

## Loss Prevention Standard

LPS 1260: Issue 3.1

Plastic pipe and fittings for use in automatic sprinkler systems

Requirements for testing and approval of plastic and fittings

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## **PARTICIPATING ORGANISATIONS**

This standard was prepared by expert group C and approved by the LPC Fire and Security Board of BRE Global Ltd.

The following organisations participated in the preparation of this standard:

Association of British Insurers / Lloyd's  
Association of Building Engineers  
Association of Chief Police Officers  
Association for Specialist Fire Protection  
BRE Global  
British Automatic Fire Sprinkler Association  
British Fire Protection Systems Association  
British Security Industry Association  
BT Redcare  
Confederation of British Industry  
European Fire Sprinkler Network  
Chief Fire Officers' Association  
Door and Hardware Federation  
Electrical Contractors Association  
Health and Safety Executive  
RISC Authority  
International Fire Sprinkler Association  
MetroNet  
National Fire Sprinkler Association  
Risk Engineering Data Exchange Group  
Royal and Sun Alliance  
Royal Institution of Chartered Surveyors  
The Fire Protection Association

## **REVISION OF LOSS PREVENTION STANDARDS**

Loss Prevention Standards will be revised by issue of revised editions or amendments. Details will be posted on our website at [www.redbooklive.com](http://www.redbooklive.com)

Technical or other changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments. (See amendments table on page 18)

The issue number will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

**USERS OF LOSS PREVENTION STANDARDS SHOULD ENSURE THAT THEY POSSESS THE LATEST ISSUE AND ALL AMENDMENTS.**

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## FOREWORD

This standard identifies the evaluation and testing practices undertaken by LPCB for the purposes of approval and listing of products. LPCB listing and approval of products and services is based on evidence acceptable to LPCB:

- that the product or service meets the standard
- that the manufacturer or service provider has staff, processes and systems in place to ensure that the product or service delivered meets the standard

and on:

- periodic audits of the manufacturer or service provider including testing as appropriate
- compliance with the contract for LPCB listing and approval including agreement to rectify faults as appropriate

## NOTES

Compliance with this LPS does not of itself confer immunity from legal obligations. Users of LPSs should ensure that they possess the latest issue and all amendments.

LPCB welcomes comments of a technical or editorial nature and these should be addressed to “the Technical Director” at [enquiries@breglobal.co.uk](mailto:enquiries@breglobal.co.uk).

The BRE Trust, a registered charity, owns BRE and BRE Global. BRE Global and LPCB (part of BRE Global) test, assess, certificate and list products and services within the fire and security sectors. For further information on our services please contact BRE Global, Watford, Herts. WD25 9XX or e-mail to [enquiries@breglobal.co.uk](mailto:enquiries@breglobal.co.uk)

Listed products and services appear in the LPCB “List of Approved Products and Services” which may be viewed on our website: [www.redbooklive.com](http://www.redbooklive.com) or by downloading the LPCB Red Book App from the App Store (for iPhone and iPad), from Google Play (for Android devices) or from the Windows Store (for Windows 8 Phones and Tablets from 2014).

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## 1 SCOPE

This Standard specifies the requirements and test methods for the assessment of the suitability of opaque plastic pipes and fittings to be used in sprinkler systems. These pipes and fittings should always be used in a system which conforms to an appropriate system installation standard (for example The LPC Rules for Automatic Sprinkler Systems (including BS EN 12845) and Technical Bulletins in particular TB 227). Additionally the system should be installed and maintained by an appropriately qualified installer, such as an LPS 1048 installer and in accordance with the manufacturer's instructions and specification.

Particular attention should be paid to the installation standard "The LPC Rules for Automatic Sprinkler Systems (including BS EN 12845) and Technical Bulletin 227"

## 2 DEFINITIONS

Component type – Various sizes of components of the same type (eg. 3" Tee and 2" Tee are of the same *component type*)

Component – An individual component of the piping system (eg. a fitting or a section of pipe)

Creep - Gradual, permanent deformation of a body produced by a continued application of stress. The rate is increased with increased temperature.

Cure time – period of time, specified by the manufacturer required for adhesive or welded joints to achieve a satisfactory bond prior to pressure testing and filling the system with water.

End User – The person(s) assuming responsibility for the components once installed in a sprinkler system.

Fittings –Parts used to join sections of pipe to other components, examples include but are not limited to, elbows, tees, crosses and adapters.

Installer – a qualified sprinkler system installer, such as an LPS 1048 approved sprinkler system installer.

Potable water – drinkable mains water.

Plastic Pipe – Thermoplastic pipe intended for use in an automatic sprinkler system.

## 3 REQUIREMENTS

### 3.1 Documentation

For the initial approval, prior to examination and testing, the applicant shall provide LPCB with comprehensive information about the product for review. All documents

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shall be dated and given a reference number, issue and title. These documents should include:

- Document Register (containing date, issue and status of all documents)
- Production Drawings (including materials and finish)
- A comprehensive set of design, installation and maintenance instructions.
- Full material specification, manufacturer and designation
- Details of any product training which may be available or required
- The manufacturer shall provide data to verify any claims of design life, operating temperature and working pressure. An example of typical characteristics can be found in the published standard BS EN ISO 15874 part 2, tables 1, 2 and 3.

The design, installation and maintenance instructions (user guide) shall include sufficient information to enable the product to be installed as intended and shall include the following information as a minimum:

- Suitability of the installations for exposure directly to fire.
- Details of jointing compounds/materials/tools and procedures (including curing or cooling times, manufacturers of tools, materials and compounds)
- Compatibility of water additives (corrosion inhibitors, legionella treatments, anti freeze, etc) shall be stated along with maximum permissible concentrations.
- Suitability for use inside and outside of buildings shall be stated or excluded.
- Details of any product training which may be available or required
- Sufficient information shall be provided to allow system designers to undertake the necessary hydraulic calculations.
- Full material specification(s).

Note: The formation of sections of no flow pipe work is undesirable.

The end user of the product shall be supplied with sufficient information for them to identify the service and maintenance requirements of the product in their installation including the maintenance regime, and life expectancy of the product.

If the applicant is not the manufacturer then an application must be accompanied by written permission for testing from the manufacturer. The applicants should contact LPCB for a "cross listing" application form BF406.

The documentation that supports the product in the market place is critical to the successful use of a product. Therefore LPCB will review and use the documentation to prepare test samples and undertake testing. The documentation supplied to LPCB should be given a date and issue number. These documents will form part of the approval.

Note :The Fire Protection Association (<http://www.thefpa.co.uk/>) also require that products to be used in accordance with TB227 have documentation that has been checked by them and published on their website. It is intended that the documentation to satisfy LPCB approval will also satisfy the FPA. On application

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LPCB will help applicants with this requirement, including making contact with the FPA. However LPCB can not accept any responsibility in relation to this requirement. Any matter concerning the FPA must be discussed directly with them, including the criteria, review and publication of this documentation.

For LPCB approval, user documentation should adequately address at least the following points:

- Full details about the use of the product (assembly method, tools, materials, suitable applications, parameters for use).
- Suitable pipe hangers for use with the product, along with required pipe hanger spacings.
- The installation standard(s) the product is intended to be used with. If there is more than one installation standard, it shall be clear what the different requirements and practices are and in what circumstances they are appropriate.
- Details of product certification body(s), standard approved to and approved ranges of products.
- Types of sprinkler system appropriate for the product (wet, dry, alternate and deluge)
- Details of compliance with appropriate local water regulatory requirements, or appropriate restrictions on use. (For example, in the UK, products to be connected to a water main must be WRAS approved for connection to the potable water supply).
- Acceptable limits of temperature, ultraviolet light and chemical exposure.
- Compatible paints or coatings.
- Fire compartmentation penetration details (eg. Penetration seals, fire stopping, cavity barriers).

### 3.2 Testing methods

All tests should be conducted at 20 °C ± 5 °C unless otherwise stated.

General laboratory procedures, confidential handling of specimens, event record requirements and presentation of the test report shall be in accordance with the requirements specified in ISO 17025.

Depending on the size of the application for approval and the number of components to be approved, it may be appropriate to use a sampling regime to reduce test assembly numbers. It may be, for example, not necessary to test every size of every component. This decision will be made by LPCB. Sample numbers and assembly details will be provided in the test schedule compiled by LPCB for each approval. Tests shall be carried out as required by the LPCB test schedule.

Unless stated otherwise, all test assemblies shall be built, as directed by the manufacturer's written instructions

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### 3.2.1 Examination

One of every size of every component shall be examined for dimensional conformance with the manufacturer's drawings.

### 3.2.2 Marking

Each component type shall be examined for adequate identification. The requirements for markings for LPCB approval are specified in the accompanying Scheme Document SD025 available from LPCB upon application.

For pipes this shall include: Manufacturer's name or identifying mark, year of manufacture, pipe size, pressure rating, temperature rating, manufacturing plant (if more than one), material identification and LPCB reference.

For fittings this shall include: Manufacturer's name or identifying mark, year of manufacture, size(s) of connections, manufacturing plant (if more than one), material identification and LPCB reference.

Note: due to space limitations on smaller sizes of fittings those of  $d_n \leq 32$  mm shall only be required to be marked with at least the following information:

- The manufacturer's name or trademark
- The nominal diameter
- The material
- The manufacturing plant (if more than one)

As per EN ISO 15877-3 clause 12 - Markings shall be permanent and shall not initiate cracks or other defects.

### 3.2.3 Assembly

The clarity, accuracy and provision of essential component details within the assembly instructions shall be assessed (LPCBs decision in this matter will be final). All components shall fit together as specified. Installation instructions shall adequately cover the following when used in practice in building test assemblies:

- Curing time of adhesive or solvent cement prior to pressurisation.
- Cooling time after welding prior to pressurisation.

### 3.2.4 Pressure strength tests

All pressure tests shall be for 5 minutes  $-0, +30$  seconds unless otherwise stated.

#### 3.2.4.1 Operational Hydrostatic pressure test

The test specimens shall be assembled as directed by the manufacturer's instructions.

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For systems that require a cure time, the minimum period of time required for curing as specified by the manufacturer as required prior to installation testing shall be allowed. If different cure times are provided by the manufacturer in their instructions related to ambient temperature conditions, the lowest temperature in each range and corresponding stated cure time shall be used. If only one cure time suitable for all operating temperatures is used, then the cure and test shall be carried out at the following temperatures:

- 4°C or the minimum service temperature stated by the manufacturer, whichever is the lower.
- 21°C
- 50°C or the maximum service temperature stated by the manufacturer, whichever is the higher.

The tolerance for all test temperatures is  $\pm 2^\circ\text{C}$ .

For welded systems, joints shall be made in accordance with the manufacturer's instructions.

At the specified minimum time after the joint is made (+10%, -0%), the test assembly shall be subjected to a pressure of 1.5 times the maximum rated working pressure (+2 bar, -0 bar) for 5 minutes (-0, +30 seconds).

The specimen shall then be examined for permanent failures (cracks, leaks or separation of joints are not permitted).

#### 3.2.4.2 Long-term hydrostatic pressure

The test assemblies shall be subjected to the maximum rated working pressure (+2 bar, -0 bar) and a temperature of  $50^\circ\text{C} \pm 2^\circ\text{C}$  for 90 days -0, +1 day. Tests shall commence after the manufacturer's specified minimum cure time for the working pressure has elapsed. The cure may take place at any temperature specified by the manufacturer between  $0^\circ\text{C}$  and  $50^\circ\text{C}$ .

The test specimens shall be examined for failures in structural integrity (cracks, leaks or separation of joints not permitted).

Note: Pipes and fittings rated at operating temperatures in excess of  $50^\circ\text{C}$  shall be tested at the highest rated temperature. In this event, the manufacturer's documentation must clearly state the relationship between higher ambient temperatures and the service life of the product. Data in support of these claims should be submitted to LPCB for review.

#### 3.2.4.3 Hydrostatic pressure and ultimate strength

The test specimens shall be assembled as directed by the manufacturer's instructions. Joints may be allowed to cure for up to 30 days at any temperature (as directed by the manufacturer). After the curing period, the test assemblies shall be subjected to a pressure of four times the maximum rated working pressure (+2 bar, -0 bar) for 1 hour (-0 minutes, +5 minutes) at ambient temperature.

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The test specimens shall not fail (cracks, leaks or separation of joints not permitted).

After the 1 hour test, the pressure shall continue to be raised until the assembly fails. The pressure at which the assembly fails and the mode of failure shall be recorded.

Note: The sampling regime of the test programme must ensure that an assembly using each pipe size to be approved is tested, with an exposed pipe length between fittings of at least 3 times the pipes OD.

#### 3.2.4.4 Water Hammer Test

The test specimens shall be assembled as directed by the manufacturer's instructions. Joints may be allowed to cure for up to 30 days at any temperature (as directed by the manufacturer). The pipe and fitting assemblies shall be subjected to a pressure cycle, rising from 4 ( $\pm 2$ ) bar to 25 bar at a rate of 45 bar/s (+10, -5); after which the pressure shall be returned to 4 ( $\pm 2$ ) bar. The pressure cycles shall be repeated 3 000 times at a rate of 15 cycles per minute. The pressure changes against time shall be measured and recorded. Each assembly shall be examined visually for leakage. The samples shall not leak, crack or disassemble.

#### 3.2.5 Ageing

The test specimens shall be assembled as directed by the manufacturer's instructions. Joints may be allowed to cure for up to 30 days at any temperature (as directed by the manufacturer). The pipe and fitting test pieces shall be assembled and weighed. Fill with water to 60% ( $\pm 5\%$ ) of the internal volume and condition at a temperature of 95°C (+2 °C, -0 °C) for 90 days (-0, +1 day). The samples shall be weighed before and after the test to determine the degree of moisture absorption.

At ambient temperature the assemblies shall be assessed for structural integrity at a pressure four times the maximum working pressure held for 5 minutes (+1 bar, -0 bar). Thereafter they shall be tested to destruction. The failure pressure shall be recorded.

#### 3.2.6 Resistance to low temperature

The test specimens shall be assembled as directed by the manufacturer's instructions. Joints may be allowed to cure for up to 30 days at any temperature (as directed by the manufacturer). Following this period the test assembly shall be subjected to conditioning at a temperature of  $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$  for 90 days, (-0, +1 day). The samples shall then be returned to ambient temperature for a minimum of 24 hours. Thereafter the samples shall be tested to destruction, the failure pressure recorded.

#### 3.2.7 Resistance to high temperature

Pipe specimens shall be tested and assessed to the methods and requirements stated in BS EN ISO 2505 (air oven method). Fitting specimens shall be tested and assessed to the methods and requirements stated in BS EN ISO 580.

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### 3.2.8 Sulphur dioxide corrosion

The test specimens shall be assembled as directed by the manufacturer's instructions. Joints may be allowed to cure for up to 30 days at any temperature (as directed by the manufacturer). The test assemblies shall then be conditioned in sulphur dioxide in accordance with BS EN 12259 part 1 clause 4.12.2.

The test assemblies shall then be tested for structural integrity at a pressure four times the maximum working pressure (+1 bar, -0 bar) bar. Thereafter the samples shall be tested to destruction and the failure pressure recorded.

### 3.2.9 Resistance to sulphuric acid

The test specimens shall be assembled as directed by the manufacturer's instructions. Joints may be allowed to cure for up to 30 days at any temperature (as directed by the manufacturer). The test assemblies shall then be conditioned in sulphuric acid in accordance with BS 3506 clause 8.4.

The components shall be assessed for structural integrity at a pressure four times the maximum working pressure (+1 bar, -0 bar). Thereafter the samples shall be tested to destruction and the failure pressure recorded.

### 3.2.10 Resistance to bleach

The test specimens shall be assembled as directed by the manufacturer's instructions. Joints may be allowed to cure for up to 30 days at any temperature (as directed by the manufacturer). The test assemblies shall then be immersed in bleach (Sodium Hypochlorite 14 - 15% solution) for 30 days (-0, +1 day) at 21°C ( $\pm$  5°C).

Assess the components for structural integrity at a pressure four times the maximum working pressure (+1 bar, -0 bar). Thereafter the samples shall be tested to destruction and the failure pressure recorded.

### 3.2.11 Resistance to acetone

The test specimens shall be assembled as directed by the manufacturer's instructions. Joints may be allowed to cure for up to 30 days at any temperature (as directed by the manufacturer). The test assemblies shall then be conditioned in acetone and tested in accordance with clause 8.3 of BS 3506. Any change in state shall be recorded.

Assess the components for structural integrity at a pressure four times the maximum working pressure (+1 bar, -0 bar). Thereafter the samples shall be tested to destruction and the failure pressure recorded.

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### 3.2.12 Fire exposure

The components shall be assessed for structural integrity at maximum working pressure (+1 bar, -0 bar) following the completion of the fire tests described below.

In a test room 4 m x 4 m x 2.8 m high, with a 50 mm air gap all around the base of the test room, install 1½" or metric equivalent pipe work flush to the ceiling. The pipe work shall terminate in one 15 mm 68°C quick response pendant spray sprinkler. (See figure 1.)

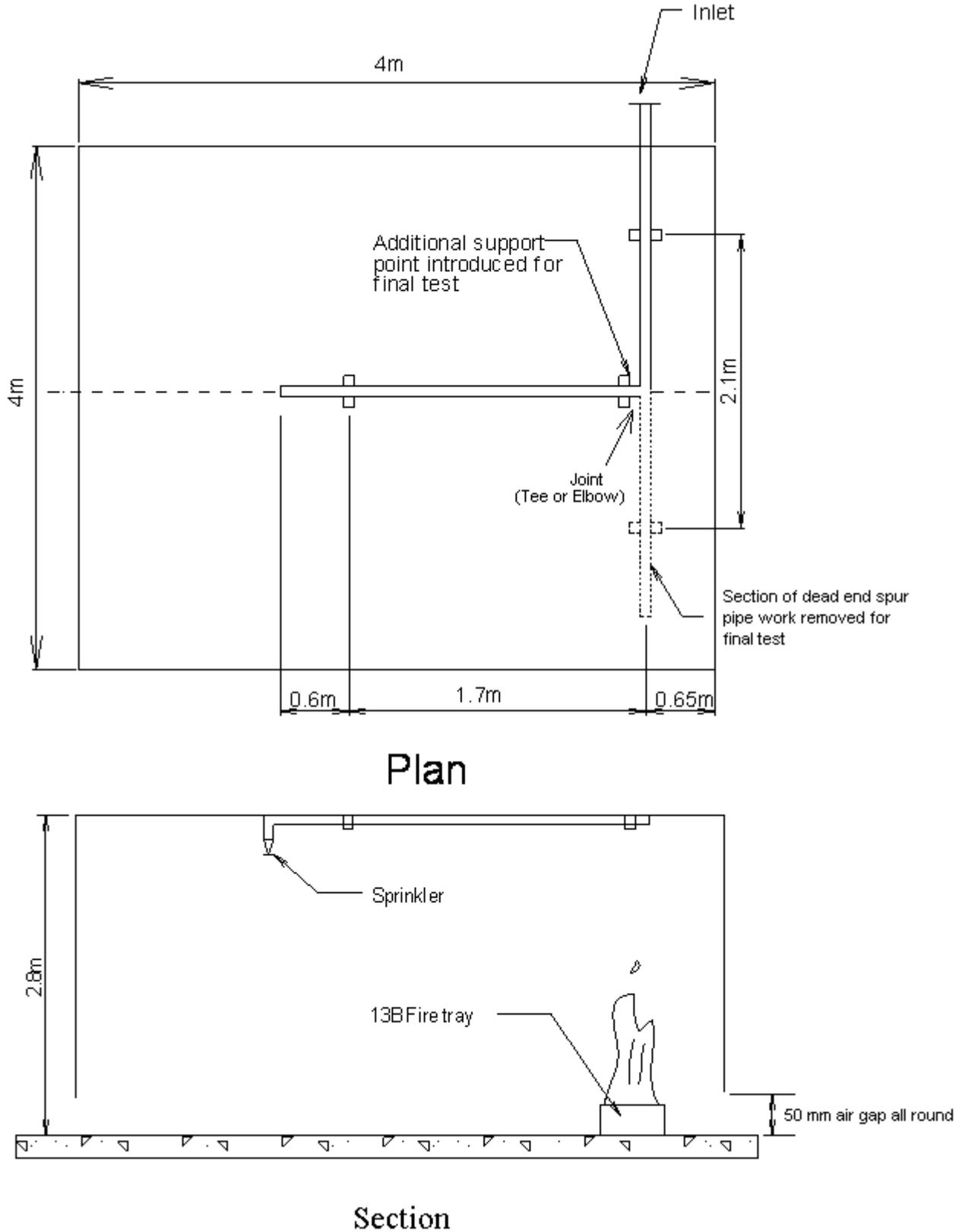
The pipe work shall be pressurised to its maximum working pressure (+1 bar, -0 bar) for 10 minutes (-0, +1 minute). Air shall not be bled from the pipe work (in the test enclosure) prior to testing, such that the volume of air within the pipe work is retained when the pipe work is pressurised with water. During this period the pipe work assembly shall not leak.

Immediately following this, a 13B test fire tray (as specified in BS EN 3-1:1996) containing 10 litres of heptane on a water base shall be placed immediately below the joint. The heptane shall be ignited and allowed to burn freely. The sprinkler will operate and discharge at 47 litres / minute ( $\pm 3$  l/m). Once the heptane has been exhausted (or been extinguished) the discharge rate shall be increased to 100 litres / minute ( $\pm 5$  litres / minute) for a further 10 minutes (-0, +1 minute). If any leaks occur during the test the following pass/fail criteria shall be applied. 95% of flow shall be through the sprinkler head with a maximum of 5% leakage from any other point of the assembly. Test evidence has shown that these criteria adequately address pinhole failures.

This test shall be conducted twice; one test shall incorporate the dead end spur and one shall not.

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Figure 1 – Fire test arrangement



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### 3.2.13 UV exposure

The components shall be assessed for structural integrity at a pressure four times the maximum working pressure  $\pm 1$  bar, after exposure to natural daylight (or equivalent UV) for  $90 \pm 1$  day,  $180 \pm 1$  day and  $360$  days  $\pm 1$  day or methods in BS EN ISO 16871 or BS EN 1056.

After the 90 day test the components shall be tested to destruction the failure pressure recorded at ambient temperature.

### 3.2.14 Impact resistance

Any change of state of materials shall be recorded, after subjecting a sample of each nominal size of pipe to an impact energy as per clause 7.2 of BS EN ISO 15877-2.

### 3.2.15 Bend test

The assemblies of pipe and fittings shall be tested to determine ability to withstand mechanical loading.

- 3.2.15.1 Coupling assemblies shall be filled with water ensuring there is no trapped air in the assembly. The assembly shall be hydrostatically pressurised to their maximum allowable working pressure for the duration of the test. The couplings shall not leak or fail when subjected to the bending moments specified by equation 1 and in the manner described.

**Equation 1 – Bending moment load (F) (mass of pipe plus water contents over length allowed between hangers multiplied by a safety factor of 2).**

$$F = 2 \times \left[ \left[ \left( \pi \left( \frac{od}{2} \right)^2 - \pi \left( \frac{id}{2} \right)^2 \right) \times l \times \sigma \right] + \left[ \pi \left( \frac{id}{2} \right)^2 \times l \times 1000 \right] \right] \times \frac{l}{2} \times 9.88$$

Where:

$F$  = Force to be used as bending moment (N)

$l$  = Maximum permissible length of pipe between hangers (m) (as specified by manufacturer)

$od$  - Outside diameter of pipe (m)

$id$  - Inside diameter of pipe (m)

$\sigma$  - Density of pipe compound ( $\text{kg/m}^3$ )

- 3.2.15.2 An assembly configured as in figure 2, positioned in a horizontal plane and with the pipe securely clamped shall be pressurised with water to 12 bar or the maximum working pressure whichever is the least,  $\pm 1$  bar. The pressure is to be maintained throughout the application of the bending moment.
- 3.2.15.3 The appropriate bending moment found using equation 1 for the applicable pipe size shall then be applied to the free pipe and held for 2min +30s/-0s. The pressure is to be maintained throughout the application of the bending moment.

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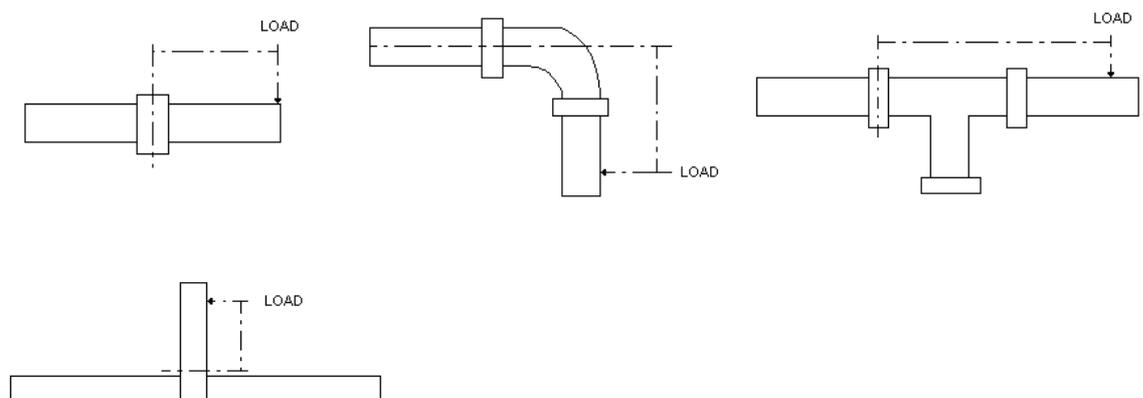
3.2.15.4 Repeat 3.2.15.3 at pressures of 12 bar  $\pm$ 1 bar and 5 bar  $\pm$ 0.5 bar.

Note: If the maximum working pressure is less than 12 bar then apply the bending moment at the maximum and 5 bar only.

Where reducing couplings/fittings are tested the appropriate bending moment for the smaller size pipe shall be applied at all pressures first and the test repeated using the appropriate bending moment for the larger size pipes.

In all tests no leakage shall occur and assembly integrity shall be maintained.

Figure 2 –Example Fitting assemblies



Note 1: Pipe of a length 1m to 1.25m shall be fitted to the coupling and/or fitting.

Note 2: Components shall be joined as specified in the manufacturer's installation instructions and shall have a pressure/leak tight blank at the other end.

Note 3: Provision shall be made for:

- i) Pressure charging connection.
- ii) Pressure monitoring.
- iii) Vent valve.

Note 4: The bending moment is to be applied at the appropriate point measured from:

- a) Single coupling – centre line of coupling.
- b) 45° or 90° elbow – centre line of longitudinal axis of fixed pipe.
- c) tee piece – centre line of first coupling connected to fixed pipe.

In the case of (b) and (c), the appropriate angles of deflection of the two couplings involved shall be calculated and combined for the required total angle of deflection.

Note 5: The testing shall permit the free pipe to move unimpeded and friction is to be reduced to a minimum.

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### 3.2.16 High pressure actuation

The effect of reaction forces shall be assessed on a typical pipe work installation as per the manufacturer's instructions, upon activation of a K80 sprinkler head. The pipework shall not be permanently displaced by the reaction force, such that the head is discharging above the ceiling tile, or the distribution pattern of the head is disrupted.

A 3m ( $\pm 0.10$ m) length of 1" or metric equivalent pipe with two 0.6 m ( $\pm 5$  mm) vertical drops (one from a tee, one from an elbow) either side of a hanger at the maximum permissible spacing shall be installed. Each vertical drop shall terminate in a sprinkler in a suspended ceiling. The simulated ceiling tile shall be 600mm ( $\pm 5$ mm) square and made from 10mm ( $\pm 1$  mm) thick plasterboard with a nominal weight of 7.6 kg/m<sup>2</sup>. The sprinkler shall be without an escutcheon.

The installation shall then be subjected to an internal standing pressure of 12 bar ( $\pm 0.5$  bar), and operate the sprinkler at the extremity of the installation, maintaining a running pressure of 11 bar ( $\pm 0.5$  bar) for a minimum of 2 minutes. Observations of the effect of the discharge on the performance of the sprinkler head and pipe work assembly shall be recorded.

### 3.2.17 Spectro-analysis

The adhesive for joining together components shall undergo spectro-analysis to confirm its chemical composition conforms to that declared by the manufacturer.

### 3.2.18 Oxygen Index flammability test

The oxygen index shall be provided in an accredited test report to BS EN ISO 4589-2 for the compound(s) used to make the pipe and fittings. This data shall be recorded and held on file. In this version of the standard, there is no pass or fail criteria associated with this test method.

### 3.2.19 Limitations

The contents of this test standard are intended to assess products for suitability of service in fire protection applications. Products shall always be used in accordance with appropriate installation standards and as directed by the manufacturer's instructions. Products should always be installed by an approved installer, such as an LPS 1048 approved installer. Any modifications or alterations to the protected risk should always be made under the supervision of an appropriately qualified person.

The tests in this standard have been designed using fire research and testing experience to replicate a range of foreseeable scenarios that might be encountered by the product in practice. However, not all scenarios can be adequately replicated in tests.

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#### 4 CLASSIFICATION AND DESIGNATION

The following information shall be included in the product listing:

- Product details; manufacturer, component description, part number LPCB certificate number.
- Installation and product instructions – document number and issue number
- Maximum permissible ambient temperature
- Any additional product training required for installers of the product.
- Compatibility of pipe and fittings with those from other LPCB approved manufacturers shall be stated, as agreed by LPCB based upon the approval programme.

#### 5 MARKING, LABELLING AND PACKAGING

The manufacturer shall provide appropriate marking, labelling and packaging for the safe transport and subsequent use of the product as well as clear details of the manufacturer, their contact address, the product model identification and any other safety requirements. See section 3.2 and Scheme Document 025 (SD025) for further details of requirements for LPCB certification.

#### 6 PUBLICATIONS REFERRED TO AND FURTHER RESOURCES:

BS EN 3-1: 1996	Portable fire extinguishers Part 1 description, duration of operation, Class A and B fire tests
BS 2782:Part 8:Method 830A:1986, ISO 175-1981	Methods of testing plastics. Other properties. Determination of the effects of liquid chemicals, including water
BS 3506:1969	Specification for unplasticized PVC pipe for industrial uses
BS 4346-1:1969	Joints and fittings for use with unplasticized PVC pressure pipes.
BS 7291-4:1990	Thermoplastics pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings. Specification for chlorinated polyvinyl chloride (PVC-C) pipes and associated fittings and solvent cement
BS EN 1056:1996, BS 2782-11:Method 1107A:1996	Plastics piping and ducting systems. Plastics pipes and fittings. Method for exposure to direct (natural) weathering
BS EN 12259-1	Fixed firefighting systems — Components for sprinkler and water spray systems — Part 1: Sprinklers
BS EN 12845	Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance
BS EN ISO 580	Plastics piping and ducting systems. Injection-moulded thermoplastics fittings. Methods for visually assessing the effects of heating

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BS EN ISO 4589-2	Plastics - Oxygen index - ambient temperature
BS EN ISO 15874-1:2003	Plastics piping systems for hot and cold water installations. Polypropylene (PP). General
BS EN ISO 15874-2:2003	Plastics piping systems for hot and cold water installations. Polypropylene (PP). Pipes
BS EN ISO 15874-3:2003	Plastics piping systems for hot and cold water installations. Polypropylene (PP). Fittings
BS EN ISO 15874-5:2003	Plastics piping systems for hot and cold water installations. Polypropylene (PP). Fitness for purpose of the system
BS EN ISO 16871:2003	Plastics piping and ducting systems. Plastics pipes and fittings. Method for exposure to direct (natural) weathering
BS EN ISO 2505	Thermoplastics pipes. Longitudinal reversion. Test methods and parameters
BS ISO 4433-1:1997, BS 2782-11:Method 1161A:1998	Thermoplastic pipes. Resistance to liquid chemicals. Classification. Immersion test method
BS ISO 4433-3:1997, BS 2782-11:Method 1161C:1998	Thermoplastic pipes. Resistance to liquid chemicals. Classification. Chlorinated poly(vinyl chloride) (PVC-C) pipes
CP 312-1:1973	Code of practice for plastics pipework (thermoplastics material). General principles and choice of material
DD ENV 12108:2001	Plastics piping systems. Guidance for the installation inside buildings of pressure systems for hot and cold water intended for human consumption
LPS 1048	Requirements for the Approval of Sprinkler System
BS EN ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories

For undated references please refer to the latest published issue.

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Amendments Issued Since Publication

DOCUMENT NO.	AMENDMENT DETAILS	SIGNATURE	DATE
LPS 1260-2.1	Clause tiles added, moisture details added to 6.7	PJF	31/07/02
LPS 1260-2.2	Changes to copyright information	CJA	20/09/05
LPS 1260-3.0	Standard extensively revised following industry experience with product. Tests added and clarified	PJF	21/04/09
LPS 1260-3.1	<ol style="list-style-type: none"> <li>1. New front cover</li> <li>2. Title added to header</li> <li>3. Notes added on Page 3</li> <li>4. Repagination</li> <li>5. Update to copyright information</li> </ol>	DC	Jan. 2014