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Test Report

REPORT NO. MA5658/R

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EPDM

E70KX44P SHORE A 70±5 BLACK

- a) O-ring
- b) Washer

CLIENT:

Shen Zhen DEKE SEALING Technology Co., Ltd.
No. 27 Jixiang Three Road
Baishitang
Pingdi Town
Longgang District
Shenzhen City
China

reported by:

**PATRICK DAVIES
ANALYST**

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reviewed by:

**HANNAH SNELL
SECTION HEAD OF MATERIALS**

CLIENT'S REFERENCE: J160122001

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

**SUITABILITY OF NON-METALLIC PRODUCTS FOR USE IN CONTACT WITH WATER INTENDED FOR HUMAN CONSUMPTION WITH REGARD TO THEIR EFFECT ON THE QUALITY OF THE WATER
WRAS TESTS OF EFFECT ON WATER QUALITY (BS 6920: 2014)
HIGH TEMPERATURE TESTS (BS6920: PART 3: 2014)**

INFORMATION AND GUIDANCE NOTE

WATER REGULATIONS ADVISORY SCHEME

The Scheme wishes to draw to the attention of product manufacturers and users that reports issued by accredited test laboratories do not of themselves constitute approval by the Scheme or the test laboratory. Only a letter from the Scheme, citing a Directory Reference Number, can be regarded as indicating approval.

1. SAMPLES FOR TESTING

General composition of products	EPDM, shore hardness 70
Trade name and reference of material	E70KX44P SHORE A 70±5 BLACK
Materials manufacturers	CHX LLC., China
Submitting organisation	Shen Zhen DEKE SEALING Technology Co., Ltd., China
Component names/refs	a) O-ring b) Washer
Component manufacturers	Shen Zhen DEKE SEALING Technology Co., Ltd., China
Batch number of products	2MO1512290062
Date of manufacture of products	29 December 2015
Method of manufacture of samples	compression moulding
Sampling procedure	random
Description of samples	a) opaque, matt, black O-ring b) opaque, matt, black washer
Surface area of test pieces	a) 15303mm ² b) 14793mm ²
Number of articles constituting a test piece	a) 21 b) 17
Surface area of one article	a) 729mm ² b) 870mm ²
Dimensions of test pieces:	ext./int. diameter: in-radius: ext./int. diameter/thickness: in-radius:
	a) 30.23mm/24.87mm 1.34mm b) 37.09mm/33.21mm/2.00mm 0.97mm

Calibration mark of test containers	1 litre
Date of application	2 February 2016
Date of receipt of test samples	3 February 2016
Condition of samples on receipt	satisfactory
Method of packaging	plastic bag
Conditions of storage of the samples between receipt and testing	as instructed in BS6920-2.1: 2014: clause 5.2
Proposed use of the product	O-rings, gaskets, seals, rubber diaphragms etc.

2. ODOUR AND FLAVOUR OF WATER

Number of tasters in the taste panel – 3

Product a)

Date tests commenced – 19 April 2016

Extraction temperature – **23°C**

Extract 1

(i) chlorine free test water:

Taster	Odour description	Flavour description	Flavour dilution number
1	nil	nil	<1
2	nil	nil	<1
3	nil	nil	<1

(ii) chlorinated test water:

Taster	Odour description	Flavour description	Flavour dilution number
1	nil	nil	<1
2	nil	nil	<1
3	nil	nil	<1

Comment - thus the samples of this product have been found to comply with the requirements of BS 6920: Part 1: clause 4 when extracted at **23°C**.

Extraction temperature – **85°C**

Extract 1

(i) chlorine free test water:

Taster	Odour description	Flavour description	Flavour dilution number
1	musty	nil	<1
2	nil	nil	<1
3	nil	nil	<1

(ii) chlorinated test water:

Taster	Odour description	Flavour description	Flavour dilution number
1	nil	nil	<1
2	nil	nil	<1
3	nil	nil	<1

Comment - thus the sample of this product has been found to comply with the requirements of BS 6920: Part 1: clause 4 when extracted at **85°C**.

Product b)

Date tests commenced – 19 April 2016

Extraction temperature – **23°C**

Extract 1

(i) chlorine free test water:

Taster	Odour description	Flavour description	Flavour dilution number
1	nil	nil	<1
2	nil	nil	<1
3	nil	nil	<1

(ii) chlorinated test water:

Taster	Odour description	Flavour description	Flavour dilution number
1	nil	nil	<1
2	nil	nil	<1
3	nil	nil	<1

Comment - thus the samples of this product have been found to comply with the requirements of BS 6920: Part 1: clause 4 when extracted at **23°C**.

Extraction temperature – **85°C**

Extract 1

(i) chlorine free test water:

Taster	Odour description	Flavour description	Flavour dilution number
1	musty	nil	<1
2	nil	nil	<1
3	nil	nil	<1

(ii) chlorinated test water:

Taster	Odour description	Flavour description	Flavour dilution number
1	nil	nil	<1
2	nil	nil	<1
3	nil	nil	<1

Comment - thus the sample of this product has been found to comply with the requirements of BS 6920: Part 1: clause 4 when extracted at **85°C**.

3. APPEARANCE OF WATER

Product a) only

Extraction temperature – 85°C

Date test commenced – 26 April 2016

Extract 1

	Colour (Hazen units)	Turbidity (Formazine nephelometric units)
Test container (product)	<5	0.19
Blank	<5	0.17
Net increase	nil	0.02

Comment - thus the sample of this product has been found to comply with the requirements of BS 6920: Part 1: clause 5 when extracted at 85°C.

4. GROWTH OF AQUATIC MICROORGANISMS

Product a)

Date test commenced – 1 March 2016

Mean dissolved oxygen differences –

Test containers (product)	1.3mg/l
Negative reference (glass) sample	0.6mg/l
Positive reference (wax) sample	5.4mg/l
Mean dissolved oxygen concentration of the test control	8.2mg/l

Product b)

Date test commenced – 9 August 2016

Mean dissolved oxygen differences –

Test containers (product)	0.7mg/l
Negative reference (glass) sample	0.4mg/l
Positive reference (wax) sample	4.4mg/l
Mean dissolved oxygen concentration of the test control	8.2mg/l

Note - At the end of this test the test pieces showed no changes in colour and appearance.

Comments - thus the samples of these products have been found to comply with the requirements of BS 6920: Part 1: clause 6.

5. **THE EXTRACTION OF SUBSTANCES THAT MAY BE OF CONCERN TO PUBLIC HEALTH**

Extracts were tested using African Green Monkey Cell Line (VERO ATCC CCL 81)

Product a) only

Extraction temperature – **23°C**

Date test commenced – 12 April 2016

Extract	Growth of cell tissue (monolayer)
Reagent blank	healthy, confluent
Zinc sulphate validation solution (cytotoxic)	cell death
Sample	healthy, confluent

Comment - thus the sample of this product has been found to give a non-cytotoxic response and therefore it has been found to comply with the requirements of BS 6920: Part 1: clause 7 when extracted at **23°C**.

Extraction temperature – **85°C**

Date test commenced – 5 April 2016

Extract	Growth of cell tissue (monolayer)
Reagent blank	healthy, confluent
Zinc sulphate validation solution (cytotoxic)	cell death
Sample	healthy, confluent

Comment - thus the sample of this product has been found to give a non-cytotoxic response and therefore it has been found to comply with the requirements of BS 6920: Part 1: clause 7 when extracted at **85°C**.

6. THE EXTRACTION OF METALS

Product a) only

Extraction temperature – 85°C

Date test commenced – 28 April 2016

Number of extracts – 1

All analyses carried out at location A, Sunbury Technology Centre, on duplicate samples of the product as specified below

Aluminium, Antimony, Arsenic, Boron, Cadmium, Chromium, Iron, Lead, Manganese, Mercury, Nickel, Selenium: Inductively coupled plasma – mass spectrometry (ICP-MS)

Extract 1

Metal	Expression of the results	Max. admissible concentration	Reporting limit	Concentration final extract		Determined reagent blanks
				I	II	
Aluminium	Al µg/L	200	20.0	< 20.0	< 20.0	< 20.0
Antimony	Sb µg/L	5	0.5	< 0.5	< 0.5	< 0.5
Arsenic	As µg/L	10	1.0	< 1.0	< 1.0	< 1.0
Boron	B µg/L	1000	100.0	< 100.0	< 100.0	111.0
Cadmium	Cd µg/L	5	0.5	< 0.5	< 0.5	< 0.5
Chromium	Cr µg/L	50	5.0	< 5.0	< 5.0	< 5.0
Iron	Fe µg/L	200	20.0	< 20.0	< 20.0	< 20.0
Lead	Pb µg/L	10	1.0	< 1.0	< 1.0	< 1.0
Manganese	Mn µg/L	50	5.0	< 5.0	< 5.0	< 5.0
Mercury	Hg µg/L	1	0.1	< 0.1	< 0.1	< 0.1
Nickel	Ni µg/L	20	2.0	< 2.0	< 2.0	< 2.0
Selenium	Se µg/L	10	1.0	< 1.0	< 1.0	< 1.0

Comment - thus the samples of these products have been found to comply with the requirements of BS 6920: Part 1: clause 8 when extracted at 85°C.

Further Comment - In the Extraction of Metals Test the concentration of Boron found in the reagent blank exceeded the reporting limit of detection for this element. After investigation it was concluded, that the test was valid and that the results obtained for the product conform with the requirements for this test.

CONCLUSION

The sample of the product referred to in this report has been tested in accordance with the methods specified in BS 6920: Part 2: 2014 "Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water: Methods of test" (including High Temperature Tests in accordance with BS 6920: Part 3: 2014) and the requirements of the Water Regulations Advisory Scheme 'WRAS Materials Guidance, Version 4.1 dated 20 January 2016'.

Product a) has satisfied the criteria set out in BS 6920: Part 1: 2014 "Specification" and thus complies with the requirements of the Water Regulations Advisory Scheme Tests of Effect on Water Quality (BS 6920: 2014). It is suitable for use with hot water (up to 85°C) and cold water.

Product b) has satisfied the criteria set out in BS 6920: Part 1: 2014 "Specification" and thus complies with the requirements of the Water Regulations Advisory Scheme Tests of Effect on Water Quality (BS 6920: 2014): Odour & Flavour of Water / Growth of Aquatic Microorganisms / High Temperature Tests (85°C).

NO OTHER TESTS WERE UNDERTAKEN ON PRODUCT B)

N.B The results specified in this report relate only to the samples of the products submitted for testing. Any changes in the nature or source of ingredients and the process of manufacture or application could affect the suitability of the products for use in contact with potable water.

Materials and products intended for use by a public water supply company in the preparation or conveyance of water may need to satisfy more comprehensive toxicological requirements as set specified by the Drinking Water Inspectorate. These additional requirements are necessary to ensure legal compliance with Regulation 31 of Water Supply (Water Quality) Regulations 2000.

NOTES FOR WRAS

The tests carried out on the sample of this product are based upon 'WRAS Material Guidance – Version 4.1: Issued 20th January 2016; Section 6.4; Ranges of elastomeric materials/component differing in size and Ranges of elastomeric components differing in shape only.

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