

Code of practice for the operation of fire protection measures

Part 3: Electrical actuation of pre-action sprinkler systems

ICS 13.220.20

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee FSH/12, Fire detection and alarm systems, to Subcommittee FSH/12/4, Automatic operation of fire protection, upon which the following bodies were represented:

- British Fire Protection Systems Association
- British Telecommunications plc
- Department of the Environment, Transport and the Regions (Building Research Establishment)
- Home Office
- Institute of Fire Safety
- London Fire and Civil Defence Authority
- Loss Prevention Council
- Ministry of Defence

This British Standard, having been prepared under the direction of the Health and Environment Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 October 2000

© BSI 10-2000

Amendments issued since publication

Amd. No.	Date	Comments

The following BSI references relate to the work on this standard:
Committee reference FSH/12/4
Draft for comment 99/540022 DC

ISBN 0 580 33185 7

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
Introduction	1
1 Scope	2
2 Normative references	2
3 Terms and definitions	3
4 System design	3
5 Fire detection	4
6 System interface	4
7 Power supplies	6
8 Wiring	7
9 Servicing	7
Annex A (informative) Example of an arrangement for separate fire alarm and pre-action control and indicating equipment	8
Annex B (informative) Example of an arrangement for fire detectors and pre-action valve-set connected to and monitored by a single control panel	9
Annex C (informative) Example of an arrangement for any coincidence logic provided at fire alarm control and indicating equipment	10
Annex D (informative) Example of an arrangement for any coincidence logic provided at pre-action control and indicating equipment	11
Figure 1 — Typical logic gate depiction of pre-action systems	2
Figure A.1 — Example of an arrangement for separate fire alarm and pre-action control and indicating equipment	8
Figure B.1 — Example of an arrangement for fire detectors and pre-action valve-set connected to and monitored by a single control panel	9
Figure C.1 — Example of an arrangement for any coincidence logic provided at fire alarm control and indicating equipment	10
Figure D.1 — Example of an arrangement for any coincidence logic provided at pre-action control and indicating equipment	11
Table 1 — Maximum areas of coverage per point-type smoke detector to operate pre-action sprinkler installations in still air conditions for coincidence and non-coincidence connection fire detection systems	4

Foreword

This British Standard code of practice has been prepared by Technical Committee FSH/12. It is part of a series of standards covering the actuation of fire protection measures. BS 7273-1 and BS 7273-2 cover the electrical and mechanical actuation of gaseous extinguishing systems, BS 7273-3 is concerned with the “priming” of pre-action systems, i.e. the rapid conversion of what is essentially a dry pipe sprinkler system into a wet pipe system. This code of practice takes into account current British and European Standards for fire detection systems (see BS 5445, BS 5839 and BS EN 54) and for sprinkler systems (see BS 5306-2).

Annexes A, B, C and D are informative.

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

NOTE It has been assumed in the drafting of this British Standard that the execution of its provisions is entrusted to appropriately qualified and competent people.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 11 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Introduction

A pre-action sprinkler system consists of a sprinkler system and an electrical detection system with water held back by the pre-action valve and pressurized air in the sprinkler pipework. In the event of the operation of the electrical detection system the pre-action valve operates and allows water into the sprinkler pipework. Two generic forms of operation exist: the “type 1” pre-action system and the “type 2” pre-action system.

The type 1 pre-action system will only discharge water onto the seat of the fire when both the electrical detection system and a sprinkler or sprinklers have operated. Water will only enter the sprinkler pipework following the pre-arranged operation of the detection system. Any accidental damage to the sprinklers or pipework will not cause water to be discharged.

The type 1 systems are, therefore, normally used in situations in which:

- there is high potential for mechanical damage to the system; or
- the probability of mechanical damage may not be high, but the consequences of inadvertent water damage would include serious damage to sensitive contents and/or major interruption to business.

The type 2 pre-action system will discharge water onto the seat of a fire when a sprinkler or sprinklers operate, whether or not the electrical detection system has operated.

However, normally the fire detection system will operate before a sprinkler head so that, in effect, the system is “wet” at the time of sprinkler operation. The type 2 systems are normally used in circumstances in which there is a need to speed up the operation of a dry system.

The functions of the two systems can be depicted by the binary logic sequence using “and” and “or” gates as given in Figure 1.

It is of extreme importance that fire detection systems and any interfaces associated with preaction sprinkler systems have high integrity and do not cause the pre-action valve to remain closed under fire conditions. The seriousness of this circumstance cannot be overstated.

It is also important to avoid inadvertent operation of the pre-action valve, as draining down of the system may be time consuming and inconvenient.

The recommendations in this code of practice take these factors into account, as well as the recommendations of the relevant British and European Standards covering fire detection (BS 5445, BS 5839 and BS EN 54) and sprinklers (BS 5306-2).