

REPORT

Testing Welesgard WG-Weleforce PW
according to BS 6920 full cold water test.

Haarlem, 28 October 2019

Consultancy Laboratory

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Client

:



Project number

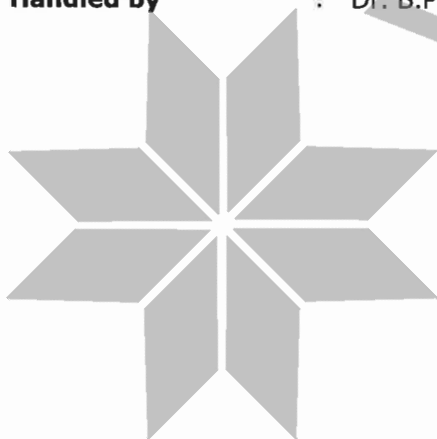
: 20190014

Report number

: LAB19-0465-REP

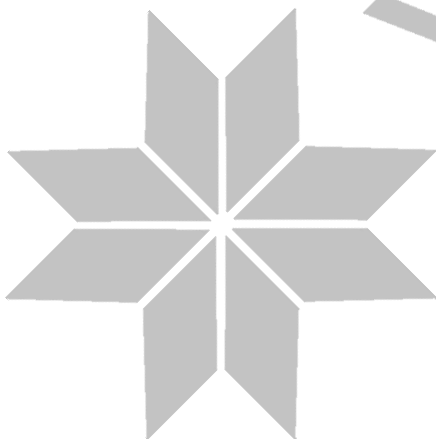
Handled by

: Dr. B.P. Alblas



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welesgard

1 INTRODUCTION

1.1 Order

By order of [REDACTED], the Centrum voor Onderzoek en Technisch advies (COT bv) in Haarlem, The Netherlands, has tested the Welesgard paint WG-Weleforce PW with COT sample number 05-04-19/0167 according to BS 6820, full cold water test for use with drinking water.

The order has been confirmed by email correspondence on 22-05-2019.

1.2 General information

Table 1: Received samples

COT sample number	Sample	Received
05-04-19/0167	WG Weleforce PW Component A Component B	05-04-2019

The received coating has been used for sample preparation. The following information has been received from the client.

WG Weleforce PW

Type : Two-pack epoxy coating
Colour : Yellow
Date of Manufacture : 01-04-2019
Mixing ratio : 2 : 1 (vol)
Cure temperature : 20 - 25 °C, time 2 h
Batch number : -

2 PROCEDURE

The test has been performed according to BS 6920-2 by The Water Quality Centre (WQC) in Reading, UK.

It concerns the full cold water testing at 23 °C and the Odour and Flavour test at 23 °C.

About 2 litres of the paint has been sent by COT to WQC in two cans with volumes adapted to the required mixing ratio.

The paint has been applied on rectangular glass panels with dimensions 120 x 60 x 4 mm according to the manufacturer instructions (Welesgard Technical data sheet WG-Weleforce PW, date of issue 22.11.2017, V.02). Coating thickness 550-600 µm.

Two curing schemes have been applied:

- (a) 10 °C cure for 7 days and
- (b) 50 °C cure for 6 hours.

The tests have been performed between 20th May and 16th October 2019.

3 REQUIREMENTS

Requirements for the testing procedure are stated in BS 6920-1 Clauses 4, 5, 6, 7 and 8. These requirements concern colour, turbidity, mean dissolved oxygen difference, cell morphology, culture medium colour, monolayer confluence and extraction of metals (Al, Sb, As, B, Cd, Cr, Fe, Pb, Mn, Hg, Ni and Se).

4 RESULTS

Two test reports have been received from WQC, both have been completely included in the Annex.

5 CONCLUSION

The samples of this product Welesgard WG Weleforce PW meet the test criteria of BS 6920-1 and thus do conform with the requirements of the Water Regulations Advisory Schema (WRAS) Tests of Effect on Water Quality, Odour and Flavour of Water Test, and is suitable for use with cold water.

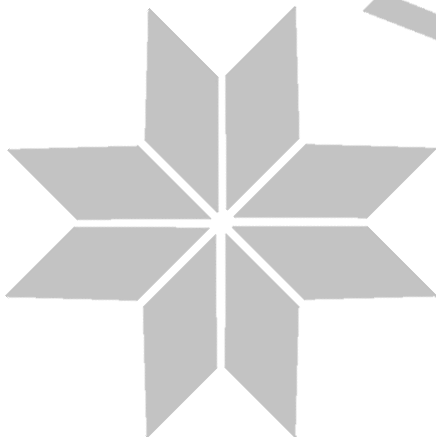
CENTRUM VOOR ONDERZOEK
EN TECHNISCH ADVIES (COT bv)

A blue ink signature of Dr. B.P. Alblas, written in a cursive style.

Dr. B.P. Alblas
Manager Laboratory

A blue ink signature of J.R.S. Brakenhoff, written in a cursive style.

J.R.S. Brakenhoff
Technical Manager Laboratory

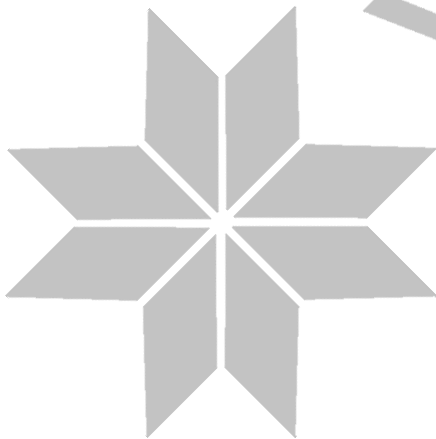


welesgard



ANNEX

WQC TEST REPORTS, Ref. M106864/A+B



welesgard



THE WATER QUALITY CENTRE

MATERIALS TESTING

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WATER REGULATIONS ADVISORY SCHEME (WRAS)

**TESTING OF NON-METALLIC MATERIALS FOR USE WITH DRINKING
WATER (BS 6920 : 2014)**

TEST REPORT

Product: WG Weleforce PW
Report Reference: M106864/A
Page 1 of 9 Pages

COT BV
Jan Tademaweg 40
2031 CV Haarlem
THE NETHERLANDS

Report Issue Date: 16th October 2019

Executive Summary - this product has met the requirements of the Water Regulations Advisory Scheme (WRAS) Tests of Effect on Water Quality/BS 6920:2014/ Cold Water Use.

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.
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**TESTING OF NON-METALLIC MATERIALS FOR USE WITH DRINKING WATER
WATER REGULATIONS ADVISORY SCHEME TESTS OF EFFECT ON WATER
QUALITY (BS 6920:2014)**

0. INTRODUCTION

The samples of the product referred to in this report have been tested in accordance with the methods of the Water Regulations Advisory Scheme (WRAS) Tests of Effect on Water Quality/BS 6920-2:2014 "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".

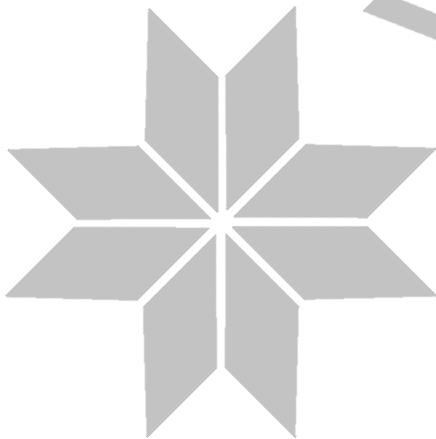
1. TEST SAMPLES

General composition of product	Epoxy Coating	
Material trade name/ designation	WG Weleforce PW	
Material manufacturer / site	Welesgard / Kiev, Ukraine	
Samples prepared by	WQC Staff	
Submitting organisation	Cot BV	
Date of application	16 th May 2019	
Date of receipt of test samples	20 th May 2019	
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	Yellow Matt Opaque
Surface area of one article (mm ²)	≈15000	
Number of articles to give a surface area to volume ratio of 15000mm ² to 1L of test water	1	
Calibration mark of the test vessel/container in litres	1	
Extraction temperature used for tests 2, 3, 5 & 6	(23±2)°C	

1.1 SITE APPLIED PRODUCTS

Typical uses of the product	Epoxy Coating
Batch numbers of materials used	Resin = C54190167A Curing Agent = C54190167B
Date of preparation/mixing	23 rd July 2019
Appearance of product/component parts before mixing	Resin = Yellow, Curing Agent = White
How cure conditions will be achieved on site	Not Known
Method of test sample preparation	Resin (Comp A) and Curing Agent (Comp B) were mixed with a slow speed drill and paddle mixer in accordance with manufacturer's instructions, and brush applied onto sanded glass panels.
Mix ratio (vol : vol)	Comp A : Comp B = 2 : 1
Number of coats used	1
Thickness of coating	550-600µm
Coat 1 = Curing (time and temperature)	7 days at (10±2)°C
Location of sample preparation	WQC Laboratory
Equipment used for sample preparation	Slow speed drill and paddle mixer
Total curing (time and temperature)	7 days at (10±2)°C

[method code LP/R/MT01]



2. ODOUR & FLAVOUR OF WATER

Temperature of extraction: (23±2)°C

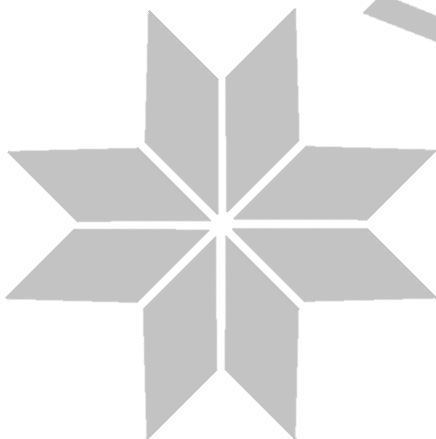
Date test started: 30.07.19

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 WRAS	
		Flavour	---	---
	Chlorinated	Odour	Not Tested – See Notes to WRAS	
		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.



welesgard

3. APPEARANCE OF WATER

Temperature of extraction: (23±2)°C

Date test started: 30.07.19

	Colour (Hazen Units)		Turbidity (Formazine Nephelometric Units)	
	First Extract	Final Extract	First Extract	Final Extract
Test sample extract	<1.0	--	<0.09	--
Reagent blank	<1.0	--	<0.09	--
Test sample effect	<1.0	--	<0.09	--

[method code LP/R/MT03 & LP/R/610 & LP/R/14 & LP/R/15]

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 5 when extracted at 23°C.

4. GROWTH OF AQUATIC MICROORGANISMS

Temperature of extraction: (30°C)

Date test started: 30.07.19

Container	Mean Dissolved Oxygen Difference (MDOD) in mg/L
Test product (weeks 5 to 7)	0.0
Negative reference (glass) (weeks 5 to 7)	0.0
Positive reference (wax) (weeks 5 to 7)	6.9
Special positive reference Bactericidal/Bacteriostatic effect	n/a n/a
Negative control - Mean dissolved oxygen concentration (weeks 5 to 7)	8.3

[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 (CYTOTOXICITY)

Temperature of extraction: (23±2)°C

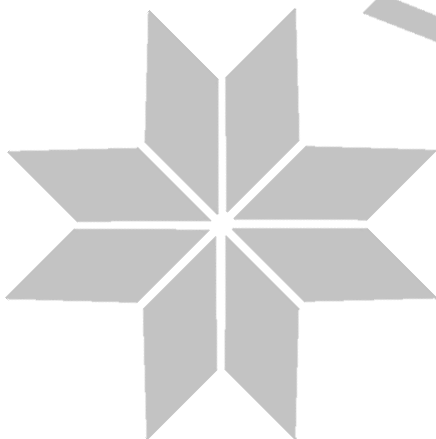
Date test started: 30.07.19

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.



6. EXTRACTION OF METALS

Temperature of extraction: (23±2) °C

Date test started: 30.07.19

The results obtained for the first extract are given below -

Element	Unit	MAC	Limit of Detection (LOD)	Sample 1	Sample 2	Reagent blank
Aluminium	Al µg/L	200	5.3	<5.3	<5.3	<5.3
Antimony	Sb µg/L	5	0.2	<0.2	<0.2	<0.2
Arsenic	As µg/L	10	0.2	<0.2	<0.2	<0.2
Boron	B µg/L	1000	4	8	<4	5
Cadmium	Cd µg/L	5	0.1	<0.1	<0.1	<0.1
Chromium	Cr µg/L	50	0.9	<0.9	<0.9	<0.9
Iron	Fe µg/L	200	1.2	<1.2	1.5	<1.2
Lead	Pb µg/L	10	0.2	<0.2	<0.2	<0.2
Manganese	Mn µg/L	50	0.2	<0.2	<0.2	<0.2
Mercury	Hg µg/L	1	0.03	<0.03	<0.03	<0.03
Nickel	Ni µg/L	20	0.7	<0.7	<0.7	<0.7
Selenium	Se µg/L	10	0.7	<0.7	<0.7	<0.7

[* method code LP/R/MT06 & LP/R/615 Part 1 & LP/R/616 Part 1]

Extract Analytical.

Aluminium, antimony, arsenic, boron, cadmium, chromium, iron, lead, manganese, mercury, nickel, and selenium - inductively coupled plasma mass spectrometry* or inductively coupled plasma optical emission spectrometry*.

Analytical Control Data - this technique is in continuous use for analysis of drinking water metals; this technique is fully validated to the requirements of "A Manual on Analytical Quality Control for the Water Industry" (NS 30) and the requirements laid down by the Drinking Water Inspectorate. The technique has a comprehensive AQC protocol including control solutions with each batch of samples for analysis; full details available upon request.

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 8 when extracted at 23°C.

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

CONCLUSIONS

The samples of this product meet the test criteria of BS 6920-1:2014 ("Specification") and thus DO conform with the requirements of the Water Regulations Advisory Scheme (WRAS) Tests of Effect on Water Quality, and is suitable for use with cold but not hot water.

NOTE: materials and products intended for use by a public water supply organisation 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 conforms with Regulation 31 of the Water Supply (Water Quality) Regulations 2000.

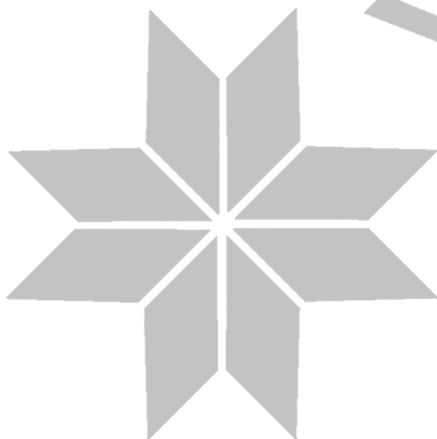
NOTES -

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 wholesome 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. Applicants will be formally notified of their WRAS approval number by the Scheme if their application has been successful.

Note for the Water Regulations Advisory Scheme (WRAS): 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.



Anthony Maddox
Materials Testing Analytical Consultant





THE WATER QUALITY CENTRE

MATERIALS TESTING

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WATER REGULATIONS ADVISORY SCHEME (WRAS)

TESTING OF NON-METALLIC MATERIALS FOR USE WITH DRINKING WATER (BS 6920: 2014)

TEST REPORT

Product: WG Weleforce PW
Report Reference: M 106864/B
Page 1 of 6 Pages

COT BV
Jan Tademaweg 40
2031 CV Haarlem
THE NETHERLANDS

Report Issue Date: 16th October 2019

Executive Summary - this product has met the requirements of the Water Regulations Advisory Scheme (WRAS) Tests of Effect on Water Quality/BS 6920:2014/ Odour & Flavour of Water Test/ Cold Water Use.

NOTES.

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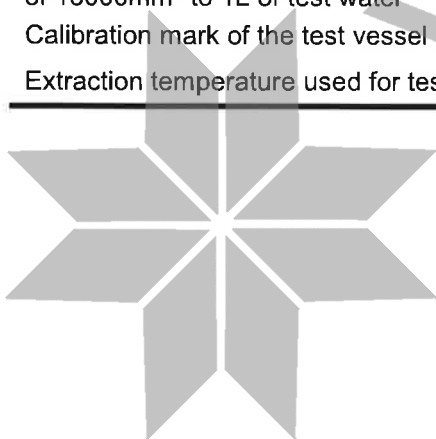
**TESTING OF NON-METALLIC MATERIALS FOR USE WITH DRINKING WATER
WATER REGULATIONS ADVISORY SCHEME TESTS OF EFFECT ON WATER QUALITY
(BS 6920:2014)**

0. INTRODUCTION

The samples of the product referred to in this report have been tested in accordance with the methods of the Water Regulations Advisory Scheme (WRAS) Tests of Effect on Water Quality/BS 6920-2:2014 "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".

1. TEST SAMPLES

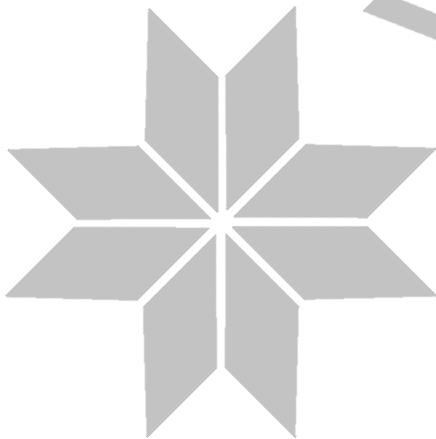
General composition of product	Epoxy Coating	
Material trade name / designation	WG Weleforce PW	
Material manufacturer / site	Welesgard / Kiev, Ukraine	
Samples prepared by	WQC Staff	
Submitting organisation	Cot BV	
Date of application	16 th May 2019	
Date of receipt of test samples	20 th September 2019	
Method of packaging	In product container	
Condition on receipt	Satisfactory	
Laboratory storage before test	Ambient temperature (21±4)°C	
Description	test article	Coated Glass Panel
	shape	Rectangular
	dimensions	120mm x 60mm x 4mm
Appearance of article	colour	Yellow
	surface finish	Matt
	opacity	Opaque
Surface area of one article (mm ²)	≈15000	
Number of articles to give a surface area to volume ratio of 15000mm ² to 1L of test water	1	
Calibration mark of the test vessel / container (L)	1	
Extraction temperature used for test 2	(23±2)°C	



1.1 SITE APPLIED PRODUCTS

Typical uses of the product	Epoxy Coating
Batch numbers of materials used	Resin = C54190167B Curing Agent = C54190167B
Date of preparation / mixing	24 th September 2019
Appearance of product / component parts before mixing	Resin = Yellow, Curing Agent = White
How cure conditions will be achieved on site	Not Known
Method of test sample preparation	Resin (Comp A) and Curing Agent (Comp B) were mixed with a slow speed drill and paddle mixer in accordance with manufacturer's instructions, and brush applied onto sanded glass panels.
Mix ratio (vol : vol)	Comp A: Comp B = 2 : 1
Number of coats used	1
Thickness of coating	550-600µm
Coat 1 curing (time and temperature)	6 hours at (50±2)°C
Location of sample preparation	WQC Laboratory
Equipment used for sample preparation	Slow speed drill and paddle mixer
Total curing (time and temperature)	6 hours at (50±2)°C

[method code LP/R/MT01]



2. ODOUR & FLAVOUR OF WATER

Temperature of extraction: (23±2) °C

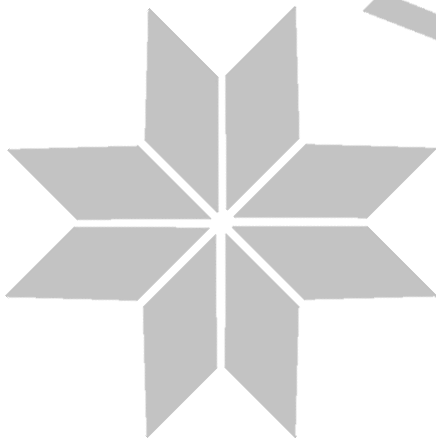
Date test started: 24.09.19

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	1 st Extract - Not Tested	
		Flavour	---	---
	Chlorinated	Odour	1 st Extract - Not Tested	
		Flavour	---	---
Final	Chlorine free	Odour	None/Chemical/None	
		Flavour	None	<1
	Chlorinated	Odour	None/Oily/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



CONCLUSIONS

The samples of this product meet the test criteria of BS 6920-1:2014 ("Specification") and thus DO conform with the requirements of the Water Regulations Advisory Scheme (WRAS) Tests of Effect on Water Quality, Odour & Flavour of Water Test, and is suitable for use with cold but not hot water.

NOTE: materials and products intended for use by a public water supply organisation 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 conforms 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 wholesome 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. Applicants will be formally notified of their WRAS approval number by the Scheme if their application has been successful.

Note for the Water Regulations Advisory Scheme (WRAS): This test report must be read in conjunction with test report M106864/A.



Anthony Maddox
Materials Testing Analytical Consultant

