specific parameters with restrictions		no parameter with restrictions					Guidance Level passed

n.s.e.: not significant effected
*) tentative determination of Threshold odour number
[1)] attached results are partially not accredited