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WATER REGULATIONS ADVISORY SCHEME (WRAS).

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

AUDIT TEST REPORT

Product : Loctite Activator 7649 + Loctite 326
 Report Reference : M 103834
 Page 1 of 6 Pages.

Henkel Loctite Adhesives
 Technologies House
 Wood Lane End
 Hemel Hempstead
 Herts
 HP1 2LN

Report Date : 13th July 2006

Executive Summary - samples of this product have been tested to the Audit Test requirements of the Water Regulations Advisory Scheme (WRAS)/BS 6920:2000 for use with Hot (up to 85°C) and Cold Water.

***A copy of this report should be submitted to the Water Regulations Advisory Scheme (WRAS) for further advice concerning this product.
 Conformity with the Audit Test requirements of the WRAS will be confirmed by the Scheme.***

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.



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THE WATER QUALITY CENTRE ("WQC").

Terms and Conditions : Materials Testing.

1. These terms and conditions apply to services provided by the Water Quality Centre of Thames Water Utilities Limited (WQC) to its Clients for goods and materials testing (Services). Unless agreed in writing these Terms and Conditions shall apply to the exclusion of any others. WQC shall perform the services with all reasonable skill and care.
2. **Disclosure.** The provision of Services by WQC is undertaken on the basis that full and adequate disclosure is made by the Client to WQC of all information and documentation which may affect such testing, including, without limitation, the purpose or purposes for which the goods or materials supplied to WQC for testing are to be used. Such information and documentation and the results of all tests undertaken will be treated as confidential and will not be made available to third parties (including staff of the Thames Water Group and its agents) without the Client's written instructions.
 - (i) The Client will indemnify WQC against any third party claims for any loss or injury arising out of any use or application of any such goods or materials not disclosed to the WQC, **and**
 - (ii) WQC shall not be liable for any loss or damage arising out of undisclosed use *or application* by the Client.
3. **Testing.** (i) WQC will carry out such work as it considers appropriate or as agreed between WQC and the Client, and WQC shall be entitled to test any samples/goods to destruction.
 - (ii) WQC further reserves the right to carry out tests in any of its' UKAS accredited laboratories.
 - (iii) WQC will use established methods for testing and analysis where these are available but makes no warranty as to the accuracy or fitness for purpose of such results. Where novel test methods have to be developed and validated WQC shall not be liable for any resulting losses or damage, howsoever caused; including but not limited to, loss of profit, business revenue or goodwill.
 - (iv) If agreed by WQC, the Client or any agreed third party may be present when work is carried out.
4. **Test Samples.** Any report issued by WQC will relate only to the goods or materials in respect of which work has been done and not the bulk from which the samples tested have been selected.
5. **Reports.** WQC reports are provided in confidence. No right is given or implied to use the name of Thames Water; of any of the companies in the Thames Water Plc group; or of the Water Quality Centre in any promotion or other publication relating to any sample tested or the bulk from which it is taken. Copyright in all written statements, opinions, reports, certificates and other information given by the WQC in the course of test and analytical services will remain the property of Thames Water Utilities Limited; and must not be made public (except as required by law), edited or amended in whole or in part without prior written consent.

Test reports shall not be reproduced, except in full, without our prior written consent.
6. **Sample Disposal.** Unless otherwise agreed in writing, all goods and materials received for testing will be disposed of by WQC after completion of the work. If agreed in writing, WQC will, at the Client's expense and risk, return untested samples to the Client by a method considered to be appropriate by the WQC.
7. **Termination.** WQC reserves the right to terminate testing/analysis of samples for reasons of laboratory safety and/or instrumental integrity, and to charge the Client for all work undertaken.
8. **Payments.** All payments for samples shall be paid in advance. No result or report shall be supplied by WQC until such time as payment in full has been received. On submission of invoice all payments unless otherwise agreed in writing shall be made within 14 days of the date of the invoice. For customers outside UK payment shall be made within 30 days of the date of the invoice. Customers outside UK are responsible for costs of currency conversion and other associated charges. WQC reserves the right to withhold reports or to suspend or discontinue the provision of services at any time and at its discretion. The WQC accepts no responsibility for the consequences of withholding reports or suspending or discontinuing work in such circumstances.
9. **Liability.** The Client accepts:-
 - (i) that it is reasonable for WQC to exclude all guarantees and warranties express or implied and all liabilities including all conditions, and warranties whatsoever that would be implied or imposed by statute, law or otherwise howsoever are excluded to the fullest extent permitted by law.
 - (ii) that in no circumstances shall WQC be liable for any loss or damage, including but not limited to, loss of profits business revenue or goodwill; or for any special, indirect or consequential loss or damage, or in respect of any claim made against the Client by a third party. Save that nothing under this Agreement shall limit or exclude liability of either party in respect of death, personal injuries or fraudulent misrepresentation.;
 - (iii) that WQC shall bear no duty of care or contractual liability to the Client in providing the Services in respect of use and/or applications not disclosed by the Client to WQC.
 - (iv) The liability of WQC, if any, shall be limited to the sum of the Contract Price plus 25% thereof.
10. **General.** (i) Neither party may assign this agreement without the express written permission of the other. (ii) A person who is not a party to this agreement has no rights under the Contract (Rights of Third Parties) Act 1999 to enforce any term of this agreement. (iii) This agreement sets out the entire agreement between the parties and supersedes all prior agreements and understandings relating to its subject matter.
11. **Jurisdiction.** This Agreement shall be interpreted in accordance with the Laws of England and Wales and any dispute arising under it shall be submitted to the non-exclusive jurisdiction of the courts in England and Wales.

30th September 2003

TESTING OF NON-METALLIC MATERIALS FOR USE WITH DRINKING WATER. WATER REGULATIONS ADVISORY SCHEME TESTS OF EFFECT ON WATER QUALITY (BS 6920:2000).

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 6920-2:2000 "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". **The testing undertaken is in accordance with the Water Regulations Advisory Scheme (WRAS) letter ref CR/JC dated 13th April 2006.**

1. TEST SAMPLES.

General composition of product	Thread Sealant	
Trade name/designation	Loctite Activator 7649 + Loctite 326	
Material manufacturer	Loctite Ireland	
Date of manufacture/production	December 2005	
Production batch numbers	5ND 0797	
Samples prepared by	WQC Staff	
Submitting organisation	Henkel Loctite Adhesives	
Date of receipt of test samples	26 th April 2006	
Method of packaging	In product container	
Condition on receipt	Satisfactory	
Laboratory storage before test	Ambient temperature (21±4)°C	
Description of	test article	The product was applied to couplings in accordance with clause 4.2.7.4 of BS 6920-2000, with the exception that stainless steel couplings were used in place of brass coupling.
Appearance of a test article	colour surface finish opacity	Amber Smooth Translucent
Surface area of one article (mm ²)	n/a	
Number of articles to give a surface area of 15000mm ²	n/a	
Calibration mark of the test vessel/container in litres	1	
Extraction temperature used for tests 2 & 6	(85±2)°C	

1.1 SITE APPLIED PRODUCTS.

Typical uses of the product	Adhesive for use in "General Industry"
Appearance of product/component parts before mixing	Loctite 7649 Activator: Clear Loctite 326 : Amber
Method of test sample preparation	The Loctite 7649 Activator was spray applied to both threads of a stainless steel coupling, then the Loctite 326 was applied to the activated threads and assembled.
Mix ratio (mass:mass)	One part product
Number of coats used	2
Location of sample preparation	Spencer House Laboratory
Final curing (time and temperature)	7 days at (22 ±2)°C

2. ODOUR & FLAVOUR OF WATER TEST

Temperature of extraction : (85±2)°C

Date test started : 09/05/06.

The extracts from the samples 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
Sample 1 First	Chlorine free	Odour	Earthy/Chemical/Chemical (Disinfectant)	
		Flavour	--	--
Final	Chlorinated	Odour	Earthy/Chemical/Chemical	
		Flavour	--	--
	Chlorine free	Odour	None	
		Flavour	None	<1
Chlorinated	Odour	None		
	Flavour	None/None/Bitter	<1/<1/1	

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 85°C.

4. GROWTH OF AQUATIC MICROORGANISMS.

Temperature of test : (30±2)°C.

Date test started : 09/05/06.

Container	Mean Dissolved Oxygen Difference (MDOD) in mg/L
Test product (weeks 5 to 7)	0.1
Negative reference (glass) (weeks 5 to 7)	0.0
Positive reference (wax) (weeks 5 to 7)	6.3
Special positive reference	n/a
Negative control - Mean dissolved oxygen concentration (weeks 5 to 7)	7.1

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.

6. EXTRACTION OF METALS.

Temperature of extraction : (85±2)°C

Date test started : 09/05/06.

The results obtained for the first extract are given below -

Element	Unit	MAC	Reporting limit	Sample 1	Sample 2	Stainless Steel Coupling Blank	Reagent blank
Aluminium	Al $\mu\text{g/l}$	200	15.0	36.0	17.0	<15.0	27.0
Antimony	Sb $\mu\text{g/l}$	5	0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	As $\mu\text{g/l}$	10	0.8	<0.8	<0.8	<0.8	<0.8
Barium	Ba $\mu\text{g/l}$	1000	4.0	<4.0	<4.0	<4.0	<4.0
Cadmium	Cd $\mu\text{g/l}$	5	0.5	<0.5	<0.5	<0.5	<0.5
Chromium	Cr $\mu\text{g/l}$	50	5.0	<5.0	<5.0	<5.0	<5.0
Iron	Fe $\mu\text{g/l}$	200	12.0	<12.0	<12.0	<12.0	<12.0
Lead	Pb $\mu\text{g/l}$	25	0.5	<0.5	<0.5	<0.5	<0.5
Manganese	Mn $\mu\text{g/l}$	50	3.0	<3.0	<3.0	<3.0	<3.0
Mercury	Hg $\mu\text{g/l}$	1	0.05	<0.05	<0.05	<0.05	<0.05
Nickel	Ni $\mu\text{g/l}$	20	2.0	<2.0	<2.0	<2.0	<2.0
Selenium	Se $\mu\text{g/l}$	10	0.5	<0.5	<0.5	<0.5	<0.5
Silver	Ag $\mu\text{g/l}$	10	1.0	<1.0	<1.0	<1.0	<1.0

Extract Analytical.

The analysis of the extracts for these metals was undertaken in the Millharbour Laboratories of Thames Water, UKAS registration number 1258.

Antimony, arsenic, cadmium, chromium, lead, mercury, nickel, and selenium - inductively coupled plasma mass spectrometry [method code 407].

Aluminium, barium, iron and manganese - inductively coupled plasma optical emission spectrometry [method code 385].

Analytical Control Data - these techniques are in continuous use for analysis of drinking water metals; these techniques are 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 techniques have a comprehensive AQC protocol including control solutions and spike recovery testing 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 85°C.

NOTE. In the Extraction of Metals Test the concentration of Aluminium 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 have been tested in accordance with the Audit Test requirements of the Water Regulations Advisory Scheme (WRAS) for use with hot (up to 85°C) and cold water.

A copy of this report should be submitted to the Water Regulations Advisory Scheme (WRAS) for further advice concerning this product.

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 Water Regulations Advisory Scheme (WRAS) : Samples were prepared and submitted for BS6920 testing using stainless steel couplings at the customers request.



Helen Bala
Materials Testing Manager