

BRITISH STANDARD TESTING

NON-METALLIC MATERIALS FOR USE WITH DRINKING WATER (BS 6920 : 2000)

TEST REPORT

Product : Sikaflex PRO3 - iC
Report Reference : M 104981/B
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Report Date : 29th June 2011

Executive Summary - when assessed by the methods given in BS 6920-2:2000 the samples of this product are deemed suitable for use in contact with cold water intended for human consumption.

NOTES.

1. The results given in this report relate only to the items tested, and not necessarily to the bulk from which they were taken.
2. This test work was undertaken in the UKAS accredited Spencer House laboratory of Thames Water Utilities Ltd., UKAS registration number 0677, unless otherwise stated.
3. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
4. This test report shall not be reproduced, except in full, without our prior written approval.

BRITISH STANDARD TESTING (BS 6920:2000)

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.

0. INTRODUCTION.

The samples of the product referred to in this report have been tested in accordance with the methods of BS 6920-2:2000 "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".

1. TEST SAMPLES.

General composition of product	Polyurethane sealant	
Trade name/designation	Sikaflex PRO3 - iC	
Material manufacturer	Sika Deutschland GmbH	
Date of manufacture/production	12 th April 2011	
Production batch numbers	0012786460	
Samples prepared by	WQC staff	
Submitting organisation	Sika Services AG	
Date of receipt of test samples	8 th March 2011	
Method of packaging	In product container	
Condition on receipt	Satisfactory	
Laboratory storage before test	Ambient temperature (21±4)°C	
Description	test article shape dimensions	Coated glass panel Rectangular 120mm x 60mm x 4mm
Appearance of article	colour surface finish opacity	White Matt Opaque
Surface area of one article (mm ²)	1000	
Number of articles to give a surface area ratio of 1000mm ² to 1L of test water.	1	
Calibration mark of the test vessel/container in litres	1	
Extraction temperature used for tests 2 & 5	(23±2)°C	

1.1 SITE APPLIED PRODUCTS.

Typical uses of the product	One part elastic joint sealant and multipurpose adhesive
Batch numbers of materials used	0012786460
Date of preparation/mixing	12 th April 2011
Appearance of product	White
How cure conditions will be achieved on site	Not known
Method of test sample preparation	Sealant was spread over a 1000mm ² area of a sanded glass panel using a spatula.
Mix ratio (mass : mass)	One part product
Number of coats used	1
Coat 1 = Curing (time and temperature)	21 days at (7±2)°C
Location of sample preparation	WQC laboratory
Equipment used for sample preparation	None
Total curing (time and temperature)	21 days at (7±2)°C

[method code LP/R/MT01]

2. ODOUR & FLAVOUR OF WATER TEST.

Temperature of extraction : (23±2)°C

Date test started : 03.05.11.

The extracts detailed below were compared with the procedural blank test waters by a panel of 3 testers. The following results were obtained for the test extracts.

Extract	Test water	Test	Descriptors	Threshold dilutions
First	Chlorine free	Odour	Not Tested - See Notes to DWI	
		Flavour	--	--
	Chlorinated	Odour	Not Tested - See Notes to DWI	
		Flavour	--	--
Final	Chlorine free	Odour	None	
		Flavour	None	<1
	Chlorinated	Odour	None	
		Flavour	None	<1

[method code LP/R/MT02]

COMMENT. On the basis of these results the samples of this product have been found **to conform** with the requirements of BS 6920-1 : Clause 4 when extracted at 23°C.

4. GROWTH OF AQUATIC MICROORGANISMS.

Temperature of test : (30±2)°C

Date test started : 03.05.11.

Container	Mean Dissolved Oxygen Difference (MDOD) in mg/L
Test product (weeks 5 to 7)	1.0
Negative reference (glass) (weeks 5 to 7)	-0.3
Positive reference (wax) (weeks 5 to 7)	6.8
Special positive reference Bacteriocidal/Bacteriostatic effect is detected	n/a n/a
Negative control - Mean dissolved oxygen concentration (weeks 5 to 7)	7.6

[method code LP/R/MT04]

COMMENT. On the basis of these results the sample of this product has been found **to conform** with the requirements of BS 6920-1 : Clause 6.

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

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

Temperature of extraction : (23±2)°C

Date test started : 03.05.11.

The extracts from the product and the blank were used to prepare culture media for use with a monkey kidney cell line (VERO ATCC CCL 81)

Attribute	Test sample extract	Reagent blank	Zinc sulfate solution
Cell morphology (Microscopy)	Satisfactory	Satisfactory	Cell death
Culture medium (colour)	Normal	Normal	Abnormal (alkaline)
Monolayer confluence (approx %)	100%	100%	0%

[method code LP/R/MT05 & LP/R/256]

COMMENT. On the basis of these test results the extract of this product has been found to give a non-cytotoxic response, and therefore it has been found **to conform** with the requirements of BS 6920-1 : Clause 7 when extracted at 23°C.

CONCLUSIONS.

The samples of this product meet the test criteria of BS 6920-1:2000 ("Specification") and is suitable for use in contact with cold but not hot water intended for human consumption.

NOTE : 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 specified by the Drinking Water Inspectorate. These additional requirements are necessary to ensure water company usage complies with Regulation 31 of the Water Supply (Water Quality) Regulations 2000.

NO OTHER TESTS WERE UNDERTAKEN ON THIS PRODUCT.

NOTES -

1. The results specified in this report relate only to the sample(s) submitted for testing. Any changes in the nature or source of ingredients and the process of manufacture or application could affect the suitability of this product for use in contact with drinking water.
2. We would draw to your attention that reports issued by the accredited test laboratories do not of themselves constitute approval by the Water Regulations Advisory Scheme (WRAS) or the test laboratory. Only a letter from the Scheme, citing a Directory Reference Number, can be regarded as indicating approval.

Note for the Drinking Water Inspectorate (DWI) : (1) This product was tested at the reduced surface area to volume ratio of 1000 mm² per litre (2) The first extract in the Odour and Flavour of Water Test is not assessed until a satisfactory test result has been obtained in the Cytotoxicity Test.

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BRITISH STANDARD TESTING : TEST CRITERIA (BS 6920:2000).

The following test criteria are used to determine whether your product(s) complies with the requirements of BS 6920-1:2000.

1. ODOUR & FLAVOUR OF WATER. (BS 6920-1 : Clause 4)

Off-odours and off-flavours of water are the most usual causes of customer complaints about water quality. On test the material is exposed, under controlled conditions (surface area to volume (S/V) test ratio, duration, temperature) to the test water (with and without free-chlorine); it is subsequently diluted twice on a 1 to 1 basis and assessed by a test panel.

The test sample leachates must be free from odour and, after dilution, free from flavour in the first 1:1 dilutions of them. If, after 7 sequential leaching periods, any odour is detected in the sample leachates or any flavour detected in the first dilution of these leachates by any of the three panellists, then the product fails to meet this test criterion *unless* two further sets of test samples are assessed and no odour is reported in the leachates and no flavour is reported in the first dilutions of the final (i.e. seventh) leachates from these additional test samples.

Materials meeting these test criteria do not usually give rise to off-odours and off-flavours in-service.

2. APPEARANCE OF WATER. (BS 6920-1 : Clause 5)

Any increase in the colour and turbidity of the final (i.e. seventh) leachate from the sample of the product must be less than 5 Hazen units and 0.5 FNU respectively. If any colour or turbidity is detected in the final extract, then the product fails to meet the test criteria *unless* two further samples are tested and the mean of the colour and turbidity measurements of the final extracts of *all* of the samples meet the test criteria.

Materials meeting these test criteria do not usually give rise to in-service changes in the appearance of water.

3. GROWTH OF AQUATIC MICROORGANISMS. (BS 6920-1 : Clause 6)

The original methods were based on microbiological counting techniques and the test took a longer time period and cost considerably more (in real terms) than the present test. In an attempt to improve the performance of the test, including duration, other techniques were evaluated for assessing materials for the supports of biofilms and overall growth in water.

Work using dissolved oxygen depletion measurements as a surrogate measure of microbial growth in water showed improved reproducibility and repeatability compared with bacterial counts. The mean dissolved oxygen difference (MDOD) value obtained for the product is a surrogate measure of its ability to support the growth of microorganisms - as the growth of the organisms increases oxygen is removed from the test system; thus the greater the loss of dissolved oxygen caused by the product, the greater the MDOD value. This work was subsequently published (Colbourne and Brown, 1979) and incorporated into BS 6920 : Section 2.4:1988.

The mean dissolved oxygen difference between the water in contact with the sample of the product and the negative control system must be less than 2.4 mg/l; two further test samples of products giving a value in the range 1.7 to 2.9 mg/L are tested and the mean of the three readings used to show conformity with the test requirement $s(<2.4 \text{ mg/l})$.

The pass/fail criterion was set after consideration of results obtained from materials using microbial counts and evaluation of materials associated with biofilm development and/or microbial deterioration in water quality in-service.

4. THE EXTRACTION OF SUBSTANCES.... (CYTOTOXICITY TEST) (BS 6920-1 : Clause 7)

If the first aqueous extract from the sample of the product is free from toxicity to the test cell line, it can be regarded as suitable for use in contact with potable water in relation to this particular test. If any toxicity is detected in this extract, then the product fails to meet the test criteria *unless* two further samples are tested and found to be free from any toxic response.

A failure in this test is indicative only of a possible public health issue and NOT necessarily of a real concern.

5. THE EXTRACTION OF METALS. (BS 6920-1 : Clause 8)

Any metal present in the final duplicate extracts obtained from the samples of the product must be at levels less than Maximum Admissible Levels (MACs) based on both the first and subsequent EU Drinking Water Directives. If the MACs of any metal is exceeded in either of the final extracts from the samples of the product then the product fails to meet this test criterion *unless* three further samples of the product are tested and the levels of the specified metals in the extracts from all of these additional samples do not exceed the MACs.

Materials meeting these test criteria do not usually give rise to significant in-service changes in the concentrations of metals in water.