



WRAS Material Guidance

A guide for Manufacturers, Suppliers and Test Laboratories on the Application Requirements for WRAS Material Approval

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Ver 2.0	01/04/2021	Document re-issued in the name of the new legal entity: Water Regulations Approval Scheme Limited
Ver 2.1	21/04/2021	Correction of misnumbering of the notes under Table 1: Note #5 now reads: "Only where the GMO performed on the Approved Material have a result of >1.7mg/l"
Ver 2.2	28/04/2021	Correction of pagination
Ver 3.0		<p>a) Addition of revision history</p> <p>b) paragraph #108: Reference to WRAS guidance used when reporting solvent cement testing reports updated</p>
Ver 4.0	Nov 2024	complete revision to reflect current WRAS Requirements. Removal of re-approval testing requirements. Clarification of BPR and GB BPR as both are required if product used throughout UK.

Introduction

- 1 A Water Regulations Approval Scheme Limited (WRAS) Material Approval demonstrates that a product satisfies the requirements of Schedule 2 Paragraph 2 (1) of the Water Supply (Water Fittings) Regulations 1999, Scottish Water Byelaws 2014 & the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 (the Water Supply (Water Fittings) Regulations).

...‘no material or substance, either alone or in combination with any other material or substance or with the contents of any water fitting of which it forms a part, which causes or is likely to cause contamination of water shall be used in the construction, installation, renewal, repair or replacement of any water fitting which conveys or receives, or may convey or receive, water supplied for domestic or food production purposes.’ ...

- 2 The Regulations are typically in effect between the boundary of a property and the point of discharge.
- 3 Usually only non-metallic materials which will be in direct contact with wholesome water provided by the water supplier for domestic purposes (drinking, bathing, washing, or cooking) will be considered for WRAS Material Approval.
- 4 WRAS Material Approval will only be granted to materials which have satisfied the requirements of BS 6920:2000/2014 Parts 1 and 2, together with Part 3 for hot water usage. “Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of water.” No standard of any other EEA State includes the same suite of tests, although individual tests may be considered as providing evidence for an equivalent level of performance. Further advice on the equivalence of other standards is available from the Water Regulations Approvals Scheme.

Non-metallic materials

- 5 Non-metallic materials are used in a wide variety of different water fittings and assemblies. However, some materials can produce effects on the odour, flavour, colour or turbidity of the water. Non-metallic materials may also release toxic metals or soluble organic chemicals into the water. If they support microbial growth, materials may give rise to unsatisfactory microbiological quality of the water or may release metabolic products which can cause odour, flavour, colour or turbidity, result in slimes or flakes of microbial growth in the water and might pose a health risk to vulnerable people.
- 6 WRAS assess non-metallic materials against the test methods and criteria described in BS 6920: 2000/2014 “*Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of water*”. The tests in BS 6920 have been developed to reproduce typical conditions that a material might be likely to meet during its service life in contact with wholesome water.
- 7 Satisfactory results for these tests do not guarantee that the material cannot cause adverse water quality effects if circumstances favour it. It is only an indication that the material is less likely to cause unwanted water quality effects than materials which have not passed the tests, and it does not signify fitness for purpose.

WRAS Material Approvals

- 8 WRAS Material Approvals are only granted to products which meet the Scheme's acceptance requirements and fully satisfy the appropriate BS 6920 testing criteria. A WRAS material approval is valid for up to five years on the basis that there will be no change in formulation, or to the source or nature of ingredients or in the method or site of manufacture or method of application during the lifetime of the approval.
- 9 A condition of WRAS Approval is that no modification shall be made to the product without first notifying the Scheme and submitting details of the proposed modification for consideration by WRAS. Failure to comply with this condition will invalidate an approval and result in its removal from the WRAS Approvals Directory.

Scope of WRAS Material Approvals

- 10 Samples submitted for WRAS Material approval can take the form of finished components or specially moulded blocks or plaques.
- 11 Components manufactured from WRAS approved thermoplastic materials can be used in fittings seeking WRAS Product approval, usually without any further BS 6920 testing providing that there has been no change to the formulation and the manufacturing processes are the same as those used in the preparation of the test sample.
- 12 Components made from WRAS approved thermosetting materials in particular rubbers or elastomers may require additional testing when used in fittings seeking WRAS Product approval. Components made using the same process from the same material but of different sizes, thicknesses or shapes from that which is listed may require some additional testing to demonstrate that these differences have not caused any change in the material acceptability. Please contact WRAS for clarification.

Validity of WRAS Material Approvals

- 13 The WRAS Material Approval number is based on the earliest issue date of the test report and is valid for a maximum of five-years. When the report has been re-issued because additional testing has been performed, the approval will be based on the most recent date of issue.
- 14 Where more than one report is used, the approval will be based on the issue date of the most recent report.
- 15 Only those products identified and listed in the approval are covered by the scope of the approval.
- 16 The approval is valid for materials or components manufactured and used/installed during the lifetime of that approval ONLY whilst the approval remains current.
- 17 The approval holder is the company named in the M2 Application Form and it is that company that 'owns' the approval.

Application Process

Application File

- 18 The application file will include, where available, the following:
- A completed application form
 - All associated BS6920 test reports.
 - Where the company name on the test report differs from the company that is applying for the approval, WRAS will require written permission from the company for the approval holder to use the report.
 - Instruction and data safety sheets where required
 - Completed Invoice Information Form (which gives WRAS the details to include on the invoice).

Application Form

- 19 All applications for WRAS Material Approval must be submitted using the official WRAS application form (M2 for initial applications, MA3 for re-approvals and M3 for secondary approvals).
- 20 When the application is presented to WRAS the information provided must be current, with the application form having been completed in the last 12 months.
- 21 The application form must be signed by the Applicant (ideally a director in the company)
- 22 and must not be signed by the Agent on behalf of the Applicant.

Renewal of WRAS Material Approvals – re-approval

- 23 Materials approvals issued by the Scheme are valid for a maximum of five years. All WRAS approved materials are listed in the online WRAS Approvals Directory. All expired approvals are deleted within a month of their expiry date.
- 24 Please note that it is the responsibility of the Approval Holder to ensure continuity of approval. WRAS accepts no liability for the delay in granting approval where this is caused by circumstances outside of its control.
- 25 Rather than repeat all five tests needed for new approvals, existing approval holders may be able to renew their approvals on the basis of satisfactory limited testing. To benefit from this arrangement a number of conditions have to be considered including:
- The age of the previous test reports,
 - Whether there have been any changes in the test requirements,
 - Whether there has been a revision of the test method or requirements of BS 6920
 - Whether there have been any changes, including material composition/formulation, method of manufacture, alternative suppliers and changes to ingredients and/or their proportions.

Only after consideration of all the facts can it be decided what tests will be sufficient to demonstrate on-going conformity with BS 6920.

- 26 Full testing will be necessary when an approval has expired more than two years previously.

Re-approval Test Requirements]

Re-approval

- 27 WRAS Material Approvals are valid for a maximum of five years. In order to gain re-approval further BS6920 testing is always necessary. The extent of the testing is based on information declared within the completed MA3 application form.
- 28 Where the material or component has not altered in any way, including ingredients and their proportions, suppliers of raw ingredients and site and method of manufacture, in the majority of cases the test requirements for the re-approval will be reduced; please contact WRAS for written test requirements. Re-approval testing must not be performed without written test requirements from WRAS.
- 29 Where an approval holder seeks re-approval the test requirements issued by WRAS are valid for 12 months, provided the information submitted in the MA3 remains unchanged.

Secondary Material Re-approval

- 30 For approval holders who have obtained a WRAS Material approval through the Secondary approval route but find that the primary approval holder is no longer planning to seek re-approval, so will have no new approval to base another Secondary approval upon, or simply wish to obtain their own primary approval, WRAS will offer the opportunity for (potentially limited) re-approval test requirements.
- 31 In addition to the MA3 form Secondary material approval holders are required to provide the following additional information:
- a) A declaration from the primary approval holder on their company letterhead paper, signed and dated, making reference to:
 - Primary approval number: (insert the WRAS material approval number)
 - BS6920 test report reference associated with the primary approval: (insert BS 6920 test report of primary material)
 - Primary approval material: (insert primary material trade name(s))
 - Secondary approval material: (insert secondary material trade name(s))
 - b) Indication they supply the primary material to be re-branded as the Secondary material to the Secondary approval holder (full company name and address of Secondary approval holder must be included)
 - c) The declaration must give authorisation for the Secondary approval holder to use the BS6920 test report to request test requirements from WRAS which will allow them to seek their own re-approval.
- 32 The following statements must also be included:
1. *We (insert Primary approval company name) the primary approval holder, have read and understand and accept the terms applicable to applications for WRAS Approval as set out*

in the Standard Terms of Approval and agree to comply with the Requirements and Code of Practice for WRAS Approvals

2. *We are aware that it is a condition of a WRAS Material Approval that NO changes or modifications are made to an Approved Material(s) during the lifetime of the approval, without first notifying WRAS Approvals.*
 3. *As we supply the Secondary approval holder (insert Secondary approval company name here), we acknowledge that if any changes or modifications are made to the material(s) named above and supplied to the Secondary approval holder, we must notify the Secondary approval holder so that they may inform WRAS Approvals.*
 4. *It is understood that WRAS Approvals must be provided with full details of the proposed change(s) so that WRAS may consider the necessary testing required, and that failure to comply with this condition will immediately invalidate a previously granted Approval.*
- 33 If the Secondary approval holder wants to make additions or modifications WRAS require full formulation details (ingredients and percentages) existing and new so that a decision can be made on the necessary testing. Where this information cannot be provided full testing is required on all additional or modified materials.

Consecutive WRAS Material Approvals

- 34 Applicants may apply for re-approval at any time during the lifetime of an approval. Approvals will be allowed to run consecutively if the re-approval is granted in the last nine months of validity (of the existing approval) providing that this does not conflict with the guidelines for processing applications.
- 35 The new approval number starts the month after the original expires.
- As an example an approval number beginning 0804 will be valid until April 2013. Therefore, the new approval number would begin May 2013 (1305) and expire May 2018. WRAS Inform the approval holder that they should use the approval number beginning with 0804 until April 2013 and the new approval number, beginning 1305 from May 2013.

Directory Entries, Alterations/Additions, Secondary Approvals & Components Manufactured from Approved Materials

WRAS Approvals Directory Entries

- 36 All WRAS Material Approvals will be added to the WRAS Approvals Directory on the WRAS website within ten working days of them gaining approval.
- 37 All expired approvals will be deleted within one month of their expiry date.

Tradenames

- 38 In order for a WRAS Material Approval to be issued the material or component must be accompanied by a unique tradename/reference/identifier that refers only to the tested material or component and distinguishes it from any other material/component that the company may sell.

Alterations and additions to an existing approval

- 39 These are considered on a case-by-case basis and the information required by WRAS varies depending upon the request. Please refer to the scheme for advice.

Changes in name/designation of tested and/or listed products

- 40 If the name and/or designation of a tested product is changed after the issue of the test report, the test laboratory are not required to issue an amended report.
- 41 Upon receipt of a formal declaration from the applicant detailing the changes the Scheme shall amend their records (and any listing in the WRAS Approvals Directory).

Restrictions to additions

- 42 There are no restrictions to the number of revisions that can be made to an approval provided that the conditions of the Scheme are satisfied.
- 43 Revisions to an existing approval can be made at any time during the lifetime of a valid approval.

Secondary Approvals

- 44 Approval holders may request secondary approvals for their factors i.e. where an approved material or component is rebranded and sold by a second company. These requests will be considered upon receipt of the following information:
- a) a completed M3 application form (which requires permission from Primary Approval Holder)
 - b) Instruction and safety data sheets where appropriate

Please note that the expiry date of a secondary approval will be the same as that of the original.

Consecutive Secondary Approvals

- 45 A Secondary Approval may only ever be issued based on a valid and current Primary Approval. Some Primary Approvals may not yet be valid as a consecutive approval may have been issued (Please refer to section 4.3 – Consecutive WRAS Material Approvals).
- 46 If an application for a Secondary Approval is made prior to the consecutive primary Approval becoming valid, then the Secondary Approval will only be granted if the secondary applicant already has a Secondary Approval based on the current and valid primary, i.e. if you are applying for renewal of an existing Secondary Approval.

Approval of pipe & fittings

- 47 Pipe & fittings cannot appear on one approval as this may suggest that approval has been granted to the system.

Testing of materials

- 48 WRAS uses five tests contained within BS 6920 to show that a non-metallic material or component does not:
- Impart odour or flavour on the water (Section 2.2)
 - Cause change in the appearance of the water (colour, turbidity) (Section 2.3)
 - Enhance microbial growth (MDOD test) (Section 2.4)
 - Leach substances harmful to human health into the water (cytotoxicity) (Section 2.5), and
 - Leach metals into the water (Section 2.6).

Modifications or changes to existing approvals

- 49 It is a condition of a WRAS Material Approval that the Scheme is notified of any proposed modifications/changes to a WRAS Approved material or component before they are made.

Failure to comply with this condition will invalidate the approval and result in its removal from the WRAS Approvals Directory.

- 50 Modifications and/or changes include, but are not limited to:
- a) the addition of pigments.
 - b) changes in the percentages of fillers.
 - c) introduction of processing aids.
 - d) changes to suppliers of ingredients.
 - e) alternative suppliers of raw ingredients.
 - f) changes to the manufacturing method.
 - g) changes to the site of manufacture.
 - h) change in processing conditions after a test failure.
 - i) increasing the operating temperature of an existing approval.
- 51 Contact WRAS for further information about the additional testing that may be required for changes to existing approvals.

Components manufactured from approved materials

- 52 The Scheme will accept applications for approval of components manufactured from WRAS Approved Materials. Additional testing must be performed whilst the base material possesses a valid approval. The WRAS approval number for the component will be based on the date of the component test report and expires five years after this date.

Approval of Product Ranges

- 53 Applicants must provide full details of the range of products to be covered by an approval.

Colours

- 54 Where the only variation between products in a range is the colour i.e. the products are made from the same basic formulation, using the same manufacturing conditions (both the method and site of manufacture) and suppliers of raw ingredients, approval of the range may be obtained by

full testing of one sample, and limited testing of various coloured samples. Contact WRAS for clarification and test requirements.

Elastomers

Ranges of elastomeric materials/components differing in Shore hardness.

- 55 WRAS offers approval for such ranges which differ in Shore hardness. Where this is achieved by changing the relative concentrations of the ingredients (i.e. no additional or substitute ingredients) and/or changing the curing conditions, additional test requirements will apply, refer to Table 1 a) or contact WRAS for specific details.
- 56 Where an approval holder wishes to change the Shore hardness of an existing approval or add an shore hardness to an existing approval, contact WRAS for the required additional test requirements.

Ranges of elastomeric materials/component differing in size:

- 57 WRAS offer approval for such ranges which differ in size, providing that the formulation, supplier of raw ingredients and manufacturing conditions (both the method and site of manufacture) are identical. Refer to Table 1 b) or contact WRAS for test requirements.

Ranges of differently sized elastomeric components which also differ in Shore hardness:

- 58 WRAS offer approval for ranges of components which differ in both size and Shore hardness providing both the site and method of manufacture remain identical. Please refer to Table 1 c) or contact WRAS for test requirements.

Ranges of elastomeric components differing in shape only:

- 59 WRAS offer approval for such ranges made from the same base material and considers each shape (e.g. 'O' rings, gaskets, seals or bellows) to be a separate range. Accordingly, each differently shaped component must undergo testing. Contact WRAS for test requirements.
- 60 Subsequently, it is the choice of the Applicant whether they wish for these components to appear on one approval or whether they wish to apply for separate approvals for each differently shaped component.
- 61 Where there is a range of elastomeric components which differ in shape & size, shape & shore hardness or shape, size and shore hardness please refer to WRAS Approvals for written test requirements. The laboratory shall not commence testing until WRAS have issued requirements.

Thermoplastics

Ranges of thermoplastic products which vary only in filler content:

- 62 WRAS offer approval for ranges of thermoplastic products which vary only in filler content, providing that the formulation, suppliers of raw ingredients (detailed information of the ingredients and their proportions must be submitted to WRAS) and manufacturing conditions (both the method and site of manufacture) remain the same. Please refer to Table 1 d) or contact WRAS for test requirements.

Products manufactured at more than one site

- 63 The Scheme will consider applications for approval of products manufactured at more than one site.
- 64 Full BS6920 testing must be carried out on a material/component manufactured at one of the sites (site A). Where there are additional manufacturing sites or where there are additional manufacturing sites but suppliers or raw ingredients differ from those used at site A then please contact WRAS for test requirements.

Change to the site of manufacture affecting and existing approval

- 65 If an approval holder wishes to change the site of manufacture of a WRAS Approved Material/component then further testing will be necessary. Please contact WRAS for test requirements.
- 66 In addition, the approval holder should supply the following information to WRAS in the form of a written statement on company headed paper which is signed and dated by the Applicant (ideally a Director within the company) and must not be signed by an Agent on behalf of the Applicant:
- Full postal address of the new site.
 - Date of the proposed move and when manufacturing will begin.
 - Details of any changes in the sources of ingredients.
 - Details of any changes in the manufacturing process, including those providing efficiency.
 - Details of the quality management system in place at the new site.

Specific Product Information

- 67 Specific substances not approved by the scheme:
- Products containing asbestos, coal-tar bitumen or PVC containing lead-based stabilisers.
 - Silicon dioxide/Quartz based materials since they are very unlikely to leach appreciable concentrations of any concern into the water. Some naturally occurring quartz may however be contaminated with very low concentrations of metals and require an Extraction of Metals test. Please contact the Scheme for further advice.
 - Fluids for indirect heating systems.
 - Treatment chemicals, including Hydrogen Peroxide.
 - Tungsten Carbide (an inorganic compound containing equal parts of tungsten and carbon atoms).
- 68 Materials and components comprising solely of Silicon Carbide require an Extraction of metals test.
- 69 The applicant should make WRAS aware when a material or component includes a natural ingredient such as cellulose. Approvals of products including such a material or component will state: *"This product incorporates a natural ingredient. Please note that water companies will evaluate the evidence provided and may ask for more information, and they reserve the right to refuse installation"*.

Filtration media & water treatment chemicals

- 70 DWI publishes a 'List of Relevant European Standards - British Standards BS EN for Chemicals used for Treatment of Water'. Water treatment chemicals and filtration media (except ion exchange resins) shall meet the requirements of the relevant European Standard given in this list. WRAS does not offer approval for these materials.
- 71 Filtration media and water treatment chemicals used by water supply companies and organisations are covered by a separate approval scheme operated by the Drinking Water Inspectorate (Regulation 31 of the Water Supply (Water Quality) Regulations).
- 72 Activated carbon blocks based upon a plastic matrix are not covered by a relevant BS EN Standard and should undergo an Odour and Flavour of Water Test (BS 6920-2.2.1). In addition, cut 10 sections (each of approximately equal size) from the block so that the total weight is 1 gramme. Immerse these sections in 1 litre of test water (shaken or stirred) for a 24-hour period. Filter the extraction water through a 0.45 micron filter and perform an Extraction of Metals Test (BS 6920-2.6).

Waterproofing membranes for treated water reservoir roofs

- 73 The Scheme will only consider applications for these products where they fall under the remit of the Water Supply (Water Fittings) Regulations, and will be used in direct contact with wholesome water or are intended to be used where condensation forming on them may come into contact with wholesome water.
- 74 Membranes used by water supply companies and organisations are covered by a separate approval scheme operated by the Drinking Water Inspectorate (Regulation 31 of the Water Supply (Water Quality) Regulations).

Magnets – Test Requirements

- 75 Magnets will only be approved by the Scheme where they are either encapsulated or coated with a non-metallic material.
- 76 Magnets comprising metallic magnetic component contained within a matrix of ceramic material (usually strontium or barium oxides): extraction of metals.
- 77 Magnets encapsulated in a non-metallic material: full BS6920 parts 1-3 testing of the coating.
- 78 The coating may be applied to the actual magnet or a glass plate.
- 79 Other types of magnets (e.g. comprising metallic materials) are not appropriate for BS6920 testing or WRAS Approval. These are accepted in fittings in contact with wholesome water provided they don't contain prohibited materials, e.g. lead or bitumen, or give rise to obvious detrimental effect on water quality, e.g. rusting.

Other Metallic Materials

- 80 In the absence of a satisfactory test method for assessing the effects of metallic products upon water quality the Scheme does not consider applications for WRAS Material approval of metallic materials.

Ceramic & vitreous enamel based products

- 81 Any of these products which do not contain organic ingredients, either because they are not present in the formulation or would have been lost due to firing or sintering should be tested for conformity with the requirements of clause 8 of BS 6920-1:2000/2014 in accordance with BS 6920-2.6 (extraction of metals). No other tests are required.

Biocides/Active substances (Materials incorporating a biocide with one or more active ingredient(s))

- 82 Materials and components including a biocide/active substance may require authorisation under the Biocidal Products Regulation (BPR/GB BPR). It is up to applicant to check that it conforms with all the appropriate regulations. Applicants should check whether their product is covered under the BPR/GB BPR and if so should ensure that the active substance(s) in their biocidal products are under review or already approved and that they have made any necessary application for Product Authorisation under the BPR/GB BPR. Any subsequent approval will indicate that the product falls under the scope of the GB Biocidal Products Regulations and EU Biocidal Products Regulations.
- 83 Information on the BPR and GB BPR, including how to check the status of an active substance, how and when to apply for product authorisation and what actions need to be taken whilst an active substance is still under review, is available on the Health and Safety Executive website at www.hse.gov.uk/biocides.
- 84 WRAS requires that approval holders contact WRAS should the status of the active substance/s change during the lifetime of the approval. If a decision is made to reject the change, or not to approve the active substance/s the original WRAS Material Approval will be withdrawn from the WRAS Directory and the material will no longer be able to claim WRAS approval.
- 85 When the Growth of aquatic microorganisms test is required, testing shall include the extra reference container specified in Clause 10.1.2 of BS 6920-2.4.

Products made from recycled materials

- 86 The Scheme will only consider applications for WRAS approval of recycled materials if it can be satisfactorily demonstrated that the source, quality and nature of the ingredients together with the manufacturing process or application overcome any concerns regarding inconsistency.
- 87 A decision regarding acceptability will be made by the Approvals & Enquiries Manager and be based upon the documentary evidence supplied by the applicant, which includes the following:
- a) Details of the sources of the recycled ingredients, which must include:
 - i) evidence to demonstrate full traceability of the recycled material, including the product formulation of the recycled material, and
 - ii) an outline of any analytical quality checks undertaken, and
 - iii) details of any Quality Systems covering these materials.
 - b) Details of any treatments given to them before re-use.
- 88 The Scheme reserves the right to withhold approval if the information given does not provide an adequate safeguard to the reproducibility of the material.

- 89 When approved materials containing recycled ingredients are used in the manufacture of finished products which are subsequently submitted for inclusion in the Directory, the Scheme reserves the right to request an annual retest of a fresh batch of the material/product in the Odour and Flavour of Water Test and for any other parameter of concern.
- 90 For approval purposes one batch of the final material containing the recycled ingredient(s) shall be tested and shown to conform with all the test requirements. In addition, two further (random) sets of test samples shall be taken from the manufacturers' premises by either the test laboratory, or by an accredited quality management assessor/organisation; these shall be tested in the odour and flavour of water test, to provide evidence of consistency of the product.

Use of 'regrind' materials

Full testing of "virgin" material.

- 91 Products containing clean 'regrind' material from the production process are not deemed to be made from recycled material, however, the sample submitted for testing must contain the maximum "regrind" content that will be used.
- 92 Where recycled sprues and runners from thermoplastics moulding operations are recycled into products designed for use with drinking water the following test requirements shall be implemented, either:
- a) Test example pieces moulded from 100% regrind of the sprues and runners for odour and flavour, MDOD and cytotoxicity - satisfactory test results would cover the use of 100% reground material plus lower percentages of regrind material, e.g. 50%, or
 - b) Test example pieces moulded from, say 50% regrind material, in the same tests - use permitted only for this percentage or less of regrind material.

Additives including fillers & pigments

- 93 These cannot be tested in their own right; test samples should be made from the material into which they are incorporated.

Lubricants

- 94 The Scheme approves both high and low viscosity lubricants giving satisfactory results when tested in accordance with clause 6.6 of BS 6920-2.1.

Graphite based products

- 95 The Scheme will approve graphite products giving satisfactory results when tested in accordance with clause 6.10.2 of BS 6920-2.1.

Products containing antioxidants

- 96 Applicants should declare the use of antioxidant and the test laboratory must report any odours or flavours detected in samples of these products to the Scheme.
- 97 Applicants who wish to seek approval of products containing the antioxidant 6,6'-di-t-butyl-4,4'-thiodi-m-cresol are advised to contact the Scheme.

Solvent cements

- 98 In the case of solvent cements used in the assembly of plastic pipe systems it is likely that small areas of the cement may be in contact with water.
- 99 In addition, there are three issues which have to be taken into account when these products are tested:
- a) Dissolved/suspended solids in the cement which are left on the surface as the solvent(s) evaporate
 - b) High boiling point solvents which are slow to evaporate from the cement and may still be present when the product is put into contact with drinking water.
 - c) Substances which dissolve into the cement from the fittings during application and are subsequently left as solids as the solvents evaporate.
- 100 The final test results will cover the solvent cement only and not the pipe or fittings.

Waterstops

- 101 WRAS will consider granting approval of water stops where they are in contact with wholesome water AND used within the boundary of a property and therefore fall under the remit of the Water Supply (Water Fittings) Regulations 1999.
- 102 These materials are for use in concrete reservoirs and similar structures, constructed in accordance with the design criteria of BS EN 1992-3:2006 (Design of concrete structures – Liquid retaining and containing structures) with respect to normal frequency of joints. The materials should be tested at a reduced surface area to volume ratio of 1000mm² per litre as specified in BS 6920: Part 1.
- 103 This information will be included on any subsequent approval.

Bituminous Based Products

- 104 WRAS will consider granting approval of petroleum or asphaltic bitumen but NOT coal tar bitumen.
- 105 Materials listed in this section are not approved for use for contact with water that is required to be wholesome on large water retaining structures such as lining of pipes or water storage cisterns. Products of this nature may be approved for applications such as taps, valves and pipe connectors only. This information will be included on any subsequent approval.

Anaerobic Adhesives

- 106 Anaerobic Adhesives should be tested as specified in BS 6920-2.1:2014, clause 7.6. WRAS will remove the curing conditions from the approvals listed in section 5520 of the WRAS Approvals Directory and add, to the section title that “these products are to be applied and cured in strict accordance with the manufacturer’s instructions.”

Cementitious products incorporating blast furnace slag

- 107 When an application for approval of a cementitious product, incorporating blast furnace slag is received, WRAS Approvals will require further information prior to deciding whether approval is to be granted:
- a) The source of the slag, including the name/s and address/es of the furnaces.

- b) Whether the ingredients that go into the furnace/s remain constant and how this is achieved.
- c) Quality documents/certificates that the blast furnace/s may have.

SITE APPLIED PRODUCTS

Definition of Site Applied Products

- 108 These products are applied on site, typically where they will be used, after which they undergo some form of change or cure before they are suitable for use in contact with water and where conditions affecting its application may vary widely if uncontrolled.

Curing

- 109 Product samples, including all primer and undercoats, prepared by the test laboratory should be prepared and cured in accordance with clause 7 of BS 6920-2.1 (standard curing conditions).
- 110 The soaking and flushing arrangements applied must be the minimum identified in the manufacturer's instructions and WRAS will request a copy of these instructions before an approval is granted.
- 111 Curing shall take place in temperature-controlled incubators or refrigerators with appropriate thermostats. Since volatile solvents etc will be released from many products during the curing regime, appropriate climatic cabinets, including the provision for regular air changes within the cabinets, shall be used for the curing of such products. If critical to product cure and/or performance the relative humidity shall be controlled during the cure period and recorded in the final product report. When transportation of samples is required detailed records of the method of transportation and temperature control of the sample container shall be made, together with a record of the temperature of the test samples at the start and end of the transportation period.

NOTE: the **minimum** specification for a suitable curing incubator shall include temperature control $\pm 2^{\circ}\text{C}$, humidity control of $\pm 10\%$ of that specified by the manufacturer/supplier plus the facility for continuous extraction/air exchange from the cabinet during the curing of solvent containing coatings and sealants.

- 112 Jointing materials, solders and fluxes for plumbing systems shall not be cured for periods greater than 24 hours.

Non-standard curing conditions (other than those specified in clause 7 of BS 6920-2.1)

- 113 The Scheme may accept a manufacturer's request to apply non-standard curing conditions, other than those specified in clause 7 of BS 6920-2.1, but only if it can be demonstrated to the Scheme's satisfaction that these cure conditions can be obtained on site, in practice in the UK.
- 114 These must be achievable on site including under typical United Kingdom winter conditions. If the product will not cure under these typical conditions on site, the instructions for application of the product should clearly state this. If elevated temperatures are required to achieve the necessary degree of cure of the product, clear statements must be included in the Instructions (product data sheet) as to how the appropriate temperature(s) will be achieved and maintained throughout the curing period.
- 115 WRAS Approvals must be notified prior to commencement of testing if non-standard curing conditions are to be used.

- 116 When a sample has been prepared and cured, using non-standard curing conditions, but in accordance with the manufacturer's instructions for use, a note drawing the attention of the Scheme to the non-standard curing conditions used shall be added to the final test report along with full details of the actual conditions applied. In addition, a copy of the manufacturer's instructions for use must be supplied with the application.

New Approvals with curing curves

- 117 WRAS will request instructions issued to users that include a curing curve showing the relationship between curing temperature and time.
- 118 The instructions issued to users (product data sheet) must include a date and issue number.
- 119 Full BS6920 testing shall be done on samples made under the lowest recommended/most onerous curing conditions (lowest temperature and shortest recommended time at that temperature).
- 120 Additionally, test samples made using the highest recommended or achievable curing conditions (highest temperature and shortest recommended time at that temperature) for "on-site" application of the product in the United Kingdom (including the use of heaters etc. where required) shall be assessed in the odour and flavour of water test (BS 6920-2.2.1).
- 121 The subsequent approval shall be granted for all curing conditions referenced in the curve.
- 122 If these two sets of tests give satisfactory results, then the following statements shall be included on the subsequent approval:

"The end user must ensure that the product is cured in accordance with cure curves provided by the approval holder in their Instructions dated XX XX XX, issue no xxxxxxx", and

"This material is only approved for the curing conditions that appear on the approval. If the cure conditions are varied from those specified on the approval then the material is not covered by the scope of the approval."

New Approvals – no curing curves available

- 123 Where the potential approval holder of the site applied product is unable to provide information relating to curing conditions at a range of temperatures, they shall be made aware that approval will only be applicable to the product when cured as tested (usually using the standard curing conditions specified in clause 7.2 of BS6920-2.1).
- 124 The Scheme may accept a manufacturer's request to apply non-standard curing conditions, other than those specified in clause 7 of BS 6920-2.1, but only if it can be demonstrated to the Scheme's satisfaction that these cure conditions can be obtained on site, in practice in the UK.
- 125 WRAS must be notified prior to commencement of testing if non-standard curing conditions are to be used.
- 126 The subsequent approval shall make reference to the tested curing conditions and in addition the following statement included:

"This material is only approved for the curing conditions that appear on the approval. If the cure conditions are varied from those specified on the approval then the material is not covered by the scope of the approval".

Existing approved site applied products

- 127 WRAS will write to existing approval holders to advise them of the new approach. Where testing has been performed on one sample using specific curing conditions then the approval will already reference those curing conditions. An amended approval letter will then be issued to include the statement:

“This material is only approved for the curing conditions that appear on the approval. If the cure conditions are varied from those specified on the approval then the material is not covered by the scope of the approval”.

- 128 WRAS will inform the approval holder that should they wish to have approval of their product for application using other curing conditions then further testing, based on curing curves will be necessary.

- 129 Full BS6920 testing shall be done on samples made under the lowest recommended/most onerous curing conditions (lowest temperature and shortest recommended time at that temperature).

- 130 In addition, test samples made using the highest recommended or achievable curing conditions (highest temperature and shortest recommended time at that temperature) for “on-site” application of the product in the United Kingdom (including the use of heaters etc. where required) shall be assessed in the Odour and Flavour of Water Test (BS 6920-2.2.1).

- 131 If these two sets of tests give satisfactory results, then the subsequent approval shall be granted for all curing conditions referenced in the curve & the following statements shall be included on the subsequent approval:

“The end user must ensure that the product is cured in accordance with cure curves provided by the approval holder in their Instructions dated XX XX XX, issue no xxxxxxx”. and

“This material is only approved for the curing conditions that appear on the approval. If the cure conditions are varied from those specified on the approval then the material is not covered by the scope of the approval”.

- 132 Assuming the testing is successful, it is the approval holder’s choice as to whether they wish to apply for a new five-year approval (the existing approval will be removed once the new approval is granted) or extend the scope of their existing approval.

- 133 If the approval holder wishes to apply for a new five-year approval payment on a pro-rata basis will be requested on based on remaining whole years.

- 134 If the approval holder wishes to extend the scope of their existing approval WRAS will not charge a fee (please note the laboratory will charge for the testing performed).

Re-approvals

- 135 Approval holders will have the choice as to whether to apply for a new approval based on the scope of the existing/expired approval or to extend the scope of the existing/expired approval.

- 136 Where the new approval is to be based on the scope of the existing/expired approval standard Re-approval tests (where appropriate) shall be requested on a sample manufactured using the same curing conditions as the existing/expired approval.

- 137 Should an approval be subsequently granted the approval letter will include the statement:

“This material is only approved for the curing conditions that appear on the approval. If the cure conditions are varied from those specified on the approval then the material is not covered by the scope of the approval”.

- 138 Where the approval holder wishes to extend the scope of the approval to have approval of their product for application using other curing conditions then further testing, based on curing curves will be necessary.
- 139 Full BS6920 testing shall be done on samples made under the lowest recommended/most onerous curing conditions (lowest temperature and shortest recommended time at that temperature).
- 140 In addition, test samples made using the highest recommended or achievable curing conditions (highest temperature and shortest recommended time at that temperature) for “on site” application of the product in the United Kingdom (including the use of heaters etc. where required) shall be assessed in the Odour and Flavour of Water Test (BS 6920-2.2.1).
- 141 The subsequent approval shall be granted for all curing conditions referenced in the curve.
- 142 If these two sets of tests give satisfactory results, then the following statements shall be included on the subsequent approval:

“The end user must ensure that the product is cured in accordance with cure curves provided by the approval holder in their Instructions dated XX XX XX, issue no xxxxxxx”.

And:

“This material is only approved for the curing conditions that appear on the approval. If the cure conditions are varied from those specified on the approval then the material is not covered by the scope of the approval”.

Commencement of testing

- 143 ALL the tests to be carried out must commence IMMEDIATELY once the cure period is completed, or in the case of cementitious products ONLY, within 1 working week of completion of the pre-conditioning soaks.
- 144 Retesting - if it is necessary to undertake ANY retesting, this shall only be undertaken on freshly prepared and cured samples.

Product samples prepared on site: witnessed by test laboratory staff.

- 145 Some products can only be prepared and/or applied using specialised equipment. In these cases, the test laboratory shall witness the preparation of the test samples and shall then transport these samples back to the laboratory for curing and subsequent testing.

FACTORY APPLIED PRODUCTS (including potting resins etc.)

- 146 Definition of Factory Applied: a product which is applied and cured (if appropriate) under carefully controlled conditions as part of a manufacturing process in a factory or workshop.

Preparation and curing of samples

- 147 These products shall be prepared and cured by the manufacturer or supplier and tested as received without any further curing or treatment. To ensure that the samples provided are typical of normal production they shall be drawn from the production line wherever possible and the following additional information provided to the test laboratory and Scheme:
- date of preparation of samples and/or product batch number (where available)
 - mode of preparation
 - curing conditions
- 148 This information shall be included in the final test report and in the Scheme's records. If the sample has been specially prepared for test purposes this shall be stated in the test report together with all relevant details. For more information see clause 6 of BS 6920- 2.1:2000/2014.
- 149 As it is not a requirement of BS6920-2.1, in addition the applicant shall provide the following information to WRAS:
- number and thickness of coats applied (including primers)
 - method of application of the product
 - ambient temperature at the time of preparation
 - date of preparation of the sample, cure conditions
 - substrate onto which the product has been applied and whether the product was prepared in accordance with the application instructions.
 - where products are made from more than one part, description of the parts and how these were mixed.
 - a copy of the instructions issued to users
- 150 The approach applied to Site Applied Products (including scope of approval, test requirements and the use of generic statements) shall also be taken with Factory Applied Products.

TEST LABORATORIES

- 151 Test reports will only be accepted from test laboratories recognised by WRAS.
- 152 A list of Recognised Laboratories for material testing can be found on the WRAS website: www.wrasapprovals.co.uk/material-approvals/contact_details_for_laboratories/.

TEST REPORTS

- 153 Please refer to the WRAS Code of Practice (WRAS.Cust-402, a copy of which is available from the WRAS website) for details of the reporting requirements.

Validity of Test Reports

- 154 BS 6920 testing of materials must have been completed no more than two years before the date when the report is presented to WRAS.
- 155 Where the test report is over two years old the decision as to whether to grant approval lies with The Approvals and Enquiries Manager. For the purpose of WRAS Material Approval BS6920 test reports are valid for a maximum of five years.

SAMPLES

- 156 The Scheme does not consider it to be appropriate to grant WRAS Material Approval to a product that will not come into direct contact with wholesome water in building water systems. Therefore, before commencing testing if there is any question about the nature of the product or its suitability for WRAS Material Approval advice must be sought from WRAS.
- 157 Samples must reflect the actual conditions of manufacture. The method used to manufacture the tested sample will be included on any subsequent approval and only this method will be covered by the scope of the approval. Materials/components made from the same material using a different manufacturing method will require further testing (contact WRAS for test requirements).
- 158 When seeking approval of a component, samples must be provided for testing in component form, for example o-rings, gaskets or hoses.
- 159 When seeking approval of a compound or sheet material, specially moulded sheets or plaques may be used.
- 160 Granules and pellets shall NOT be tested.

Age of sample

- 161 A sample should be no more than 12 months old on the date of receipt by the laboratory and testing of that sample should commence within no more than 12 weeks of its receipt.
- 162 If in exceptional circumstances these conditions cannot be met please contact the Scheme, prior to commencing testing, for further advice.

Sample surface area

- 163 All materials tested for use with drinking water are normally tested using a sample surface area/volume ratio specified in BS 6920 Section 2.1.
- 164 Whilst some materials used in fittings will be exposed to water at a lower surface area/volume ratio, the standard ratio must be applied unless:
- Otherwise specified in BS6920-2.1 (Samples for testing),
 - With specific dispensation, prior to commencement of testing, granted by WRAS.

Whole Product Testing

- 165 To ensure that consistent assessment is maintained the Scheme does not accept whole product testing, i.e., water quality testing cannot be carried out on a complete valve or tap.

Hoses, Pipes and Tubes: Odour & Flavour testing

- 166 Multi layered hoses, pipes and tubes must be tested, for possible effects on the odour and flavour of water, in accordance with BS 6920 – 2.2.2 & 2.2.3 as appropriate, i.e. in their final form.

FAILURES

Failures - Retest requirements

- 167 Where BS6920-1 (Specification) does not specify any retest requirements please refer to WRAS.
- 168 WRAS should first be contacted where a product fails testing and/or retesting and the applicant intends to modify the product in order to satisfy the requirements of BS6920.
- 169 WRAS will request an explanatory statement from the client and if appropriate, the test laboratory giving the likely cause of the failure of the first set of samples and the action that will be taken in order to prevent a further failure occurrence.
- 170 The statement should be on company headed paper, signed and dated, and contain the following information:
- Test report reference and date.
 - Name of tested material and/or component.
 - The likely cause of the failure/s.
 - The action that will be taken in order to prevent a further failure occurrence.
- 171 Where applicable WRAS will then issue further test requirements based on the information contained in the above statement and advice given by the Scientific Advisor. The extent of retesting is at the discretion of WRAS and decided on a case-by-case basis.
- 172 If a sample of a material or component fails in any test, or for any other reason further testing is requested by the Scheme, either untested or fresh samples of the product must be used for further testing in accordance with BS 6920.

- 173 Where any retest has to be undertaken using more than one set of samples, e.g. Odour and flavour of water or the Growth of Aquatic Microorganisms tests (duplicate), the sets of samples must be sourced from different batches (with different manufacturing/production batch numbers).
- 174 Samples for retest must be identical to, as far as is practicable, the samples that failed the testing, e.g. identical dimensions (and in-radius in the case of elastomers), Shore hardness, colour, suppliers of raw ingredients, flushing and soaking used where applicable, curing times and temperatures where applicable, and method of manufacture and/or application. Please note that this is not an exhaustive list and where any doubt arises, please refer to WRAS.
- 175 If the retest is successful, then ALL test results (including failure results) shall be included in the final report.

Retest Failures

- 176 Where no modifications are made to the material/component (formulation, suppliers of raw ingredients and site & method of manufacture) and it fails the retest then the Scheme considers this to be an outright failure and shall be reported to WRAS.
- 177 Where a product fails testing and/or retesting and the applicant intends to modify the product in order to satisfy the requirements of BS6920 then WRAS should first be contacted.

Re-approval Test Failures

- 178 Any failure of an re-approval test must be reported to WRAS by the Test Laboratory.
- 179 Where a product fails testing and the applicant intends to modify the product in order to satisfy the requirements of BS6920 then WRAS should first be contacted. Additional testing may be required.

Failure of High Temperature Testing

- 180 The Scheme will accept retesting using lower temperature test conditions if a product fails to conform to one or more of the high temperature tests (Part 3 of BS 6920). Both results should be included in the final test report rather than in a separate supplementary report.

TECHNICAL ADVICE

- 181 The formal route for all technical queries from the test laboratories or their clients and applicants is via the WRAS Approvals Technical Assessors.
- 182 Recognised laboratories may approach WRAS informally on behalf of clients, but the outcome of all such contacts and decisions must be confirmed in writing by WRAS. Communications relating to the operation of accredited laboratories and to individual tests may be made (on a confidential basis) in writing to the Scheme.
- 183 Where the technical query relates to materials which are either used or may be used in products tested under Regulation 31 of the Water Supply (Water Quality) Regulations 2000/2014 (previously Regulation 25 of the Water Supply (Water Quality) Regulations 1989), also seek advice from the Drinking Water Inspectorate (DWI).

Table 1: Variation in Testing Requirements for Specific New Approvals

Table reference	Material situation	Tests required				
		O&F	APP	GMO	EXS	EM
a)	Elastomeric materials/components – new approval of a range where the only variation between the elastomers is the Shore hardness					
	Softest version	✓	✓	✓	✓	✓
	Hardest version	✓		✓		
b)	Elastomeric materials/components – new approval of a range which differ in size					
	Largest in-radius	✓	✓	✓	✓	✓
	Smallest in-radius	✓				
c)	Elastomeric materials/components – new approval of a range which differs in size and Shore hardness					
	Largest in-radius and softest Shore hardness	✓	✓	✓	✓	✓
	Smallest in-radius and hardest Shore hardness	✓		✓		
d)	Thermoplastics – new approval of a range of thermoplastics which differ only in filler content					
	Sample with highest filler content	✓	✓	✓	✓	✓
	Sample with lowest filler content	✓				
e)	Components manufactured from a WRAS Approved Material					
	Components made from a WRAS Approved plastic material	✓		✓	✓	✓ ¹
	Components made from a WRAS Approved rubber/elastomeric material	✓		✓	✓	✓ ¹

1. Only required for pipes & hoses.