WRc-NSF

TEST REPORT

Client: **Sejin SMC Company Limited**

Product: **GRP Panel for Water Tank**

Tests Undertaken: **BS6920: 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**

Report Number: **MAT/LAB: 330B & 678B**

Date of Report: **9th February 2010**

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UKAS TESTING
0626

CONTENTS

1. EXECUTIVE SUMMARY

Test	Result
Odour and flavour of water	Pass
Appearance of water	Pass
Growth of aquatic microorganisms	Pass
The extraction of substances that may be of concern to public health	Pass
Extraction of metals	Pass

This product <u>has</u> satisfied the criteria set out in BS6920: Part 1: 2000 "Specification" and thus <u>does</u> comply with the requirements of the Water Regulations Advisory Scheme Tests of Effect on Water Quality and is suitable for use with hot (up to 55 °C) and cold water.

Mark Norris

Mr Mark Norris, Materials Testing Manager Date 9th Feb 2010

Please note the following statements	
a)	The samples of the product referred to in this report have been tested in accordance with the methods specified in BS6920: 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.
b)	This work has been undertaken in the UKAS accredited laboratory of WRc-NSF Ltd Oakdale, UKAS registration number 0626, unless otherwise stated. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.
c)	The results specified in this report relate only to the samples(s) of this product submitted for testing. Any changes in the nature or source of ingredients and the process of manufacturer or application could affect the suitability of this product for use in contact with potable water.
d)	We draw to your attention that reports issued by the accredited test laboratories do not of themselves constitute approval by the Water Regulations Advisory Scheme or the test laboratory. Only a letter from the Scheme, citing a Directory Reference number can be regarded as indicating approval.
e)	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.

2. SAMPLES FOR TESTING

BS6920, Section 2.1 and in-house method PROC/MAT 001.

Contact name: Ms Kay Lee
Name of organisation: Sejin SMC Company Limited
Address: 16th Floor Miwon Building 43 Yeouido-dong Yeongdeungpo-gu Seoul 150-733 Korea

Product:	GRP panel for water tank
Product manufacturer:	Sejin SMC Company Limited
Submitting organisation:	Sejin SMC Company Limited
Manufacturing site:	Industrial Complex 6BL, 680-1 Seonggok-dong, Dawon-gu, Ansan-si, Gyeinggido, Korea
Method of manufacture:	Compression moulding

WRc-NSF reference number:	Date of receipt of product for test:
MAT/LAB 330B	20/07/09
MAT/LAB 678B	05/01/10
Trade name and reference of product:	GRP panel for SEJIN water tank
Batch number	SH09G13A
General nature of product:	GRP
Shore hardness:	Not applicable
Typical use of the product:	Water tank
WRAS Approval number	Not applicable

Sampling procedure:	Random
Receipt conditions and packaging:	In good condition
Storage conditions:	As in BS 6920 Part 2 Section 2.1 Clause 5.2
Description / Appearance of the product:	Light grey GRP panel

Component name/reference:	GRP panel
Component manufacturer:	Sejin SMC Company Limited
Fitting name/reference:	Sejin water storage tank
Fitting manufacturer:	Sejin SMC Company Limited

Test sample preparation:	Product prepared by applicant
Date test sample manufactured:	Not known
Date test sample prepared:	Not applicable

Surface area of one article:	152278 mm^2
Number of articles constituting a sample:	One
Dimensions of test sample:	L = 118 mm, W = 60 mm, Thickness = 3 mm
Surface area for test:	15228 mm^2
Calibration mark of test container:	1 Litre

3. ODOUR AND FLAVOUR OF WATER

Methodology: BS6920, Section 2.2.1 and in-house method PROC/MAT 004 and 006.

Test results MAT/LAB 330B

Date leaching tests started: 28/07/09	Date leaching tests finished: 06/08/09
Number of panellists: 3	Temperature of extraction: 55 ±2 °C

Odour test

Extract	Date of test	Test water	Dilution number*	Odour descriptor
First	29/07/09	Chlorine free	0(3)	Chemical, Paint, Plastic
First	29/07/09	Chlorinated	0(3)	Oily, Paint, Plastic
Final	6/08/09	Chlorine free	0(2)	Plastic, Chemical
Final	6/08/09	Chlorinated	0(1)	Plastic

Flavour test

Extract	Date of test	Test water	Dilution number*	Flavour descriptor
First	29/07/09	Chlorine free	Not suitable for flavour failed odour	
First	29/07/09	Chlorinated	Not suitable for flavour failed odour	
Final	6/08/09	Chlorine free	1(0)	None
Final	6/08/09	Chlorinated	1(0)	None

* figure in brackets is the number of panellists detecting an odour or flavour at this dilution

On the basis of these results the samples of this product referred to in this report have been found not to comply with the requirements of BS 6920, Part 1, Clause 4

The test was repeated with the cut edge sealed with an approved silicone sealant,

Methodology: BS6920, Section 2.2.1 and in-house method PROC/MAT 004 and 006.

Test results MAT/LAB 678B

Date leaching tests started: 31/01/10	Date leaching tests finished: 09/01/10
Number of panellists: 3	Temperature of extraction: 55 ±2 °C

Odour test

Extract	Date of test	Test water	Dilution number*	Odour descriptor
First	01/02/10	Chlorine free	0(0)	None
First	01/02/10	Chlorinated	0(1)	Chemical
Final	-	Chlorine free	-	-
Final	09/01/10	Chlorinated	0(0)	None

Flavour test

Extract	Date of test	Test water	Dilution number*	Flavour descriptor
First	01/02/10	Chlorine free	1(0)	None
First	01/02/10	Chlorinated	Not suitable for flavour failed odour	
Final	-	Chlorine free	-	-
Final	09/01/10	Chlorinated	1(0)	None

* figure in brackets is the number of panellists detecting an odour or flavour at this dilution

On the basis of these results the samples of this product referred to in this report have been found to comply with the requirements of BS6920, Part 1, Clause 4

4. APPEARANCE OF WATER

Methodology: BS6920, Section 2.3 and in-house methods PROC/MAT 004, ING 78 (colour) and ING 100 (turbidity).

Test Results MAT/LAB 678B

Date leaching tests started: 28/07/09	Date leaching tests finished: 29/07/09
Temperature of extraction: 55 ±2 °C	

Colour

Extract	Date of test	Hazen units		Test sample effect
		Blank	Extract	
First	29/07/09	<2	<2	None
Final	-	-	-	-

Turbidity

Extract	Date of test	Formazine Nephelometric units		Test sample effect
		Blank	Extract	
First	29/07/09	<0.1	<0.1	None
Final	-	-	-	-

First extract becomes final extract

On the basis of these results the samples of this product referred to in this report have been found to comply with the requirements of BS6920, Part 1, Clause 5

5. GROWTH OF MICROORGANISMS

Methodology: BS6920, Section 2.4 and in-house method PROC/MIC 001.

Test Results MAT/LAB 678B

Date leaching tests started: 28/07/09	Date leaching tests finished: 15/09/09
Incubation temperature: 30 ± 1 °C	

Mean dissolved oxygen difference MDOD (mg l^{-1} O_2)	
Test sample	0.17
Positive reference (paraffin wax)	6.09
Negative reference (glass)	0.00

Test water control dissolved oxygen (mg l^{-1} O_2)	8.00

Comments on changes in appearance of test material and any visible microbial growth	At the end of this test, the test pieces showed no change in colour or appearance.

On the basis of these results the samples of this product referred to in this report have been found to comply with the requirements of BS6920, Part 1, Clause 6

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

Methodology: BS6920, Section 2.5 in-house methods PROC/MAT 004 and PROC/MIC 004.

Test Set-up Date: 29/07/09

Cell line: VERO cell line of African green monkey kidney cells (ATCC number CCL 81).	
Media preparation date: 27/07/09	Passage number: 41
Cell concentration in sample: 7.5×10^5	Positive control: Zinc sulphate Bt 63
Morphology: Confluent growth of elongated cells, some round cells and cell debris. Media orange/pink in colour.	
Media log batch numbers Medium concentrate (CCM): B 142	Distilled water (SDW): B 64

Test Results MAT/LAB 678B

Date leaching tests started: 28/07/09	Date leaching tests finished: 29/07/09
Temperature of extraction: 55 ±2 °C	

Cell Morphology	
Test Sample	Confluent growth of elongated cells, some round cells and cell debris. Media orange/pink in colour.
Blank	Confluent growth of elongated cells, some round cells and cell debris. Media orange/pink in colour.
Negative control	Confluent growth of elongated cells, some round cells and cell debris. Media orange/pink in colour.
Positive control	All cells rounded and mainly still in suspension. Media pink in colour.

On the basis of these results the samples of this product referred to in this report have been found to comply with the requirements of BS6920, Part 1, Clause 7

7. THE EXTRACTION OF METALS

Methodology: BS6920, Section 2.6, in-house methods PROC/MAT 006 and INGs, as specified, metals analysis undertaken in the UKAS accredited laboratory of WRc-NSF Ltd Reading, Berks, UKAS registration number 1550.

Test Results MAT/LAB 678B

Date leaching tests started: 28/07/09	Date leaching tests finished: 29/07/09
Analysis Registration No N22808	Temperature of extraction: 55 ±2 °C

Metal (µg l^{-1})	Analytical Method (in-house method)	MAC (µg l^{-1})	LOD (µg l^{-1})	Blank (µg l^{-1})	Sample 1 (µg l^{-1})	Sample 2 (µg l^{-1})
Aluminium	ICPMS (ING113)	200	20	<20	58.4	51.7
Antimony	ICPMS (ING113)	5	0.5	<0.5	<0.5	<0.5
Arsenic	ICPMS (ING113)	10	1	<1	<1	<1
Barium	ICPMS (ING113)	1000	100	<100	<100	<100
Cadmium	ICPMS (ING113)	5	0.5	<0.5	<0.5	<0.5
Chromium	ICPMS (ING113)	50	5	<5	<5	<5
Iron	ICPMS (ING113)	200	20	<20	<20	<20
Lead	ICPMS (ING113)	25	1	<1	7.59	1.82
Manganese	ICPMS (ING113)	50	5	<5	<5	<5
Mercury	ICPMS (ING113)	1	0.1	<0.1	<0.1	<0.1
Nickel	ICPMS (ING113)	20	2	<2	<2	<2
Selenium	ICPMS (ING113)	10	1	<1	<1	<1

MAC - Maximum admissible concentration ICPMS Inductively Coupled Plasma Mass Spectrometry

LOD - Required limit of detection

#: - MAC is taken from the 1989 Drinking Water Directive requirements
LOD is based on the 1998 Drinking Water Directive requirements.

First extract becomes final extract

On the basis of these results the samples of this product referred to in this report have been found to comply with the requirements of BS6920, Part 1, Clause 8

NOTES

1. This report is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS). WRc-NSF is UKAS accredited against ISO/IEC 17025 : 2005 for calibration and testing, laboratory numbers 0248 and 0626 respectively. For details of the laboratory Schedule of Accreditation please see the UKAS website (www.ukas.org).
2. The laboratory provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories.
3. Opinions and interpretations in this report are outside the scope of UKAS Accreditation.
4. The results specified in this report relate only to the sample(s) of the product submitted for testing. Any change in the source or nature of the product or materials used in the product, method of manufacture or application could affect the performance of the product.
5. This test report does not constitute approval or endorsement of the product by either WRc-NSF or its parent companies.
6.
7. Any queries regarding this report should be addressed to the authorised signatory or to the Technical Manager at WRc-NSF. Copies of reports are retained by WRc-NSF for six years after issue.
8. Tests not UKAS accredited or tests which have been subcontracted are identified in the following manner:
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   - Tests marked @ have not been performed by WRc-NSF and the approved subcontractor is not UKAS accredited for the test(s);
   - Tests marked * have not been performed by WRc-NSF and the approved subcontractor is UKAS accredited for the test(s).