

Category 2 Standard

S2102

Fire Engineering - Fire Compartmentation

Issue No.: A1

Issue date: October 2014
Review date: October 2019

Contents

1	Purpose	3
2	Scope	3
3	Requirements	3
3.1	General	3
3.2	Proof of Performance	4
3.3	Building Elements - Structure, Walls and Floors	5
3.4	Ceilings and Raised Floors, Fixed and Suspended	5
3.5	Doors	6
3.6	Glazed Elements	7
3.7	Cavity Barriers	8
3.8	Ductwork	8
3.9	Dampers, Fire / Smoke	8
3.10	Penetrations	9
4	Responsibilities	10
4.1	Project Manager	10
4.2	Asset Managers	10
4.3	Designer	10
4.4	Suppliers/Contractor	10
4.5	Fire Engineer	10
5	Supporting information	10
5.1	Background	10
5.2	Safety considerations	10
5.3	Environmental considerations	11
5.4	Customer considerations	11
5.5	Construction	11
5.6	Drawings and Information	11
5.7	Inspection	12
5.8	Access for servicing and inspection	12
5.9	Spares and repair materials	12
6	References	12
6.1	References	12
6.2	Abbreviations	13
6.3	Definitions	14
6.4	Person accountable for the document	14
6.5	Document history	14

1 Purpose

- 1.1. The purpose of this Standard is to define how the design and installation of passive fire protection (fire compartmentation) is delivered, to comply with fire legislation and meet the requirements of LU Category 1 Standards 1-081 - Design and installation of fire protection systems and compartmentation measures, and 1-083 - Passive fire protection systems.

2 Scope

- 2.1. This standard applies to all works undertaken on London Underground (LU) premises, including railway facilities (but not trains). This engineering standard applies to new installations, modifications, maintenance, repairs and to extensions to existing premises.
- 2.2. There are significant interfaces with the following asset disciplines and their associated standards:

Premises, Architectural and Building Control (walls, floors, ceilings, doors, materials, ironmongery, glazing, means of escape signage)
Building structure and layout
Building Services (Penetrations)
Electrical Services (Emergency Lighting)
Mechanical Services (Ventilation / Smoke Control Systems, Fire Smoke Dampers, Fire Dampers and ductwork)
Fire Detection Systems
Fire Suppression Systems

3 Requirements

3.1 General

- 3.1.1 The provision, extent and location of fire compartmentation including the requirement for structural fire protection, shall be determined by a review of the fire risk to the premises, and shall meet the requirements of LU Standards. There are a number of London Underground standards for other asset areas that incorporate specific fire requirements for life safety and property protection that should be considered.
- 3.1.2 The period of fire resistance required of the elements of structure shall be determined by the review of the risk to the premises and shall meet current statutory requirements, follow the recommendations of the Building Regulations Approved Document B and British Standards and be in compliance with LU Standards.
- 3.1.3 All proposals to provide new or to modify existing compartmentation provisions for changes in layout and use of Station premises shall be approved via LU Category 1 Procedure - Bb224 *Managing changes in station fire precautions*
- 3.1.4 For other premises where Bb224 does not apply the changes shall be approved by a competent accredited Fire Engineer. The Local Fire Brigade Fire Safety Officer shall be informed either through local Building Control application route or through correspondence from the project.
- 3.1.5 The fire compartmentation and separating provisions designed and installed in compliance with this standard shall follow the guidance given in the guidance document G0102 Passive Fire Protection in respect of extent, standards and details of installation.

- 3.1.6 Suppliers of compartmentation provisions shall be competent in the installation of passive fire systems and fire rated constructions. This shall be demonstrated by manufacturers or independent third party accreditation, for the systems and constructions being provided.
- 3.1.7 Where a fire compartment or fire separating structure is required the elements of construction shall consist of fire resisting walls, ceilings and floors to form a sealed enclosure, or to separate an area of risk.
- 3.1.8 Penetrations through elements of fire resisting construction such as: doors, glazing, ductwork and services shall have at least the same fire performance as the element through which they penetrate.
- 3.1.9 Material selection and use shall be in accordance with LU Cat 1 Standard - 1-085 - Fire Safety Performance of Materials, where applicable, as identified in LU Cat 1 Standard 1-086. If this is not practical, then the proposed non-compliance shall have an approved concession
- 3.1.10 Fire performance of walls or ceilings in public areas of sub-surface stations shall comply with clause 8(1) of the Fire Precautions (Sub-surface Railways Stations) England Regulations. See guidance in G0137 Walls and Partitions in Sub Surface Stations.
- 3.1.11 The products shall be physically marked with the relevant certification mark and appear in the associated lists of products. Installers of fire protection systems shall also have third party certification and issue certificates of conformity and/or labels to demonstrate that the work has been undertaken under the rules of the scheme.
- 3.1.12 Third party certification schemes will be accredited by a National Body such as United Kingdom Accreditation Service (UKAS).
- 3.1.13 London Underground has a register of approved products. It is the specifier's responsibility to ensure it meets all required standards and requirements for their design.

3.2 Proof of Performance

- 3.2.1 The fire performance of elements of construction shall be determined by tests in compliance with the relevant parts of BS - 476 or BS - EN 1634. Evidence of testing shall be produced as follows:
 - a) Fire tests shall be undertaken by a United Kingdom Accreditation Service (UKAS) accredited independent laboratory or other accredited European testing organization.
 - b) The test report shall be currently valid (i.e. less than 5 years old or independently validated against current test methods and procedures by a suitably qualified fire engineer from an independent third party laboratory).
 - c) Where proposed fire resisting constructions vary from that tested, an assessment shall be performed to confirm the adequacy of the change or variation. The assessment shall be less than 2 years old and shall have been made by a suitably qualified fire engineer.
 - d) Designs of tested elements in combination are to be tested or assessed as a whole unit.
 - e) Direct or extended fields of application or classification reports issued by Notified Bodies under the Construction Products Regulations shall also be acceptable as evidence of fire resistance performance.
- 3.2.2 All assessments against tested fire performance shall be subject to LU approval.

- 3.2.3 Some elements of construction can be accepted to achieve a standard of fire resistance designated as “nominal half-hour”, to satisfy the risk. Such provisions will not be required to meet any fire resistance test standard, but shall be constructed from predominantly non-combustible materials and have sufficient integrity to prevent the spread of smoke from rooms or areas at risk into areas used for means of escape.
- 3.2.4 Specifications prepared from this Engineering Standard shall clearly define the methods of verification during handover, testing and inspection via a test and inspection plan and inspection and certification requirements.

3.3 Building Elements - Structure, Walls and Floors

- 3.3.1 The requirements for fire protection to load bearing structural elements to maintain load-bearing capacity under fire shall be confirmed by the Structural Engineer.
- 3.3.2 Junctions between fire rated elements shall provide the same fire resistance to maintain the required fire separation.
- 3.3.3 All fire resistant walls shall run from structural floor to structural soffit unless it can be demonstrated and agreed that it is impracticable and another solution implemented such as fire resistance ceiling.
- 3.3.4 Where provisions are made for movement within and between elements of the structure, the movement detail and the fire stopping of any movement gaps shall achieve the required fire performance whilst providing for the required movement.
- 3.3.5 External walls and roofs will not normally need to be fire resisting except in the following circumstances:
- Where a means of escape passes in close proximity to the wall or roof;
 - Where any part of the roof is used as part of a means of escape in case of fire;
 - Where the premises is subject to standard 1-085 and non-compliant materials are in close proximity;
 - Where the wall or roof forms a boundary between a sub-surface station and another premises;
 - Where there are building regulations requirements in terms of protection from external fire spread for the premises or adjacent properties or;
 - Where fire resistance is required for asset protection purposes.

3.4 Ceilings and Raised Floors, Fixed and Suspended

- 3.4.1 Where it is not practicable to provide a suitable form of construction joining imperforate walls to the structural soffit or floor, fire resistant suspended ceilings or raised floors shall be provided to complete any fire separation or compartmentation that may be required.
- 3.4.2 Fire resistant floors and ceilings shall be installed in accordance with the requirements of the manufacturer together with any special conditions identified by the test and/or assessment reports for the system (including expansion and movement allowance).