Care and maintenance of automatic sprinkler systems

Replaces BS EN Clause 20 and supplements Clause 21.
Implementation date: It is recommended that this Technical Bulletin should be implemented for all contracts let from 1 January 2025. Where all stakeholders agree, it may be used immediately.

TB203.0 BACKGROUND AND INTRODUCTION

A satisfactory sprinkler system maintenance regime including a thorough review of hazard is critical to the continued dependable performance of all sprinkler systems.

This Technical Bulletin outlines procedures for care and maintenance of sprinkler systems to ensure that they remain fully operational and that periodic assessments are carried out to verify that protection is appropriate to the hazards.

This Technical Bulletin intends to re-introduce optimum requirements for maintenance derived from a selection of practices from the previous BS 5306-2 edition of the Sprinkler rules and new recommendations from the industry.

This issue of TB203 replaces TB203:2021:1 and should be applied in place of BS EN 12845: 2015 – clause 20 'Maintenance' and clause 21 'Third party inspection'.

This version of TB203 has adopted the same headings and structure as BS EN 12845 Clause 20 'Maintenance'. The paragraph numbering system is also equivalent where the content of the two documents are similar, for example:

- BS EN 12845 Clause 20.1 'General' → TB203.1 'General';
- BS EN 12845 Clause 20.2 'Users' programme of inspection and checking' → TB203.2 'Users' programme of inspection and checking arrangements'; and
- BS EN 12845 Clause 20.3 'Service and maintenance schedule' → TB203.3 'Service and maintenance schedule'.

This Technical Bulletin should also be read in conjunction with the following parts of BS EN 12845:

- Clause 19 'Commissioning'.
- Clause 21 'Third party inspection'
- Annex F 'Additional measures to improve system reliability and availability' and
- Annex J 'Precautions and procedures when a system is not fully operational'.

Further helpful guidance on service and maintenance of sprinkler systems, including examples of template records and checklists forms, are freely available online for system owners/users and specialist service and maintenance contractors, as detailed below:

- Sprinkler System Service and Maintenance Guidance, Records, and Checklists
- Sprinkler System Service and Maintenance Checklists – Appendix Template Forms

  These documents are available here: https://www.thefpa.co.uk/advice-and-guidance/free-documents?category=7

TB203.0.1 Definitions

TB203.0.1.1 Ten-year tank

A suction tank designed and protected against corrosion, approved to Loss Prevention Standard LPS 1276 or equivalent, such that the need for emptying the tank for maintenance is reduced to a period of not less than ten years.

TB203.0.1.2 Alarm receiving station

An alarm receiving station approved to Loss Prevention Standard LPS 1020 or equivalent, for transmission of fire signals to the fire authority within which the sprinklered property is situated.

TB203.0.1.3 Approved sprinkler contractor

A sprinkler installing company certificated to an appropriate level to Loss Prevention Standard LPS 1048 or to an equivalent scheme.

TB203.0.1.4 Certificate of Conformity (C of C)

A certificate issued by a nationally accredited approval and certification body or an approved sprinkler contractor, verifying compliance with defined installation rules and recording any non-compliances.

TB203.0.1.5 Fire safety official

The employee or agent of the owner or user of the sprinkler system(s) nominated to undertake specified tasks relating to the upkeep of the sprinkler protection.

TB203.0.1.6 Inspection

A visual inspection of a sprinkler system or portion thereof, to verify that it appears to be in operating condition, adequate for the risk, and free from physical damage.

TB203.0.1.7 Insured

Person or persons, companies or bodies corporate who may be either or both owners or occupiers of the sprinkler protected premises, and who have an insurable interest in the building, contents or business interruption risk.

TB203.0.1.8 Sprinkler servicing contractor

An approved sprinkler contractor with servicing as part of their approval scope appointed by the user to undertake a test, service and maintenance schedule to TB203.3.

TB203.0.1.9 Sprinkler protection user

The person responsible for or having effective control over the sprinkler system provision and its upkeep.

TB203.0.1.10 Weekly test card

Record card(s), giving both specific advice and space for recording of weekly testing of sprinkler system alarms and quarterly testing of water supplies.

TB203.1 GENERAL (REVISIONS TO BS EN CLAUSE 20.1)

TB203.1.1 Person(s) responsible for the sprinkler system

The user shall appoint an individual and a substitute, who after they have been given the necessary instructions, shall ensure that the system remains in working condition. The name, address and telephone number of the person responsible for the system, as well as those substitutes, shall be prominently displayed in the sprinkler valve room.

TB203.1.2 Programmed work

The user shall ensure that a programme of inspection and checks is carried out (see TB203.2), arrange a test, service and maintenance schedule, keep records, including a logbook, which shall be held on the premises (see TB203.3, TB203.4, TB203.5 and TB203.6).

The user shall arrange for the test, service and maintenance schedule to be carried out under contract by a sprinkler servicing contractor.

Any alarm receiving station(s) shall be notified of any system tests which will result in the transmission of an alarm. The alarm receiving station(s) shall be requested to verify that alarm signal(s) have been received. The alarm receiving station(s) shall be informed immediately that the test procedures have been completed.

After an inspection, check, test, service or maintenance procedure the system, and any automatic pumps, pressure tanks and gravity tanks shall be returned to the normal operational condition.

Where manufacturers recommend more frequent servicing and maintenance of their products than required by this Technical Bulletin, their recommendations shall be complied with.

COMMENTARY AND RECOMMENDATIONS ON TB203.1.2

Where certificates of conformity have been issued for the system, the requirements of the certificate of conformity issuer shall be observed in order to maintain the certificate validity.

If appropriate, the user should notify interested parties of the intent to carry out tests and/or of the results.

TB203.1.3 Precautions while carrying out work

See BS EN 12845 Annex J for precautions to be taken while the system is not operational or after a sprinkler operation.

TB203.1.4 Replacement sprinklers

A stock of spare sprinklers shall be kept on the premises as replacements for operated or damaged sprinklers. Spare sprinklers, together with sprinkler spanners as supplied by the supplier, shall be housed in a cabinet or cabinets located in a prominent and easily accessible position where the ambient temperature does not exceed 27°C.

The number of spare sprinklers per system shall be no less than:

(a) 6 for Light Hazard (LH);

(b) 24 for Ordinary Hazard (OH);

(c) 36 for High Hazard, Process (HHP) and High Hazard, Storage (HHS).

The stock shall be replenished promptly after spares are used.

Where installations contain high-temperature sprinklers, sidewall or other variations such as different orifice sizes, sprinkler patterns or contain multiple controls, the spares shall incorporate an appropriate proportion of these types of products.

TB203.1.5 Pressure bearing components

Inspection, testing and maintenance of pressure tanks and pressure bearing components shall fulfil the national requirements for pressure equipment.

The UK national requirement is:

The Pressure Equipment Regulations 1999

http://www.opsi.gov.uk/si/si1999/19992001.htm

Pressure Equipment (Safety) Regulations 2016

https://www.legislation.gov.uk/uksi/2016/1105/contents

which implements the common European approach:

European Pressure Equipment Directive 2014/68/EU

https://osha.europa.eu/en/legislation/directive/directive-201468eu-pressure-equipment

TB203.1.6 Sprinklers

Sprinklers subjected to contamination, such as those in spray booths, may require frequent attention and replacement may be necessary.

TB203.2 USERS' PROGRAMME OF INSPECTION AND CHECKING (REVISIONS TO BS EN CLAUSE 20.2)

TB203.2.1 General

The installer shall provide the user with a documented inspection and checking procedure for the system. The programme shall include instruction on the action to be taken in respect of faults, operation of the system, with particular mention of the procedure for emergency manual starting of pumps, and details of the weekly routine of TB203.2.2.

Any variations or differences in pressures, settings, timings, equipment duties or capacities noted by the user during the following weekly, monthly or yearly routines shall be reported immediately to the specialist sprinkler maintenance company so that they may consider and advise on any remedial works required to correct these and recommendations on the urgency with which these remedial works need undertaking.

TB203.2.2 Weekly routine

TB203.2.2.1 General

Each part of the weekly routine shall be carried out at intervals of no more than seven days.

TB203.2.2.2 Checks

The following shall be checked and recorded:

(a) all water, air pressure gauges and pressure transducers readings on installations, trunk mains, pressure tanks and control panels (see Clauses TB210.8.8.5 & TB210.9.14.5);

(b) all water levels in elevated private reservoirs, rivers, canals, lakes, water storage tanks (including pump priming water tanks and pressure tanks);

(c) the correct position of all stop valves which control the flow of water to the sprinkler system(s) from the water supply, up to and including the installation control valves stop valves but excluding the water undertaker's stop valve on a town main supply to the system.

COMMENTARY AND RECOMMENDATIONS ON TB203.2.2.2

The air pressure in the pipework in dry, alternate and pre-action installations should not fall at a rate of more than 1.0 bar per week or at a rate specified by the manufacturer, whichever is the lesser.

Content gauges on water storage tanks should be checked monthly to ensure they are registering the correct water content (refer to Clause TB203.2.3.4 on checking the actual stored water volume).

TB203.2.2.3 Water motor alarm test

Each water motor alarm shall be sounded for no less than 30s.

COMMENTARY AND RECOMMENDATIONS ON TB203.2.2.3

Where the mechanical alarm gong does not exist, the test covered in TB203.2.2.3 shall still be conducted to verify the electrical alarm system functions correctly and the alarm valve has been exercised.

TB203.2.2.4 Automatic pump starting test

Tests on automatic pumps shall include the following;

(a) water pressure on the starting device shall be reduced, thus simulating the condition of automatic starting;

(b) when the pump starts, the starting pressure shall be checked and recorded;

(c) check that there is cooling water flowing through open circuit cooling systems

(d) check diesel pump oil pressure;

(e) fuel and engine lubricating oil levels in diesel engines shall be checked;

(f) check the correct operation of any automatic ventilation louvres;

(g) Electric pump shall be run for a minimum of 15 minutes, or for the time/interval recommended by the supplier, whichever is the greater. The pump shall not be left unattended at any time while being tested.

TB203.2.2.5 Diesel engine restarting test

Immediately after the pump start test of TB203.2.2.4, diesel engines shall be tested as follows:

(a) the engine shall be run for 30 minutes, or for the time/interval recommended by the supplier, whichever is the greater. The engine shall then be stopped and immediately restarted using the manual start test button. Diesel engine driven fire pumps shall not be left unattended at any time while being tested. The test operative(s) should ensure that they remain in a safe position for the duration of the test so that they can respond accordingly in a safe manner in the event of pump issues;

(b) the water level in the primary circuit of closed circuit cooling systems shall be checked.

Oil pressure (where gauges are fitted), engine temperatures and coolant flow shall be monitored throughout the test. Oil hoses shall be checked and a general inspection made for leakage of fuel, coolant or exhaust fumes.

TB203.2.2.6 Trace heating and localised heating systems

Heating systems to prevent freezing in the sprinkler system shall be checked for correct function.

COMMENTARY AND RECOMMENDATIONS ON TB203.2.2.6

This may include for example, where relevant the ambient heaters/controls in sprinkler control valve chambers, in sprinkler pump rooms and the immersion heater/controls near ball float valves in sprinkler water storage tanks.

TB203.2.2.7 *Fire and rescue service and remote central station alarm connection*

The equipment for automatic transmission of alarm signals from a sprinkler installation to a fire and rescue service or remote manned centre (see BS EN 16.3) shall be checked for:

(a) continuity of the connection; and

(b) continuity of the connection between the alarm switch and the control unit, if the circuits are continuously monitored.

Also refer to TB236 and in particular, clause TB236.1.2 regarding verifying remote central station alarm connections.

TB203.2.3 Monthly routine

TB203.2.3.1 *General*

Each part of the monthly routine shall be carried out at intervals of no more than one calendar month in addition to the tasks identified in the weekly routine (TB203.2.2).

TB203.2.3.2 *Batteries*

Check the electrolyte level of all battery cells, (including diesel engine starter batteries and those for control panel power supplies) and carry out all other maintenance procedures specified by the battery manufacturer. Check the battery charging voltage and make sure it has not changed. Report any changes to the sprinkler service contractor.

TB203.2.3.3 *Water storage tank security*

The removeable lower section of the access ladder to sprinkler water storage tank shall be checked to ensure it is removed from the tank and stored in a conveniently located and suitably secure housing for authorised use only. Check the tank ball float valve housing cover/lid is closed, secured, and locked and there are no openings in either this ball float valve housing or the tank roof which would allow sunlight to enter the tank, encouraging the growth of algae/moss etc.

TB203.2.3.4 *Water storage tanks contents check*

Verify the water storage content gauge is registering the correct water level by lifting the ball valve housing cover and checking the actual water level in the tank.

TB203.2.4 Yearly routine

TB203.2.4.1 *Sprinkler inspection (BS EN Clause 21 and Annex Q)*

The sprinkler system shall be periodically inspected by a qualified person at least once a year. The inspection report shall assess whether the system is in accordance with this standard, with regard but not limited to maintenance, operation and adequacy for the risk. Where appropriate, a list of deviations shall be issued for action. The criticality of each action shall be identified.

When performing periodic inspection, it shall be undertaken by an independent body, e.g. not the system owner, building occupier, system installer (or competing installer) or service and maintenance provider (or competing service and maintenance provider).

The qualified person is a designated individual, suitably trained, competent through knowledge with experience of all aspects of the LPC Rules for Automatic Sprinkler Installations 2015 incorporating BS EN 12845 in order to assess system compliance to standard and be able to perform practical tests if required.

COMMENTARY AND RECOMMENDATIONS ON TB203.2.4.1

Inspections shall be undertaken by a suitably qualified independent body.

Inspections undertaken by insurers for their commercial and underwriting purposes cannot be assumed to fulfil the intent of this requirement.

TB203.3 SERVICE AND MAINTENANCE SCHEDULE (REVISIONS TO BS EN CLAUSE 20.3)

TB203.3.1 General

The tasks identified in this section shall be undertaken by a competent person, eg by an engineer from a sprinkler servicing contractor.

TB203.3.1.1 Procedures

In addition to the schedule given in this clause, any procedures recommended by component suppliers shall be carried out.

Diesel engines shall be serviced and maintained in accordance with the manufacturers' recommendations.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.1.1

Appendix A of TB203 provides a schedule of the minimum routine tasks which are considered necessary to fulfil this requirement for fire pumps and associated equipment.

TB203.3.1.2 Records

A signed, dated report of the inspection shall be provided to the user and shall include advice of any rectification carried out or needed, and details of any external factors, eg weather conditions, which may have affected the results.

TB203.3.2 Quarterly routine

TB203.3.2.1 General

The following checks and inspections shall be made at intervals of no more than 13 weeks, and shall include all the tasks identified in the weekly (TB203.2.2) and monthly (TB203.2.3) routines.

TB203.3.2.2 Review of hazard

The effect of any changes of structure, occupancy, storage configuration, heating, lighting or equipment of a building or hazard classification or installation design shall be identified in order that the appropriate corrective action may be taken immediately.

The review shall be carried out by one of the following procedures:

(a) an inspection by a competent person, for example by an engineer from a sprinkler servicing contractor; or

(b) the user shall submit a completed return to the sprinkler servicing contractor detailing any changes as specified in TB203.3.2.3.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.2.2

Review of hazard should be a continuous process undertaken by the user. Where changes occur that might change the effectiveness of the sprinkler protection, immediate remedial action should be taken. At quarterly intervals the process should be formalised either by a review by a competent person or by submission of a completed return to the sprinkler servicing contractor responsible for the review of hazard during the yearly routine as specified in TB203.3.4.

The quarterly review of hazard may be undertaken by a competent person who is not an employee of the user, for example an engineer from a sprinkler servicing contractor.

TB203.3.2.3 *Details*

The entire premises should be checked thoroughly during the review of hazard which shall include the following:

- Have any structural alterations been made since the last review which necessitate modifications to the sprinkler system (including low level office installation and partition relocation)?
- Are there any new buildings, mezzanines or extensions?
- Has there been a change of use to all or any part of the protected building?
- Is the ambient temperature range still within acceptable limits for the design of the sprinkler system?
- Has any painting or decoration been undertaken since the last inspection?
- Are frost protection measures adequate?
- Have there been any significant changes to plant or equipment (quantity and location), or changes in production?
- Is the storage type still consistent with the sprinkler system design (ie free-standing storage has not changed to rack storage)?
- Is the design of the rack sprinklers consistent with the storage category?
- Are flues (horizontal and vertical) within the storage racks kept clear as designated by the design requirements?
- Are minimum clearances maintained between stored items and sprinkler heads (See BS EN Clause 12.1 and 12.5.1)?
- Has the nature of goods stored or their packaging changed? Does this alter the category of stored goods?
- Have there been any changes to storage arrangements (plastic pallets, shelving, drum dollies, boxes or totes)?
- Have there been any changes in storage height?
- Where a smoke or heat detector system interacts with a sprinkler system, is a suitable maintenance contract in force?
- Have there been any problems with the sprinkler system?
- Have there been any alterations to the sprinkler system?

TB203.3.2.4 *Flow alarms*

Flow alarm devices (flow switches and/or pressure switches) in systems designed and installed to comply with Annex F shall be checked for correct function.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.2.4

Flow switches in systems designed and installed to comply with Annex F may be in inaccessible locations and therefore difficult to test. Flow switch functional tests in systems designed and installed to comply with Annex F should be carried out by a competent person, for example an engineer from a sprinkler servicing contractor.

TB203.3.2.5 *Float valves on water storage tanks*

Float valves on water storage tanks to be checked to ensure they are free from corrosion/debris and they function correctly. Operate the arm of the float valve to simulate a drop of water level in the sprinkler tank to verify the float valve opens and closes to control the inflow correctly.

TB203.3.2.6 *Water storage tanks*

Water storage tanks shall be checked for integrity, condition, damage and for any evidence of water leakage. The tank shell, ball float valve housing, tank roof and any flashing shall be visually checked to ensure there are no loose, missing or excessively corroded sections and there is no evidence of any areas of roof collapse. Any internal tank roof support purlins or wind bracing steels should be visually checked, where possible, to assess their condition. Where water storage tanks are fitted with internal liners, a visual check shall be undertaken to assess whether there is any evidence of shrinkage. If any of these visual inspections indicate a need, arrange for a full tank inspection in accordance with TB203.3.5.2 by either a) the original water storage tank manufacturer; b) a manufacturer of water storage tanks with proven knowledge and experience of similarly designed and constructed tanks; or c) a specialist water storage tank inspection/maintenance contractor. Any remedial works identified during this inspection shall be undertaken by one of the aforementioned parties as necessary.

TB203.3.2.7 *Flushing of underground sprinkler trunk mains*

Underground trunk main(s) which have not previously been flushed or, where there is no record the main(s) has previously been flushed, or where any of the conditions listed in Table TB237.T2 apply, shall be flushed in accordance with TB237.

TB203.3.3 Half-yearly routine

TB203.3.3.1 *General*

The following checks and inspections shall be made at intervals of no more than six months and shall include all the tasks identified in the weekly (TB203.2.2), monthly (TB203.2.3) and quarterly (TB203.3.2) routines.

TB203.3.3.2 *Alarm valves*

The moving parts of dry alarm valves, pre-action valves, and any accelerators and exhausters, shall be exercised in accordance with the suppliers' instructions.

TB203.3.3.3 *Water supplies*

Each water supply shall be tested to verify pressure and flows.

Where flow test equipment is installed at the installation control valve sets, they shall be tested to verify the pressures and flows specified are achieved.

Pump(s) if fitted shall start automatically. It shall be verified that both pump starting pressure switches operate correctly.

Each water supply pump in the installation shall be tested at the full load condition (by means of the test line connection coupled to the pump delivery branch downstream of the pump outlet non-return valve) and shall give the pressure/flow values stated on the nameplate.

Appropriate allowances shall be made for pressure losses in the supply pipe and suction tank head gain.

Low water level switches in suction lift header tanks shall be tested for correct function.

TB203.3.3.4 *Electrical supplies*

Any secondary electrical supplies from diesel generators or other sources shall be verified by the user to the sprinkler service contractor to be operating satisfactorily.

TB203.3.3.5 *Stop valves*

All stop valves controlling the flow of water to sprinklers shall be operated to ensure that the stop valve and any monitoring are in working order, and securely refastened in the correct mode. This shall include the stop valves on all water supplies, at the alarm valve(s) and all zone or other subsidiary stop valves.

TB203.3.3.6 *Pressure transducer calibration*

The pressure displayed on the sprinkler pump controller shall be compared with:

- The correlating pressure gauges for the sprinkler pump control, or
- Another pressure transducer (where more than one sprinkler pump is installed)

Pressure transducers shall be periodically checked for accuracy against suitably calibrated equipment, such as a Druck meter or similar. Any discrepancies found shall be corrected as appropriate.

TB203.3.3.7 *Sprinkler pumps*

Sprinkler fire pumps shall be maintained in accordance with the service levels outlined in TB203 Appendix A, listed under the '6 months Interim' routines, where appropriate.

TB203.3.4 Yearly routine

TB203.3.4.1 *General*

The following checks and inspection shall be made at intervals of no more than 12 months and shall include all the tasks identified in the weekly (TB203.2.2), monthly (TB203.2.3), quarterly (TB203.3.2) and half yearly (TB203.3.3) routines.

TB203.3.4.2 *Diesel engine failed-to-start test*

The failed-to-start alarm shall be tested to be in accordance with TB210.9.7.2.

Immediately after this test, the engine shall be started using the manual starting system.

TB203.3.4.3 *Float valves on water storage tanks*

Water storage tank float valves shall be maintained in accordance with the manufacturers' instructions and checked to ensure they function correctly.

TB203.3.4.4 *Review of hazard*

Where the quarterly review of hazard (TB203.3.2.2) takes the form of returns submitted by the user, at least one review per year shall be carried out by a site visit by a competent person, for example an engineer from a sprinkler servicing contractor reporting on details defined in clause TB203.3.2.3.

TB203.3.4.5 *Sprinklers, multiple controls and sprayers*

Sprinklers, multiple controls and sprayers affected by deposits (other than paint) shall be carefully cleaned. Painted or distorted sprinkler heads, multiple controls or sprayers shall be replaced.

Any petroleum jelly coatings shall be checked. Where necessary the existing coatings shall be removed and the sprinklers, multiple controls or sprayers shall be coated twice with petroleum jelly (in the case of glass bulb sprinklers to the sprinkler body and yoke only).

TB203.3.4.6 Pipework and pipe supports

Pipework and hangers shall be checked for integrity and condition and rectified or replaced as necessary.

Bitumen-based paint on pipework, including the threaded ends of galvanized pipework and hangers, shall be renewed as necessary.

Protective wrapping on pipes shall be repaired as necessary.

Verify with the user that the sprinkler system is satisfactorily earthed. Sprinkler pipework shall not be used for earthing electrical equipment and any earthing connections from electrical equipment shall be removed and alternative arrangements made.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.4.6

Bitumen-based paint may need renewal at intervals varying from one to five years, according to the severity of the conditions.

TB203.3.4.7 Replacement parts

The number and condition of replacement parts held as spare shall be checked.

TB203.3.4.8 Fire and rescue service and remote central station alarm

The electrical installation shall be checked.

TB203.3.4.9 Water supply stop valves, alarm and non-return valves

a) Stop valves controlling the flow of water to the sprinkler system shall be functionally tested to verify they are operating correctly and stop the flow of water downstream of this valve when closed. If this test shows water continues to flow downstream of the stop valve when closed, the valve shall either be dismantled, overhauled, and refurbished, or replaced with a new valve.

b) Alarm valves shall be internally inspected, cleaned out and the main seat and seal shall be checked for wear. If necessary, replace the clapper seal. Once the alarm valve is re-assembled and the installation is re-charged and put back into service following this routine, open the main drain valve to ensure the alarm valve opens, sounds the hydraulic gong, and functions correctly.

c) Non-return valves in the sprinkler mains flowing water to the sprinkler system shall be functionally tested to verify they are operating correctly and allow the water to flow downstream, but, stop the backflow of water upstream. If this test shows either water does not flow through the valve into the downstream pipework, or, does not prevent the flow of water upstream of the non-return valve, the valve shall either be dismantled, overhauled, and refurbished, or replaced with a new valve.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.4.9

Functionally testing stop valves may involve closing the stop valve, draining some pressure, or all the water, from the pipework downstream of the stop valve and checking there is no increase in pressure or flow of water into the pipework downstream of the stop valve.

Functionally testing non-return valves may involve draining water from upstream of the non-return valve to ensure the non-return valve prevents a flow of water into the upstream pipework plus, draining water from the pipework downstream of the valve to verify the non-return valve opens and refills/pressurises the pipework downstream of the non-return valve.

TB203.3.4.10 *Pump suction chambers and screens*

In natural water supplies, settling chambers and screens shall be taken out and inspected as necessary.

TB203.3.4.11 *Flow alarms*

Flow alarm devices (flow switches and/or pressure switches), other than those fitted to systems covered under Annex F, shall be checked for correct function.

TB203.3.4.12 *Performance verification for Dry, Alternate and Type A & B pre-action mode sprinkler installations*

The 'Functional Test' procedure outlined below shall be carried out to exercise the moving parts of dry and alternate valve sets, pre-action valves and any accelerators and exhausters and to ensure all monitoring alarms and fire signals are transmitted and function correctly.

Where a downstream stop valve is fitted, the procedure outlined below shall be carried out with this downstream stop valve closed to prevent water flowing into the system pipework during the test.

For installations without this downstream stop valve, the alarm valve suppliers'/ manufacturers' instructions shall be followed to prevent water flowing into the system pipework during this test.

(a) Performance tests of Dry and Alternate installations shall be undertaken to ensure the alarm valve opens/can be tripped by simulating the opening of one sprinkler head.

(b) Performance tests of Type B Pre-Action installations shall be undertaken to ensure the alarm valve opens/can be tripped using both the fire detection activation signal and the manual trip valve separately to ensure both means of actuation and all relevant alarm signals function correctly.

(c) Performance tests of Type A Pre-Action installations shall be undertaken to ensure:

- the pre-action installation control valve set remains closed when the monitoring air pressure is released from the downstream installation pipework, and
- the pre-action installation control valve and associated alarms all operate and function correctly in response to a simulated fire signal from the fire detection system.

The results of these performance tests shall be recorded in the log book provided for the system.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.4.12

For alternate systems, this functional test should be undertaken at the same time as the system is 'changed-over' from dry to wet state as the water can be allowed to flow into and remain in the installation pipework after the test has been completed.

TB203.3.4.13 *Sprinkler pumps*

Sprinkler fire pumps shall be maintained in accordance with the service levels outlined in TB203 Appendix A, listed under the '12 months Annual' routines, where appropriate.

TB203.3.5 Two-yearly routine

TB203.3.5.1 *General*

The following checks and inspections shall be made at intervals of no more than two years and shall include all the tasks identified in the weekly (TB203.2.2), monthly (TB203.2.3), quarterly (TB203.3.2), half yearly (TB203.3.3) sections and yearly (TB203.3.4) routines.

TB203.3.5.2 Water storage tanks and cisterns

The following works, together with any tank manufacturer's applicable additional tasks which may not be listed below, shall be carried out either by a specialist sprinkler water storage tank manufacturer or a specialist sprinkler water storage tank inspection/ refurbishment contractor:

(a) Inspect and examine internally and externally for corrosion and fitness for purpose, including but not necessarily limited to:

i. verify the tank Rating Plate is fixed to the tank detailing all the information required under LPS 1276, Section 9.

ii. where tanks are formed from bolted or welded steel panels, handrails etc and/or steel access manways, carry out an assessment survey of the thickness of the tank panels, handrails, access manway door and opening (e.g. using ultrasonic thickness meters/gauges capable of measuring to an accuracy of +/- 0.01mm with both Pulse Echo mode and Echo to Echo mode or alternative method to the same degree of accuracy), particularly near to where there is any evidence of corrosion, and review the results with the tank manufacturer, or carry out structural calculations and compare against the original design thicknesses/structural calculations to verify the structural integrity of the tank is still adequate for ongoing service of the tank. Other structural elements of the tank such as roof support purlins, wind or internal support bracings/tie bars and bolts connecting individual tank panels together (particularly where internal flanged sectional tank panels are involved) which cannot be accessed without draining the tank shall be visually inspected where possible and if there is sufficient evidence of corrosion to indicate a need or, where Clause TB203.3.7 is applicable, arrangements shall be made to carry out an assessment survey of the thickness of these steel members and review the results with structural calculations, all as outlined above.

iii. where tanks and roof cover are formed from GRP sectional panels or fibreglass, check each panel carefully for signs of any evidence of cracking of the panels and their connecting flanges. Any steel support columns, internal or external bracing reinforcing the tank walls shall be checked and if there is sufficient evidence of corrosion to indicate a need, carry out an assessment survey of the thickness of these steel members and review the results with structural calculations in accordance with item ii above.

iv. check the tank exterior for damage or signs of leakage/rust stains from the tank shell, the tank connections or around the base of the tank.

v. ensure there are no stored materials or vegetation around the perimeter of the tank which has or could cause damage to the tank, or obstruct access to check, inspect and maintain the tank.

vi. check whether any debris/accumulation of silt in the bottom of the tank could adversely affect the performance of the sprinkler system, or whether the rate of accumulation since the last two-yearly routine indicates there is a risk this could adversely affect the performance of the sprinkler system in the near future. If it is considered that the level of debris/accumulation of silt could adversely affect the performance of the sprinkler system in the near future, or, prior to the next scheduled two-yearly routine, then this debris/silt shall be cleaned out of the tank. Also check the condition of any protective internal coating or mastic sealing to the tank shell.

vii. check all fixing to the tank shell of all internal/external connections, pipework supports, access ladders, access platforms, handrails, and any primary steelwork such as roof support purlins or wind bracing members.

viii. check the overall condition of all access ladders and cages, platforms, and all handrails.

ix. check the condition of any internal tank liners for deterioration, shrinkage, or punctures, particularly around connection points.

x. visually check the exposed areas of the tank foundations for signs of cracking/settlement, or in the case of sectional panelled bolted tanks which are typically supported on steel beams on concrete or brick piers, check the steel supports for signs of corrosion and, if necessary, verify with structural calculations and visually check the condition of the concrete/brick piers.

xi. check all pipe/associated equipment connections to the tank wall/liner are fixed properly to provide a watertight seal and all flange connections have the correct number and size of bolts fitted.

xii. check all overflows and Type A air gap arrangements have vermin mesh fitted and ensure the mesh is cleaned/free from obstruction.

xiii. check, exercise and if applicable lubricate the tank drain valve and ensure it is suitably protected against freezing.

xiv. if the pump suction connection inside the tank is fitted with a vortex inhibitor or strainer, ensure this is properly fitted to the end of the internal suction pipe and adequately supported, and check there is no extraneous material inside this internal suction pipe.

xv. if access manway was not part of the original tank construction, review the size, shape, thickness of the door plate and opening flange arrangement together with the number and size of flange bolts with either the original tank manufacturer or by carrying out structural calculations against the original design thicknesses/structural calculations to ensure this addition does not undermine the integrity of the tank structure.

xvi. check the operation of the inlet float valve functions correctly, that the float arm travel is not impeded, and the water shut-off level is appropriate to ensure the maximum stored water level can be achieved.

xvii. where any float level switches are fitted through the tank wall check these operate correctly and the appropriate alarm is transmitted/received before the tank is refilled.

xviii. prepare and issue to the system owner/user, a fully detailed 'Inspection/ Condition Report' for the/each sprinkler water storage tank outlining the findings (with photographs) for each of the above inspection items, detailing any remedial works completed and highlighting any remedial works still required to be carried out with recommended timescales to completion of such works. The report should also provide clear recommendations for the period for re-inspection where this is considered necessary prior to the next scheduled 'Two-yearly routine'.

(b) if the condition or cleanliness of the tank indicate the need, the tank shall be drained, cleaned as necessary and examined internally and externally, generally in accordance with the aspects listed in TB203.3.5.2 a) and have the fabric attended to as necessary and restored in accordance with the manufacturers' recommendations.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.5.2

Submersible, remotely operated camera equipment (ROVs) provide a useful and relatively economical means of conducting an initial condition assessment of the accessible areas and parts of water storage tanks and cisterns, without the need to either drain the water from the tank or for divers to enter the tank. Limitations upon what can be discerned from a two dimensional remotely obtained image must be considered and the information gained from initial condition assessments carried out in this way may still show a need to drain the tank to either, further investigate parts not viewable with the submersible camera or, to carry out remedial works if the images obtained indicate a need. Such inspections cannot substitute a full structural survey or the requirement to drain the tank, as detailed in TB203.3.8.

Significant tank refurbishment works should generally aim to restore the tank to a condition and structural integrity at least equivalent to that originally installed and consistent with applicable tank approval criteria. Works and structural survey should be carried out by suitably competent and experienced suppliers. Works undertaken should be compatible with the design of the tank. For example, fitting a liner to a previously unlined tank may not be appropriate, as corrosion problems due to condensation formation between the tank and the liner may occur. Fitting a liner will not improve the structural integrity of the tank shell and may even conceal further depreciation in the tank shell condition which could result in the collapse of the tank without any prior indication of leakage. Scope of works should be agreed with the owners and Authorities (including fire insurers).

TB203.3.5.3 *Sprinkler pumps*

Sprinkler fire pumps shall be maintained in accordance with the service levels outlined in TB203 Appendix A, listed under the '24 months Biennial' routines, where appropriate.

TB203.3.6 Three-yearly routine

TB203.3.6.1 *General*

The following checks and inspections shall be made at intervals of no more than three years and shall include all the tasks identified in the weekly (TB203.2.2), monthly (TB203.2.3), quarterly (TB203.3.2), half yearly (TB203.3.3) sections and yearly (TB203.3.4) routines.

TB203.3.6.2 *Pump suction chambers, screens and strainers*

In natural water supplies, pump suction strainers and settling chambers and their screens shall be inspected and cleaned as necessary.

TB203.3.6.3 *Foot valves*

Foot valves shall be serviced.

TB203.3.6.4 *Performance verification for Dry, Alternate and Type A & B pre-action mode sprinkler installations*

The 'full trip test' procedure outlined below shall be carried out to fully operate the dry and alternate alarm valve sets, pre-action valves and any accelerators and exhausters, and to ensure all monitoring alarms and fire signals are transmitted and function correctly, all as they would operate/function under a fire condition, allowing for water to enter the sprinkler system piping and in accordance with the alarm valve suppliers'/manufacturers' recommendations.

(a) Performance tests of Dry and Alternate installations shall be undertaken as specified in TB208.3.5 (as further detailed in TB208.4.1).

(b) Performance tests of Type B Pre-Action installations shall be undertaken as specified in TB208.5.3 using both the fire detection activation signal, and the manual trip valve separately to ensure both means of actuation and all relevant alarm signals function correctly.

(c) Performance tests of Type A Pre-Action installations shall be undertaken to ensure:

- the pre-action installation control valve set remains closed when the monitoring air pressure is released from the downstream installation pipework, and
- the pre-action installation control valve and associated alarms all operate and function correctly in response to a simulated fire signal from the fire detection system.

The results of these performance tests shall be recorded in the log book provided for the system.

TB203.3.6.5 Water supply stop valves, alarm and non-return valves

Unless required more frequently by the manufacturer:

a. If the functional test detailed in TB203.3.4.9 a) shows a stop valve is not operating correctly, the stop valve shall be dismantled, examined internally, and overhauled as recommended by the manufacturer or, if necessary, replaced with a new valve,

b. All alarm valves shall be dismantled, examined internally, and overhauled as recommended by the manufacturer or, if necessary, replaced with a new valve,

c. All non-return valves shall be dismantled, examined internally, and overhauled as recommended by the manufacturer or, if necessary, replaced with a new valve.

TB203.3.7 Five-yearly routine

TB203.3.7.1 Dry pendant pattern sprinkler heads

Representative samples of the oldest or 'worst condition' dry pendant pattern sprinkler (those with a dry drop pipe section) shall be removed at regular intervals for functional testing. The minimum sample size shall be 5% or twenty heads (whichever is the greater) of each batch of dry pendant pattern sprinkler heads installed on site. Testing shall be undertaken at the intervals specified by the manufacturer. If no such interval is specified then testing shall be undertaken at intervals of five years or less.

The testing shall be undertaken as specified in TB203.3.9.3.

TB203.3.7.2 Flushing of underground sprinkler trunk mains

Underground trunk main(s) on sprinkler systems drawing water from open reservoirs/ water courses, shall be flushed in accordance with TB237.

(Note: refer to clause TB203.3.9.4 for ongoing flushing requirements at five-yearly intervals of underground trunk main(s) on sprinkler systems supplied only by potable water after systems have been in service for 25 years).

TB203.3.8 Ten-yearly routine

TB203.3.8.1 Water storage tanks

At no more than ten yearly intervals the following works, together with any tank manufacturer's applicable additional tasks which may not be specifically referred to below, shall be carried out either by a specialist sprinkler water storage tank manufacturer or a specialist sprinkler water storage tank inspection/refurbishment contractor:

(1) Drained

(2) Cleaned as necessary

(3) Examined internally and externally as detailed in TB203.3.5.2 a). Submersible, remotely operated camera equipment (ROVs) shall not be used for examination of tanks which have been in service for ten years

(4) Have the fabric attended to as necessary and restored in accordance with the manufacturers' recommendations

(5) Based on the findings of the works carried out in these items 1) to 4) above, the insurers shall be consulted to agree an appropriate ongoing service period before the tank shall be drained, cleaned and examined again. This ongoing service period would be expected to be less than the original ten-year service period.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.8.1

Loss Prevention Standard LPS 1276 outlines the 'Requirements for the LPCB certification and listing of above ground suction tanks for sprinkler systems'.

Water storage tanks complying with LPS 1276 are designed and protected against corrosion such that the need for emptying the tank for maintenance is expected to be for an initial service period of not less than ten years, when subjected to both normal ambient conditions and routinely inspected in accordance with this Technical Bulletin.

This ten-year service period should not be confused with the manufacturers' product guarantee period, which typically may be limited to only one year.

It should also not be assumed that water storage tanks which are refurbished after the initial service period will provide a further ten-year service period before any further draining, cleaning or refurbishments are required.

Significant tank refurbishment works should generally aim to restore tanks to condition and structural integrity to at least equivalent to that originally installed and consistent with applicable tank approval criteria. Works and structural survey should be undertaken by suitably competent and experienced suppliers. Works undertaken should be compatible with the design of the tank. For example, fitting a liner to a previously unlined tank may not be appropriate, as corrosion problems due to condensation formation between tank and liner may occur. Fitting a liner will not improve the structural integrity of the tank shell and may even conceal further depreciation in the tank shell condition which could result in the collapse of the tank without any prior indication of leakage. Scope of works should be agreed with owners and Authorities (including fire insurers).

TB203.3.8.2 *Flushing of underground sprinkler trunk mains*

Underground trunk main(s) on sprinkler systems supplied only by potable water, shall be flushed in accordance with TB237.

TB203.3.9 After 25 years (or sooner if considered necessary by system condition) (replaces BS EN Annex K)

In addition to the routine service and maintenance activities specified elsewhere in this document, the provisions and activities specified in TB203.3.9 shall be undertaken as required and at intervals not greater than those specified herein. All defects detected which might adversely affect the performance of the sprinkler system shall be eliminated.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.9

These requirements are considered to be minimum requirements. Where any deviation from these requirements is considered as may be appropriate to the circumstances, the insurer (and authority, if applicable) shall be consulted upon the acceptability of the proposed variation on a case-by-case basis.

TB203.3.9.1 *Inspection/flushing points downstream of the alarm valve(s) (replaces and supplements parts of annex K)*

Once the system has reached the age of 25 years (or sooner if necessitated by diminished performance or detected by other means), a flushing connection at the remote end of the distribution pipe array shall be opened until the water runs clear. For installations comprised of several terminal pipe arrays this may need to be repeated for each section until the engineer is satisfied that all have been adequately flushed. Systems with multiple installations shall have every installation re-inspected and flushed at frequencies determined by on-site findings/results, but at intervals of no more than every ten years.

Findings from this exercise as detailed within this clause, shall be reported and discussed with the authority including the building insurer to determine the frequency levels.

TB203.3.9.1.1 Pipework Inspection

As a minimum, a 1m length of each pipe diameter within each installation and from each area of the building(s) where different environments/conditions or where differing pipe specifications or finishes have been applied, which could affect the rate of deterioration/ corrosion of the pipework (e.g. office areas, ceiling voids, plantrooms, external areas, underside of exposed roof structures etc.) shall be removed and replaced with new pipe to enable a visual internal and external inspection for the presence of any foreign bodies or evidence of microbial activity (e.g. presence of tubercles).

This inspection shall be documented (with photographic evidence) of each pipe inspected together with location information and be made available to all interested parties. All pipework removed that is considered adequate/acceptable shall be retained on site for further inspection by the building insurer prior to removal from site. Should the visual internal and external inspection find sufficient foreign matter or pipe corrosion, further analysis of the pipe condition shall be undertaken by an approved accredited independent test laboratory.

If the presence of foreign matter (e.g. bodies with a diameter of 5mm or greater) is found, or any of the following have occurred:

- There is a defect in the water intake arrangements for any non-potable water source;
- Body(s) with breadth of 5mm or greater are discharged in routine water tests;
- Foreign materials (with a breadth of 5mm or greater) are found in pumps, check valves or alarm valves;
- Blocked sprinklers;
- Blocked piping found or occurring as a result of building or installation modifications;
- Failure to flush underground piping (including towns mains) prior to commissioning or following modification;
- Repeated nuisance activity of dry alarm valves;
- Persistent pin hole leaks;
- Dry systems; any increase in the time it takes for water to reach the remote test valve (BS EN 15.5.2) reference to the original commissioning value

Then steps shall be taken to ensure that all contaminants and debris are removed from all potentially affected system installations (installations sharing or with communicating water supplies). System performance shall be verified.

In wet installations sample sprinkler heads shall be removed from the near end of range pipe, for installations that can operate in the dry mode, sprinkler heads shall be removed from the most remote range pipe that is not fitted with a remote test valve.

Refer to TB237 for requirements and guidance of flushing underground mains.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.9.1.1

Corrosion of sprinkler pipework commonly first appears as pin hole leaks, therefore non-destructive testing (NDT) using ultrasonic detection, methods where only small localised pipe wall samples are tested, or the use of investigative camera technology would not be considered comprehensive enough to adequately assess the overall condition of the installation pipework.

Furthermore, such testing does not assess any internal blockage of pipework, condition of the pipe joints (e.g. threads and grooves) and the effects of the future performance of the system.

TB203.3.9.2 *Pressure testing (replaces parts of Annex K)*

The pressure test recommended by Annex K is not recommended by this technical bulletin.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.9.2

Following the replacement of pipework and sprinklers that have been removed for inspection and testing, the installation requires carefully re-commissioning. This should include appropriate inspection and testing to identify any leaks. In such circumstances, pressure testing shall be subject to the agreement of the client and all authorities having jurisdiction.

TB203.3.9.3 *All sprinkler heads (replaces parts of Annex K)*

At 25 years (or sooner if required by sprinkler head approval conditions, the manufacturer's specification, or the condition of the sprinkler heads indicate a need) a number of sprinkler heads shall be removed by a competent sprinkler maintenance provider from various locations within the building where different environments/conditions exist (e.g. ceiling voids, plantrooms, canopies, racking, etc), including sprinklers from the spares box. Identification of the locations where sprinklers have been removed shall be recorded and made available to all interested parties (including the building insurer). Dry drop pendant heads shall also be removed for testing, but at reduced intervals (see TB203.3.7). The sprinkler heads shall be inspected and tested by an independent test house. The number of sprinkler heads required to be tested will vary depending on the site and the differing environmental conditions across the premises through which the sprinkler system is installed.

Light/Ordinary Hazard occupancies (offices, schools, retail etc):

- Where there are different types of sprinkler heads installed on the system (or different environments) which have been in service for 25 years, a **minimum of 10 sprinkler heads of each different type/location** shall be removed from the installed system and tested.
- Sprinklers from the spares cabinet that are 25 years or more from the date of manufacture shall be replaced with new.
- Where there are less than 10 sprinklers of a single type that are over 25 years, these shall be replaced with new.

High Hazard Storage and Process occupancies:

- Where there are different types of sprinkler heads installed on the system (or different environments) which have been in service for 25 years, a **minimum of 50 sprinkler heads of each different type/location** shall be removed and tested.
- Sprinklers from the spares cabinet that are 25 years or more from the date of manufacture shall be replaced with new.
- Where there are less than 10 sprinklers of a single type that are over 25 years, these shall be replaced with new.

The findings of the visual inspection may be used to vary the testing regime, within the limits that follow. All batches submitted for inspection and testing shall be subjected to:

- Visual inspection (100% of samples)
    - Function testing based upon BS EN 12259-1 clause 4.6
    - Minimum sample numbers: 70% of number specified above
    - Function testing shall normally be undertaken at 0.35 bar
    - Maximum permissible non-operation rate (complete failure to open): 0%

- Maximum permissible lodgement rate ≤1 in 12 (except for ESFR heads, where no lodgements are permissible). Lodgement is considered to have occurred when one or more of the released parts lodge in the deflector frame assembly in such a way as to cause the water distribution to be significantly impeded for a period of more than 1 minute).

Depending on the findings of the visual inspection some of the following tests may be justified (the remaining 30% of heads from the sample of heads removed from the installation are retained for this purpose):

- Operating temperatures (to BS EN 12259-1 clause 4.4)
- K-factor (to BS EN 12259-1 clause 4.5.1)
- Water distribution (to BS EN 12259-1 clause 4.5.2)
- Thermal response (to BS EN 12259-1 clause 4.15)

COMMENTARY AND RECOMMENDATIONS ON TB203.3.9.3 – SIGNIFICANCE OF RESULTS

The number and locations of installed sprinklers to be removed and tested should be agreed with the insurers in advance of any works being undertaken.

Sprinkler heads that are observed by visual inspection to have been leaking through the waterway shall be considered unfit for service. All heads showing signs of leakage should be replaced.

Function test failures shall be considered serious failures. In such cases, all heads in an installation representative of those which failed should be replaced. Until this replacement programme has been completed the system shall be considered impaired. The parties (i.e. insurers) and authorities concerned shall be notified and appropriate interim fire safety precautions may need to be taken.

The significance of all other failures varies dependent upon many factors, for example: the original design of the sprinkler heads, the magnitude of the failure, and the nature of the risk to be protected. The appropriate remedial action shall be agreed in consultation with the building owner, occupier(s) and the Authorities.

Failures observed in approved product should always be brought to the attention of the approving bodies. The FPA is also interested in monitoring such occurrences in support of continuous improvement. As such we would appreciate receiving notifications of product failures, with as much detail as possible, which may be emailed to sprinklers@thefpa.co.uk.

TB203.3.9.4 Flushing of underground sprinkler trunk mains

Underground trunk main(s) on sprinkler systems supplied only by potable water, shall be flushed in accordance with TB237 and thereafter every further five years of being in service.

TB203.4 SPRINKLER SYSTEM USER PERSONNEL

TB203.4.1 Appointment of fire safety official by the sprinkler system user

The sprinkler system user shall appoint a competent person who shall be nominated to undertake specified tasks relating to the sprinkler system care and maintenance, who shall receive formal training and instructions, whether permanent or contract staff.

TB203.4.2 Staff responsible for weekly testing and emergency actions

Only appropriately trained personnel shall be permitted to undertake weekly testing of sprinkler systems or emergency actions.

COMMENTARY AND RECOMMENDATIONS ON TB203.4.2

It is important that the appropriate staff, including security staff, within a sprinklered property are given suitable levels of instruction on at least the following:

(a) the purpose of the sprinkler system;

(b) how the system operates in the event of a fire;

(c) what to do if the system operates either in a fire or accidentally;

(d) keeping sprinkler heads clear of obstruction;

(e) the avoidance of damage to sprinkler heads and pipework; and

(f) upkeep of records and documentation.

TB203.5 MAINTENANCE OF DOCUMENTATION

TB203.5.1 Record keeping

Appropriate records including the sprinkler system log book or folder shall be kept on site in a safe and secure location. When requested by the insurer, the records shall be made available by the fire safety official for inspection.

The records shall include the log book or folder for the sprinkler system containing the following information:

(1) finished drawings and hydraulic data/calculations;

(2) proprietary equipment specifications, data sheets, and maintenance requirements, including pump data provided by the pumpset supplier;

(3) maintenance, inspection and test schedules;

(4) where appropriate, the weekly test card;

(5) the sprinkler servicing contractor records and reports;

and, where issued:

(6) Certificates of Conformity/Completion certificate (where issued);

(7) Electronic report of the Pump Data Log events records.

TB203.5.2 Upkeep of records

The records shall be kept up to date. Where changes are made, the following shall be recorded by an appropriate means (for example, by appending to or modifying existing documentation)

(a) details of all alterations;

(b) details of all work and inspections carried out on the sprinkler system;

(c) details of any hazard analysis relevant to the sprinkler protection;

(d) a full and up to date list of emergency contacts, including:

- insurers (both landlord and tenants);
- insurance brokers;
- the property owner or their agent;
- sprinkler servicing company;
- the sprinkler installer;
- the pump suppliers or pump maintenance company;
- electrical contractor;
- alarm receiving station contact numbers;

- suction tank manufacturers;
- sprinkler monitoring equipment.

(e) details of calls to and from the central alarm station, taking the station off watch, restoring the station back on watch and notification of alarms or faults. The details recorded shall include, at least, the nature of the event, date and time of the call, the name of the caller and recipient, and the alarm receiving station reference.

(f) details of staff training.

(g) details of any Pump Data Log events records, where encountered.

(h) an identifiable reference together with any attendance service visit shall be logged on the controller. The controller memory shall retain a minimum of 500 logs. All data events shall be downloaded and provided with the service report within 48 hours. Post servicing data records from the controller shall not be erased.

TB203.6 PLANNING FOR MAINTENANCE

Where maintenance of a sprinkler system or building fabric is anticipated that will result in impairment of the sprinkler protection, a written maintenance plan shall be prepared by the user and agreed with the authorities prior to commencement of the maintenance work. The requirements of BS EN Annex J 'Precautions and procedures when a system is not fully operational' shall be met. If the system is for life safety, see also the requirement of BS EN Annex F 'Additional measures to improve system reliability and availability'.

The following procedures shall be included in the plan:

Before maintenance begins

(1) notification of the authorities (including the insurers) and any central alarm station;

(2) designation of named personnel to undertake specified tasks;

(3) identification of resources required for the maintenance period;

(4) consultation with key personnel;

(5) inspection and review of passive and other active fire protection measures (including fire doors, gaseous extinguishing systems and portable fire extinguishing appliances);

(6) rectification of impaired passive and active fire protection measures;

(7) reduction of stocking levels of hazardous goods (eg flammable liquids, aerosols with flammable contents);

(8) notification to the sprinkler servicing contractor of the company procedures and regulations with which they are required to comply (eg work permits, hot work prohibitions);

(9) considerations to minimising the area of coverage isolated at any one time;

(10) the provision and review of a written method statement prepared by the sprinkler servicing contractor;

(11) procedures ensuring all the necessary tools, equipment and trained personnel are available;

(12) consultation with staff about the work plan, increasing awareness and precautionary measures;

(13) procurement and placement of additional portable fire extinguishing appliances in the affected areas, ensuring that personnel are trained in their use;

(14) issue of permits to commence work;

While maintenance work is in progress

(15) suspension of operations, in particular any hazardous processes, machinery and plant;

(16) smoking controls;

(17) implementation of regular fire patrols;

During and after re-commissioning the system

(18) hydrostatic pressure testing of modified pipework or pipework extensions;

(19) water supply performance tests if changes have been made to the water supply or the water supply connections;

(20) notification to all key staff, authorities and the alarm receiving station of the reinstatement of the sprinkler protection;

(21) checks to establish that all valves, switches and other equipment have been restored to their correct stand-by setting;

(22) provision of a written statement or certificate by the sprinkler servicing contractor and countersigned by the system user signifying that the work has been completed and that the system is fully operational; and

(23) revalidation of any Certificate of Conformity.

(24) an identifiable reference to coincide with commissioning/recommissioning event shall be recorded on the Pump Data Logging facility on the controller.

COMMENTARY AND RECOMMENDATIONS ON TB203.6

Statements and certificates should be filed in the sprinkler system log book.

TB203.7 ACTION ON ALARM AND/OR SPRINKLER OPERATION (SUPPLEMENTS BS EN ANNEX J.4)

TB203.7.1 When the alarm sounds

(a) staff should be instructed to call the fire and rescue service on hearing the alarm and follow the normal fire procedure for the premises. The fire and rescue service should be called, even if there is an automatic fire and rescue service connection, in order to confirm that a call has been received;

(b) only after carrying out (a) should the cause of the alarm be investigated if it appears safe to do so;

(c) on no account (other than the express command of the fire and rescue service) should sprinkler stop valves be closed unless it is certain that there is no fire or that it is out. Even if an extinguished fire is found in one area, the whole building should be searched before the valve is turned off – there may be more than one seat of fire; and

(d) the decision to shut down an installation or zone which has operated because of a fire should be taken only by the fire and rescue service.

TB203.7.2 Reinstatement

TB203.7.2.1 Following sprinkler head activation

Following shutdown after operation of an installation, the operated sprinkler heads shall be replaced by heads of the correct type and temperature rating, and the water supply restored. Unopened sprinklers around the area in which operation took place shall be checked for damage by heat or other cause and replace necessary.

TB203.7.2.2 Water supplies

On reinstatement of the water supply, an identifiable date and time stamp to coincide with recommissioning shall be logged on the controller. This reference shall be easily identifiable in the records.

TB203.7.3 False alarms

Leaks and damaged sprinkler heads can cause the alarm to sound. Repair and reinstatement should be carried out immediately.

False alarms can also be caused by pressure surges in town main water supplies. If this problem occurs the fire insurer should be consulted and the sprinkler servicing contractor should be asked to modify the system as necessary.

TB203.7.4 Actions following sprinkler operation

Components removed from the system should be retained by the user for possible examination by an authority.

TB203.7.5 Incident report

The fire insurer should be informed of any incident whether or not an insurance claim is made.

TB203 APPENDIX A MINIMUM SERVICE LEVELS FOR SPRINKLER FIRE PUMPS AND ASSOCIATED EQUIPMENT

TB203.A.1 The items in the following list are identified as being the expected minimum service levels required in order to maintain pump-sets in compliance with the *LPC Rules for Automatic Sprinkler Installations*. Notes:

- Whilst this checklist serves as a general guide, not all items will be applicable to some makes and models of pump-set. Similarly, some pump-sets may have further maintenance activities specified by the supplier.
- **Reference should always be made to the original equipment manufacturers' specifications and requirements.**
- Service operatives shall have the appropriate competencies and capabilities to complete the work appropriately.
- Waste products from service and maintenance activities shall be disposed of correctly in accordance with environmental and health and safety legislation.
- Upon completion of the works a full copy of the service and maintenance report together with Pump Data Log event records shall be made available to the client.
- Where Pump Data Log event records raise concerns for the fire-pumps, these records shall be highlighted so that preventative maintenance and rectification can be carried out immediately.
- Any issues that could impair the operation of the automatic sprinkler installation, identified during the service and maintenance activity shall promptly be brought to the attention of the client in writing. Comment shall be provided upon the criticality of issues identified so that the client can appropriately prioritise remedial works.

Table TB203.T2

	Installation	Interval		
		6 Months 'Interim'	12 Months 'Annual'	24 Months 'Biennial'
1	Confirm and record equipment details including pump set serial numbers, equipment types and full name plated pump duty details	Y	Y	Y
2	Visually check base plate plinth fixing bolts/packer and re-torque bolts	Y	Y	Y
3	Visually check condition of all equipment guards and ensure correctly secured in place	Y	Y	Y
4	Visually check condition of installation wiring and confirm no discernible defects are present	Y	Y	Y
5	Visually check control panel/starter enclosure and confirm no discernible defects are present	Y	Y	Y
6	Check and record incoming mains supply voltage for electric motor control panel (ie by 'phase healthy' indication and satisfactory pump performance)	Y	Y	Y
6a	Check pressure gauge readings against control panel pressure level	Y	Y	Y
	Pump			
7	Carry out pump set alignment check, record results	Y	Y	Y
8	Visually check and report on condition of pump gland/ mechanical seal whilst stationary	Y	Y	Y
9	Check condition of pump gland packing. As necessary (from inspection findings, engineers report or OEM requirements) replace the pump gland packing		Y	Y

Table TB203.T2				
		Interval		
	Installation	6 Months 'Interim'	12 Months 'Annual'	24 Months 'Biennial'
10	Visually check pump gland leakage rate at duty condition and adjust	Y	Y	Y
11	Visually check and if required top up pump bearing oil level	Y	Y	Y
12	Confirm if pump and motor bearing grease nipples fitted and re-grease	Y	Y	Y
13	Check and clean (by dismantling) the pump differential bypass line assembly	Y	Y	Y
	Motor			
14	Confirm and record motor manufacturer's name plate details	Y	Y	Y
15	Confirm if pump and motor bearing grease nipples fitted and re-grease	Y	Y	Y
	Engine			
16	Confirm and record engine manufacturer's name plate details	Y	Y	Y
17	Check and record hours run for diesel engine driven pump, before and after test	Y	Y	Y
18	Check and clean (by dismantling) diesel engine differential bypass valve cooling line assembly	Y	Y	Y
19	Check, record levels and if necessary top up diesel engine battery electrolyte levels	Y	Y	Y
20	Check condition of diesel fuel. Examples: (a) Confirm with the user that a fuel of a specification suitable for use with the engine is used (see engine requirements, typically diesel fuel conforming to British Standard BS 2869) (b) Confirm suitable fuel storage and filling arrangements (eg. good storage practice observed, protected from moisture or particulate ingress is provided) If not in accordance with the engine manufacturer's requirements advice accordingly. Provide data sheets for correct fuel to be used. Record advice given on a service sheet	Y	Y	Y
21	Visually check and if required top-up the diesel engine oil	Y	Y	Y
22	Replace diesel engine oil and filter		Y	Y
23	Visually check and if required top up the diesel engine coolant mixture	Y	Y	Y
24	Replace diesel engine hoses and engine coolant mixture (as engine manufacturer's requirements)			Y
25	Visually check and report on condition of diesel engine heat exchanger sacrificial anodes (if equipment design permits). Record suitable note on service report if not possible		Y	
26	Replace diesel engine thermostat if engine running temperature indicates this is required			Y
27	Visually check, clean and report on condition of diesel engine air filter	Y	Y	Y
28	Replace diesel engine air filter			Y
29	Visually check and adjust the drive belt tension	Y	Y	Y
30	Replace diesel engine drive belts as required by engine manufacturer			Y

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		Interval		
	Installation	6 Months 'Interim'	12 Months 'Annual'	24 Months 'Biennial'
31	Visually check and report on condition of diesel engine fuel lines and fuel filter	Y	Y	Y
32	Replace diesel engine fuel filter		Y	Y
33	Check and clean diesel engine crank case vent system		Y	Y
34	Visually check and report on condition of engine mounting isolators	Y	Y	Y
35	Where fitted, visually check and if required lubricate diesel engine drive shaft	Y	Y	Y
36	Check engine water pump and seals (check operating temperatures, inspect pump and hoses, remove belt and check for play). Replace water pump if considered necessary			Y
	Jockey Pump Set			
37	Confirm and record pump manufacturer's name plate details	Y	Y	Y
38	Carry out pump set alignment check, record results and confirm if within tolerance (If applicable to pump configuration)	Y	Y	Y
39	Visually check and report on condition of pump gland/ mechanical seal whilst stationary	Y	Y	Y
40	Confirm if motor bearing grease nipples fitted and re-grease	Y	Y	Y
41	Check functionality of pump casing air vent	Y	Y	Y
42	Visually check and record pump-set start and stop pressure (check with client prior to adjusting in case the settings are purposely different to requirements)	Y	Y	Y
43	Check and confirm correct functionality and operation of starter	Y	Y	Y
	Remote Alarm Panel			
44	Confirm whether dedicated Remote Alarm Panel (RAP) installed and it's location	Y	Y	Y
45	Where possible check and confirm functionality of Remote Alarm Panel with assistance from the client's representative	Y	Y	Y
	Fire Pump Testing			
46	Record pump set start/cut in pressure	Y	Y	Y
47	Conduct pump set performance test including:			
48	• Pump test to be conducted under load, minimum running time of 15mins for electric and 30mins for diesel	Y	Y	Y
49	• Record results at closed valve and at least five additional flow rates, between closed valve and name plate flow rate	Y	Y	Y
50	• Record pump suction pressure and discharge pressure, indicating the location of the pressure gauges	Y	Y^	Y
51	• Check and confirm pump shaft speed and engine rev counter speed at each flow rate	Y	Y	Y
52	• Check and confirm motor current at each flow rate using calibrated clamp meter or similar	Y	Y	Y
53	• Check and record engine oil pressure, engine water temperature and exhaust gas colour at nameplate flow rate.	Y	Y	Y