

Essential steps for managing fire risk –

The impact of electrical and mechanical services on the fire performance of buildings.

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Electrical installations and their impact on fire performance of buildings

- Within single dwellings
- Between adjacent dwellings
- In common areas
- Regulatory Reform (Fire safety) Order



Best Practice Guides



Guide No 5

- Initially aimed at **preserving the structural stability** of premises as much as maintaining fire separation
- Developed with the help of 20 other bodies



Best Practice Guide 5

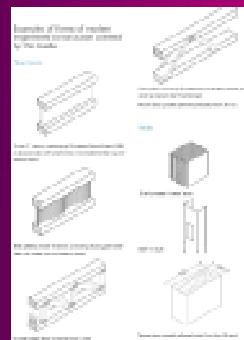


The Impact of Electrical Installations on Fire Performance

- Modern construction has lost the robustness of brickwork, blockwork, concrete and substantial wooden components.
- Buildings now have a major reliance on plasterboard linings for their fire (and sound) performance.

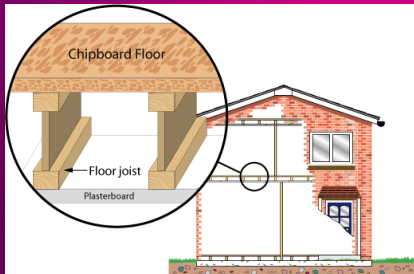


The Impact of Electrical Installations on Fire Performance



The Impact of Electrical Installations on Fire Performance

Typical ceiling/floor arrangement in two-storey dwelling (30 minute loadbearing requirement)



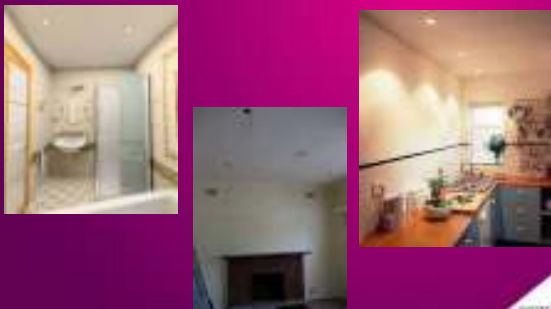
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Result of an eight minute fire on lightweight joists



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Result of an unenclosed downlighter fire



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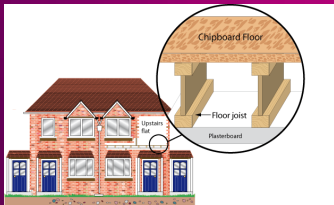
- The first floor in a two storey family dwelling is recommended to have a loadbearing capacity (R) = 30 min
- A **ceiling** must protect joists for: -
 - traditional joist - nominally 10 min
 - modern joist - nominally 25 min
- Any downlighter, or protection to a downlighter, must provide the same



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A timber **compartment** floor will invariably require to be a one hour fire resistance i.e.

- Loadbearing capacity (R) = 60 min
- Integrity (E) = 60 min
- Insulation (I) = 60 min



Downlighters having integral fire protection are preferred



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Typical intumescent fire hood for a downlighter



Table 1: Recommendations for recessed luminaires/downlighters in floors and ceilings

Building	Location	Construction	Fire Resistance Required	Recommended
Bungalow	Roof ceiling	All	N/A	A ¹
Two-storey house	Roof ceiling	All	N/A	A ¹ (assuming adequate compartmentation between adjacent dwellings)
	First floor	Robust	Modified 30 mins ¹	B, C, but A can be justified if traditional construction confirmed (Annex C)
	Below room over garage	All	30 mins	B, C
	Over basement	All	30 mins	B, C
Three-storey house	Roof ceiling	All	N/A	A ¹ (assuming adequate compartmentation between adjacent dwellings)
	First and Second floor	All	30 mins	B, C
	Ceiling of garage under room	All	30 mins	B, C
	Over basement	All	30 mins	B, C
Lift conversion (2-storeys to 3)	First floor (when lift converted)	Robust	Modified 30 mins ¹	B, C, but A can be justified if traditional construction confirmed (Annex C)
		Lightweight ²	Modified 30 mins ¹	B, C
Four-storey (or more) house	Roof ceiling	All	N/A	A ¹ (assuming adequate compartmentation between adjacent dwellings)
	All floors, including garage and basement ceilings ³ floors	All	60 mins	B, C
Flats	Top floor < 5m	Compartment floor	All	D, B*+C**
	Top floor < 18m	Compartment floor	All	D, B*+C**
	Top floor < 30m	Compartment floor	All	D, B*+C**
	Top floor > 30m	Compartment floor	All	D, B*+C**
Ducted flats	Intermediate floor	All	30 mins	B, C

KEY:
 A¹ - Unprotected downlighter permitted, but suitable fire protection recommended for safety reasons
 B - Downlighter with integral protection
 C - Downlighter with hood complying with Annex E
 D - Downlighter inserted in false (secondary) ceiling
 * - See Annex F
 ** - Ensure that thermal insulation will not preclude luminaire
 - Should only be installed if it can be verified that the penetration will not have an adverse impact on acoustic performance
 - Robust construction is defined in Annex C
 - Lightweight engineered construction is defined in Annex A

NOTE: In Scotland the guidance clause S.1.10 (Domestic Handbooks) recommends that downlighters installed in the ceiling of a combustible separating floor are fitted within the depth of a secondary ceiling.

The Impact of Electrical Installations on Fire Performance - vertical linings



The Impact of Electrical Installations on Fire Performance - vertical linings



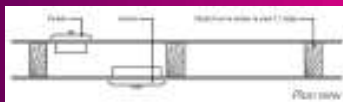
The Impact of Electrical Installations on Fire Performance - vertical linings



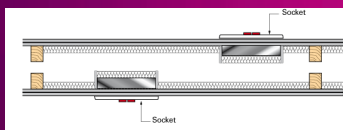
The Impact of Electrical Installations on Fire Performance - vertical linings



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Single or non-compartment wall



Compartment wall

Examples of accessories installed back-to-back in the same cavity space

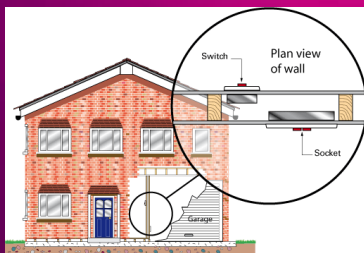


The Impact of Electrical Installations on Fire Performance – vertical linings



The Impact of Electrical Installations on Fire Performance – vertical linings

In addition to party walls, we must also consider dwellings with an integral garage or three-storey (four-storey) houses



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Intumescent pad being installed in a dry lining box

A typical fire and acoustic cover fitted behind a dry lining box



Table 2: Recommendations for E systems related accessories for fire and control level only.

ITEM	DESCRIPTION	REMARKS	APPLICABLE AREA	REMARKS
1	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
2	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
3	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
4	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
5	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
6	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
7	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
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9	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
10	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
11	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
12	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
13	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
14	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
15	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
16	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
17	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
18	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
19	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	
20	Lighting fixture	Lighting fixture must be fire-rated and suitable for the environment.	All	

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Heavy items of equipment must not be supported by plasterboard linings





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Ventilation ducts passing through ceiling voids and cavity walls need fire protection



Fire spread into a bathroom via a plastic duct

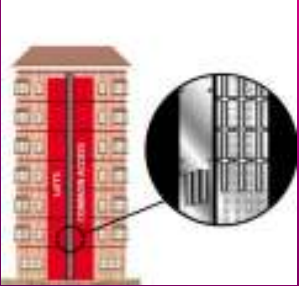




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- Issues relating to **common areas**

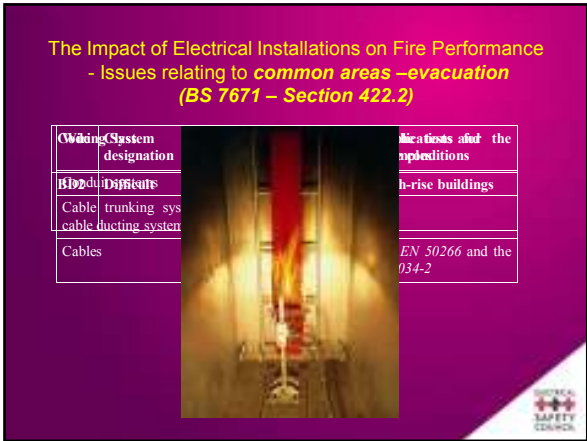
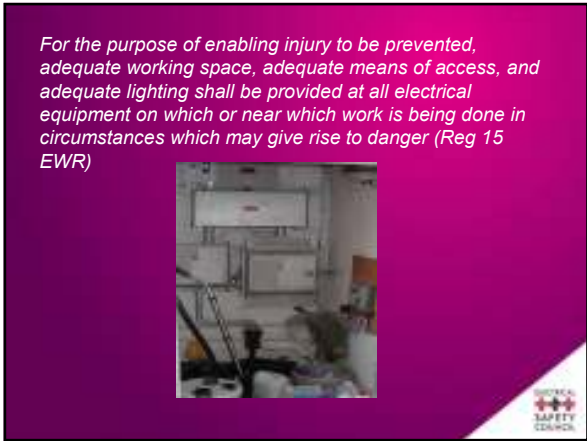
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Communal areas in blocks of flats

TYPICAL ELECTRICAL SYSTEMS:

- Supplies to individual dwellings
- Supplies to Landlord's distribution equipment
- Landlords' final circuitry
- Fire Alarm & Emergency lighting circuitry
- Door entry/call systems
- Telephone cabling
- Cable TV & Data
- Lift supplies and controls



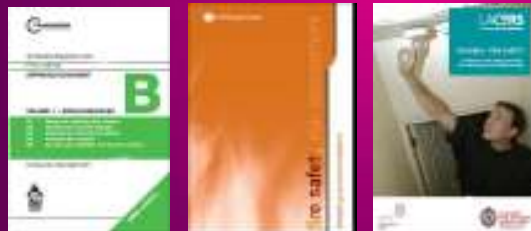


Regulatory Reform (Fire Safety) Order 2005

- Became law on **1 October 2006** it replaces most of the previous fire safety legislation with one new one.
- The Order applies to all **non-domestic** premises in England and Wales, including the **common parts of blocks of flats** or houses in multiple occupation (**HMOs**).
- It requires any person who has some level of control in premises to take steps to reduce the risk of fire, consider how to contain a fire should one break out and then ensure people can safely escape if there is a fire.



Guidance on fire safety risk assessment



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www.esc.org.uk



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Now over to Peter!



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Risk assessment

(1) The responsible person must make a suitable and sufficient assessment of the risks to which relevant persons are exposed for the purpose of identifying the general fire precautions he needs to take to comply with the requirements and prohibitions imposed on him by or under this Order.

Safety assistance

18. (1) The responsible person must, subject to paragraphs (6) and (7), appoint one or more competent persons to assist him in undertaking the preventive and protective measures.



Duty to take general fire precautions

The responsible person must:

- (a) take such general fire precautions as will ensure, so far as is reasonably practicable, the safety of any of his employees; and
- (b) in relation to relevant persons who are not his employees, take such general fire precautions as may reasonably be required in the circumstances of the case to ensure that the premises are safe.



In relation to any other premises:

In this Order "responsible person" means:

- (a) in relation to a workplace, **the employer**, if the workplace is to any extent under his control;
- (b) in relation to any premises not falling within paragraph (a)
 - (i) **the person who has control of the premises** (as occupier or otherwise) in connection with the carrying on by him of a trade, business or other undertaking (for profit or not); or

