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Ref.-No.: **K-187284-10-Ko/st**
Contact person: Dr. Andreas Koch

Gelsenkirchen, 23.02.2010

TEST CERTIFICATE
according to the KSW-Recommendations
of the German Plastic-Commission
by the Federal Health Authorities

(English version dated 30.07.2008, Ref.-No.: C-166202-08-Sf/st)

Applicant: DEHOUST GmbH
Gutenbergstr. 5-7
69181 Leimen/Heidelberg

Product: Lupolen 4261 A (uncoloured and black)

Test specimen: reservoir segments (uncoloured), label: PE 1100 DF
reservoir segments (black), label: PE 2000 DF

Test result:

The a.m. reservoir segments meet the requirements of the KSW-Recommendations according to the test report dated **23.02.2010, Ref.-No.: K-187284-10-Ko/st.**

This test certificate is valid beginning with the date of issue and is ending by **30.07.2013**, as far as there are no changes in the formula. After this time it can be extended for further 5 years if demanded.

This test certificate is only valid in combination with a test certificate according to the DVGW-Working Sheet W 270.

The Director of the Institute
on behalf of

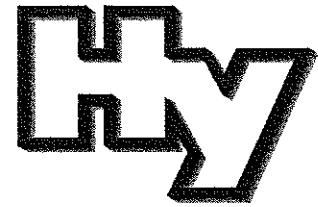
(Dr. rer. nat. A. Koch)
Head of the Dept. for water
hygienic material examination



The results and conclusions exclusively refer to the investigated samples and the relevant laws.
The validity of this document expires in case of modifications in the composition of the product or the processing conditions.

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Reference-No.: K-187284-10-Kof/st
Contact person: Dr. Andreas Koch

Gelsenkirchen, 23.02.2010

TEST REPORT
according to the KSW-Recommendation
of the German Plastic-Commission
by the Federal Health Authorities

(English version dated 30.07.2008, Ref.-No.: C-166202-08-SI/st)

Applicant: DEHOUST GmbH
Gutenbergstraße 5-7
69181 Leimen/Heidelberg

Order of: 13.03.2008 (Order-No.: 11854)

Field of application: testing according to the KSW-Recommendation
cold water and warm water

Product: **Lupolen 4261 A (uncoloured and black)**

Test parts: reservoir segments (uncoloured), label: PE 1100 DF
reservoir segments (black), label: PE 2000 DF

Test specimen: test plates (uncoloured and black) measuring:
200 mm x 200 mm x 4 mm, 200 mm x 100 mm x 4 mm,
150 mm x 150 mm x 4 mm, 150 mm x 150 mm x 4 mm,
200 mm x 60 mm x 4 mm

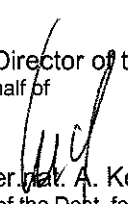
Sampler: transmitted by mail

Date of receipt: 19.03.2008

Start of test: 15.04.2008

End of test: 05.06.2008

The Director of the Institute
on behalf of


(Dr. rer. nat. A. Koch)
Head of the Dept. for water
hygienic material examination

This test report consist of 5 pages.

Die Ergebnisse und Bewertungen beziehen sich auf die untersuchten Prüfgegenstände und die geltenden gesetzlichen Regelungen.
Die Gültigkeit dieses Dokuments erlischt bei Veränderungen in der Zusammensetzung des Werkstoffs oder an den Verarbeitungsbedingungen.
Dieses Dokument darf ohne unsere schriftliche Genehmigung nur vollständig und unverändert veröffentlicht oder vervielfältigt werden.


DAP-PL-2548.00

Test results
cold water (23°C)

Product: Lupolen 4261 A (uncoloured and black)

Test parts: reservoir segments (uncoloured), label: PE 1100 DF

Test conditions:

S/V-ratio

Migration test: 1664 cm² / 3100 ml = 1 : 1,9

Odour test: 424 cm² / 1660 ml = 1 : 3,9

Chlorine demand test: 948 cm² / 3630 ml = 1 : 3,8
 (demineralised water; with ca. 1,00 mg/l free Cl₂)

| Test / Parameter | test steps | | | Requirements according KSW-Recommendation (7.-9. day) |
|---|------------|------------|------------|--|
| | 1.-3. day | 4.-6. day | 7.-9. day | |
| colour | colourless | colourless | colourless | n.s.e. |
| turbidity | clear | clear | clear | n.s.e. |
| tendency to foam formation | none | none | none | n.s.e. |
| TON (23°C) | 2 *) | 2 *) | 1 | ≤ 3 |
| total organic carbon (TOC) mg/m ² x d | < 1 | < 1 | < 1 | 10 |
| chlorine demand (free Cl ₂) mg/m ² x d | 2,5 | 1,0 | 0,8 | 8,0 |

*) temporary detection of TON

n.s.e. = no significant effect
 TON = threshold odour number

Test results
warm water (60°C)

Product: Lupolen 4261 A (uncoloured and black)

Test parts: reservoir segments (uncoloured), label: PE 1100 DF

Test conditions:

S/V-ratio

Migration test: 1027 cm² / 2050 ml = 1 : 2,0

Odour test: 522 cm² / 1740 ml = 1 : 3,3

| Test / Parameter | test steps | | | | | Requirements according KSW-Recommendation |
|--|------------|------------|------------|------------|------------|---|
| | 1. 24 hour | 2. 24 hour | 3. 24 hour | 6. 24 hour | 7. 24 hour | |
| colour | colouless | colouless | colouless | colouless | colouless | n.s.e. |
| turbidity | clear | clear | clear | clear | clear | n.s.e. |
| tendency to foam formation | none | none | none | none | none | n.s.e. |
| TON (23°C) | 8 *) | 8 *) | 7 *) | 5 *) | < 3 | ≤ 3 |
| total organic carbon (TOC) mg/m ² x d | 3,6 | 2,0 | 2,0 | 2,2 | < 1,5 | 10 |

*) temporary detection of TON

n.s.e. = no significant effect

TON = threshold odour number

Test results
cold water (23°C)

Product: Lupolen 4261 A (uncoloured and black)
Test parts: reservoir segments (black), label: PE 2000 DF

Test conditions:

S/V-ratio

Migration test: 1664 cm² / 3110 ml = 1 : 1,9
Odour test: 424 cm² / 1660 ml = 1 : 3,9
Chlorine demand test: 948 cm² / 3630 ml = 1 : 3,8
 (demineralised water; with ca. 1,00 mg/l free Cl₂)

| Test / Parameter | test steps | | | Requirements according KSW-Recommendation (7.-9. day) |
|---|------------|------------|------------|--|
| | 1.-3. day | 4.-6. day | 7.-9. day | |
| colour | colourless | colourless | colourless | n.s.e. |
| turbidity | clear | clear | clear | n.s.e. |
| tendency to foam formation | none | none | none | n.s.e. |
| TON (23°C) | 3 *) | 3 *) | 1-2 | ≤ 3 |
| total organic carbon (TOC) mg/m ² x d | < 1 | < 1 | < 1 | 10 |
| chlorine demand (free Cl ₂) mg/m ² x d | 2,5 | 1,0 | 0,8 | 8,0 |

*) temporary detection of TON

n.s.e. = no significant effect
 TON = threshold odour number

Test results
warm water (60°C)

Product: Lupolen 4261 A (uncoloured and black)
Test parts: reservoir segments (black), label: PE 2000 DF
Test conditions:
S/V-ratio
Migration test: 1027 cm² / 2050 ml = 1 : 2,0
Odour test: 522 cm² / 1740 ml = 1 : 3,3

| Test / Parameter | test steps | | | | | Requirments according KSW-Recommendation |
|--|------------|------------|------------|------------|------------|---|
| | 1. 24 hour | 2. 24 hour | 3. 24 hour | 6. 24 hour | 7. 24 hour | |
| colour | colouless | colouless | colouless | colouless | colouless | n.s.e. |
| turbidity | clear | clear | clear | clear | clear | n.s.e. |
| tendency to foam formation | none | none | none | none | none | n.s.e. |
| TON (23°C) | 33 *) | 16 *) | 10 *) | 6 *) | 3 | ≤ 3 |
| total organic carbon (TOC) mg/m ² x d | 3,8 | 3,0 | 3,0 | 3,0 | 1,8 | 10 |

*) temporary detection of TON
 n.s.e. = no significant effect
 TON = threshold oudour number

DAP Deutsches Akkreditierungssystem Prüfwesen GmbH

Signatory to the Multilateral Agreement of EA for Mutual Recognition
and to the Mutual Recognition Arrangement of ILAC

represented in the

Deutscher Akkreditierungsrat



Accreditation

The DAP Deutsches Akkreditierungssystem Prüfwesen GmbH herewith confirms that the

**Institut für Umwelthygiene und Umweltmedizin des
Hygiene-Instituts des Ruhrgebiets zu Gelsenkirchen**

Rotthausener Straße 19
45879 Gelsenkirchen

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the fields of

physical, physicochemical, chemical, biological and specific ecotoxicological analyses of water, surface water, natural water, leachate, swimming pool water, waste water, sludge, sediments, solid wastes, matters for recycling and soils; microbiological analyses of water, surface water, swimming pool water as well as mineral and table water; analyses of drinking water as specified by the Trinkwasserverordnung (German drinking water ordinance) from 2001 excluding radiological parameters; specific physicochemical, chemical and microbiological analysis of non-metallic materials in potable water supply; specific microbiological examination of disinfectants and materials; determination (sampling and analysis) of airborne organic gaseous particles, fibrous particles and microbiological substances within the frame of indoor measurements; determination (sampling and analysis) of airborne fibrous particles within the frame of measurements at workplace; determination (sampling and analysis) analysis of particle precipitations within the frame of immission measurements; analysis of solid matters and dust with regard to fibrous particles; analyses of organic trace elements in water, aqueous migrates and plastics by means of HPLC-MS; sampling of water, natural, potable and waste water, leachate, swimming pool water, water from aquifers and flowing water bodies, soil vapour and sludges; determination (sampling and analysis) of inorganic and organic gaseous or particulate air constituents in immission, determination (sampling and analysis) of fibrous particles in immission, sampling of airborne polyhalogenated Dibenzo-p-Dioxins and Dibenzofuranes in immission; modules water, soil and contaminated sites as well as waste

in accordance with the test methods listed in the annex. The annex forms part of the certificate and comprises 55 pages.

The accreditation is valid from 2009-08-04 to 2014-06-18.

DAR registration number: DAP-PL-2548.00

Berlin, 2009-08-04

Univ.-Prof. Dr.-Ing. habil. K. Ziegler
Managing Director
DAP Deutsches Akkreditierungssystem
Prüfwesen GmbH



ZERTIFIKAT

LW-BU0440

über die Anerkennung als DVGW-Prüflaboratorium

Das Prüflaboratorium

**Hygiene-Institut des Ruhrgebiets -Umwelthygiene-
Rotthausen Str. 19, 45879 Gelsenkirchen
DEUTSCHLAND**

ist als

DVGW-Prüflaboratorium Wasser

anerkannt und damit berechtigt, Produktprüfungen für die DVGW CERT GmbH in dem bescheinigten Bereich durchzuführen. Die Anerkennung ist an die Person der Leitung des Prüflaboratoriums bzw. dessen Stellvertretung gebunden.

Leitung des Prüflaboratoriums: Dr. rer. nat. Andreas Koch

**Stellvertretung: Dr. rer. nat. Georg-Joachim Tuschewitzki
Dr. rer. nat. Christiane Schell**

Die Anerkennung gilt nur in Verbindung mit der gültigen Anlage zum anerkannten Prüfumfang, sowie der aktuellen Geschäftsordnung zur DVGW-Zertifizierung von Produkten. Sie gilt bis zum 04.01.2015, sofern die Voraussetzungen, die zur Anerkennung geführt haben, unverändert bleiben. Die Erstanerkennung erfolgte am 04.01.2010.

13.01.2010

Datum, Bearbeiter, Platz, Leiter der Zertifizierungsstelle

DVGW CERT GmbH - allgemein anerkannte Zulassungsstelle für die Prüflaboratorien im Gas- und Wasserfach

DVGW CERT GmbH - commonly recognized approval body for testing laboratories in the German gas and water industry

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