TB203 (2009 draft) - Care and Maintenance of Sprinkler Systems

Replaces BS EN Clause 20 - Maintenance
Implementation date TBA

203.0 Background & Introduction

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

It has been decided that whilst some BS EN clauses concerning maintenance fall short of what is required, it would be preferable for stakeholders if proven maintenance practices were maintained. 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 BS5306-1 edition of the rules and new recommendations from the industry.

This issue of TB203 replaces TB203:2004 and should be applied in place of BS EN 12845: 2003 – 20 Maintenance and BS EN 12845: 2004 – 20 Maintenance.

This version of TB203 has adopted the same headings and structure as BS EN 129845 – 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 →TB210.1 General;

• BS EN 12845 clause 20.2 User's programme of inspection and checking →TB203.2 User's programme of inspection and checking arrangements; and

• BS EN 12845 clause 20.3 Service and maintenance schedule →TB203.3 Service and maintenance schedule.

• etc

This Technical Bulletin should also be read in conjunction with the following parts of BS EN 12845:2003 or BS EN 12845:2004 Fixed firefighting systems, Automatic sprinkler systems, design, installation and maintenance:

- Clause 19 – Commissioning, acceptance tests and periodic inspection.
- Annex J - Precautions and procedures when a system is not fully operational; and
- Annex F - Special requirements for life safety systems.

203.0.1 Definitions

203.0.1.1 3 Year Tank

A suction tank designed and protected against corrosion such that the need for emptying the tank for maintenance is reduced to a period of not less than 3 years.

203.0.1.2 10 Year Tank

A suction tank designed and protected against corrosion such that the need for emptying the tank for maintenance is reduced to a period of not less than 10 years.

203.0.1.3 Approved sprinkler contractor

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

203.0.1.4 Central Alarm Station

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

203.0.1.5 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.

203.0.1.6 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.

203.0.1.7 Inspection

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

203.0.1.8 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.

203.0.1.9 Sprinkler servicing contractor

The original installer of the sprinkler system or other approved sprinkler contractor appointed by the user to undertake a test service and maintenance schedule to TB203.3

203.0.1.10 Sprinkler protection user

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

203.0.1.11 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.

203.1 General (revisions to BS EN clause 20.1)

203.1.1 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 (see clause TB203.3) and keep records including a logbook which shall be held on the premises.

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

Any alarm monitoring station(s) shall be notified of any system tests which will result in the transmission of an alarm. The alarm station(s) shall be requested to verify that

alarm signal(s) have been received. The alarm 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.

COMMENTARY AND RECOMMENDATIONS ON TB203.1.1

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

203.1.2 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.

203.1.3 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 LH;

b) 24 for OH;

c) 36 for HHP and 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. .

203.1.4 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

Which implements the common European approach:

“European Pressure Equipment Directive 97/23/EC”
http://ec.europa.eu/enterprise/pressure_equipment/ped/index_en.html

203.1.5 Sprinklers

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

203.2 User's programme of inspection and checking (revisions to BS EN clause 20.2)

203.2.1 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.

203.2.2 Weekly routine

203.2.2.1 General

Each part of the weekly routine shall be carried out at intervals of no more than 7 days.

203.2.2.2 Checks

The following shall be checked and recorded:

a) all water and air pressure gauge readings on installations, trunk mains and pressure tanks;

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 main stop valves.

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, which ever is the lesser.

203.2.2.3 Water motor alarm test

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

203.2.2.4 Automatic pump starting test

Tests on automatic pumps shall include the following;

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

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

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

d) the oil pressure on diesel pumps shall be checked, as well as the flow of cooling water through open circuit cooling systems.

203.2.2.5 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 min, or for the time recommended by the supplier. The engine shall then be stopped and immediately restarted using the manual start test button;

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.

203.2.2.6 Trace heating and localized heating systems

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

203.2.3 Monthly routine

203.2.3.1 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.

203.2.3.2 Batteries

Check the electrolyte level of all battery cells, (including diesel engine starter batteries and those for control panel power supplies) and carryout 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

203.2.3.3 Water storage tanks security

The access ladder to all sprinkler water storage tanks shall be checked for correct housing and security and any tank ball valve covers shall be secured and locked.

203.3 Service and maintenance schedule (revisions to BS EN clause 20.3)

203.3.1 General

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

203.3.1.1 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 diesel engine manufacturers' recommendations

203.3.1.2 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, e.g. weather conditions, which may have affected the results.

203.3.2 Quarterly routine

203.3.2.1 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.

203.3.2.2 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 TB 203.3.2.3.

203.3.2.3 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 sprinkler system
- Has any painting or decoration been undertaken since the last inspection
- Are frost protection measure 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 12.5.1)
- 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

203.3.2.4 Flow switches

Flow switches shall be checked for correct function.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.2

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 TB203.3.4.1.

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.

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

203.3.3 Half-yearly routine

203.3.3.1 General

The following checks and inspections shall be made at intervals of no more than 6 months and shall include all the tasks identified in the weekly (TB203.2.2), monthly (TB203.2.3) and quarterly (TB203.3.3) routines.

203.3.3.2 Alarm valves

The moving parts of dry alarm valves, pre-action valves, and any accelerators and exhausters, in dry pipe installations and subsidiary extensions shall be exercised in accordance with the supplier's instructions.

COMMENTARY AND RECOMMENDATIONS ON TB203.3.3.2

Alternate installations need not be tested in this way providing they are exercised twice a year as a result of the changeover from wet to dry operation and back.

203.3.3.3 Water supplies and their alarms

Each water supply shall be tested to verify pressure and flows. Each control valve shall be tested. The pump(s), if fitted, in the supply shall start automatically and the supply pressure at the appropriate flow rate shall be no less than the appropriate value in accordance with TB210, recognizing any changes required by TB**Error! Reference source not found.**.

203.3.3.4 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.

203.3.3.5 Stop valves

All stop valves controlling the flow of water to sprinklers shall be operated to ensure that they 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.

203.3.4 Yearly routine

203.3.4.1 Review of Hazard

Where the quarterly review of hazard (TB**Error! Reference source not found.**) 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 TB203.3.2.2.

203.3.4.2 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 (TB203.3.3) and half yearly (TB**Error! Reference source not found.**) routines.

203.3.4.3 Automatic pump flow test

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 valves between the source and each control valve set.

203.3.4.4 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.

203.3.4.5 Float valves on water storage tanks

Float valves on water storage tanks shall be checked to ensure they function correctly.

203.3.4.6 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).

203.3.4.7 Pipework and pipe supports

Pipework and hangers shall be checked for corrosion and painted 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 TB203.3.4.7
Bitumen-based paint may need renewal at intervals varying from 1 to 5 years according to the severity of the conditions.

203.3.4.8 Replacement

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

203.3.4.9 Fire brigade and remote central station alarm

The electrical installation shall be checked.

203.3.4.10 Water supply stop valves, alarm and non-return valves

All water supply stop valves, alarm and non-return valves shall be examined and replaced or overhauled as necessary.

203.3.4.11 Pump Suction Chambers and Screens

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

203.3.5 3 Yearly routine

203.3.5.1 General

The following checks and inspections shall be made at intervals of no more than 3 years and shall include all the tasks identified in the weekly (TB203.2.2), monthly (TB203.2.3), quarterly (TB203.3.3), half yearly (TB**Error! Reference source not found.**) sections and yearly (TB203.3.4) routines.

203.3.5.2 Storage tanks

Except as provided in TB203.3.6 all tanks shall be examined externally for corrosion.

All tanks shall be examined externally for corrosion. “3 year tanks” shall be:

(a) drained;

(b) cleaned as necessary;

(c) examined internally for corrosion.

All tanks shall be repainted and/or have the corrosion protection refurbished, as necessary.

“10 year tanks” should be drained, cleaned as necessary and examined internally for corrosion if external examination indicates that this is advisable. Should any deterioration have occurred then this shall be rectified such to ensure a further 10 years can elapse without examination.

203.3.5.3 Pump suction chambers, screens and strainers

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

203.3.6 10 yearly routine

At no more than 10 year intervals, “10 year tanks” shall be drained, cleaned, examined internally and the fabric attended to as necessary.

203.4 MAINTENANCE CONTRACTS

Sprinkler systems shall be appropriately maintained, as specified herein, and a contract shall be placed for the continuing maintenance of the sprinkler systems with a sprinkler servicing contractor.

COMMENTARY AND RECOMMENDATIONS ON TB203.4

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

203.5 SPRINKLER SYSTEM USER PERSONNEL

203.5.1 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.

203.5.2 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 TB203.5.2

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.

203.6 MAINTENANCE OF DOCUMENTATION

203.6.1 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:

(a) the maintenance and test schedule for the sprinkler system; and

(b) 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 pump set 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.

203.6.2 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;

insurance brokers;

the property owner or their agent;

sprinkler servicing company;

the sprinkler installer;

the pump suppliers or pump maintenance company;

electrical contractor;

central alarm 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 central alarm station reference.

(f) details of staff training.

203.7 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 requirements of BS EN Annex F - Special requirements for life safety systems.

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 (e.g. 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 (e.g. 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 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 central alarm 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;

(23) revalidation of any Certificate of Conformity.

COMMENTARY AND RECOMMENDATION ON TB203.7
Statements and certificates should be filed in the sprinkler system log book.

203.8 ACTION ON ALARM AND/OR SPRINKLER OPERATION

(SUPPLEMENTS BS EN ANNEX J.4)

203.8.1 When the alarm sounds

(a) staff should be instructed to call the fire brigade on hearing the alarm and follow the normal fire procedure for the premises. The brigade should be called, even if there is an automatic brigade 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 brigade) 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.

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

203.8.2 Reinstatement

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 replaced as necessary.

203.8.3 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.

203.8.4 Actions following sprinkler operation

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

203.8.5 Incident report

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