

The light protection

As the use of downlighters increases, so may the risks of fire hazards. Alan Rogers explains how to maintain building protection.

Downlighters provide an attractive, modern and efficient form of lighting. Their clean lines suit many contemporary interior designs; they can illuminate or concentrate light into difficult areas, increase the feeling of space, and mix well with other lighting elements to create a very pleasant ambience.

However, if during their installation, no consideration is given to fire and location protection, then a reduction in the fire rating of the structure will occur, resulting in non-compliance of the *Building Regulations*. Also, in some situations the downlighters themselves can introduce additional fire hazards.

Building Regulations, Approved Document B (Fire) states: "If a fire separating element is to be effective, then every joint, imperfection of fit, or opening to allow services to pass through the element, should be adequately protected by sealing or fire-stopping, so that the fire resistance of the element is not impaired." The technical standards of Scotland and Northern Ireland say the same.

Structural floors are highly dependent upon the fire protection provided by the ceiling lining for their fire

resistance period. This applies to floors constructed with joists of timber, steel or a combination of these materials.

The perforation of this ceiling membrane to fit recessed downlighters, will cause a downgrade in the fire rating of the structure. This reduction can be considerable where modern I-beam or metal, lattice joists are used.

These styles of joists have many constructional advantages, plus the very economical use of wood. As a result, they do not have the sacrificial timber that traditionally provides the protective charcoal which allows timber structures to achieve their fire resistance. They may therefore be unable to withstand fire exposure for more than five to ten minutes.

It is hence essential that consideration be given to maintaining the fire resistance of the protective ceiling lining. This can be done by ensuring that the downlighters fitted are

so protected that they reinstate the properties of the ceiling material that has been removed.

This is particularly important where modern joists are used, because the lining will now have to provide protection to the structure for 90% of the target rating duration.

It is unfortunately often considered that the perforation of the ceiling will only result in a loss of integrity, and that if the floor boarding is of reasonable thickness and well jointed, this will not result in a failure of the fire resistance because the floor will resist burn-through.

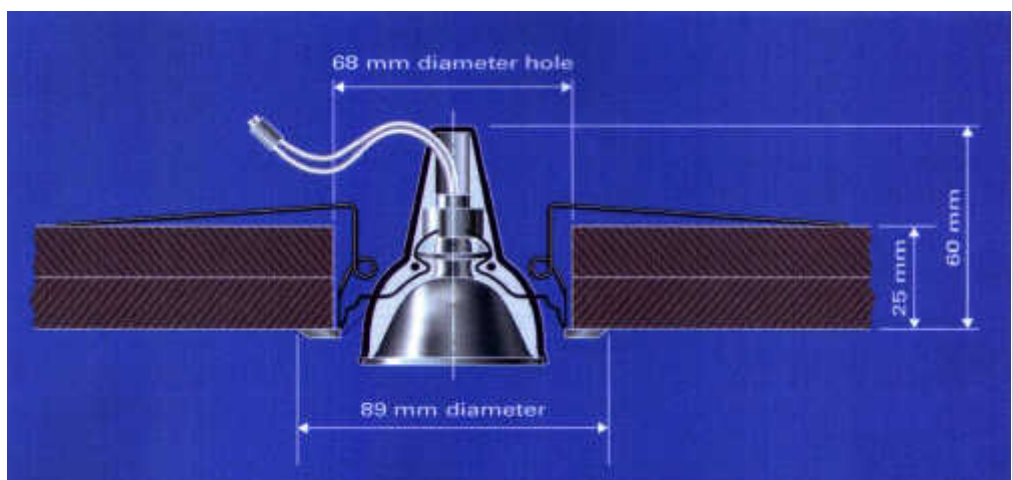
This is particularly the case in domestic housing, where the rating is 30 minute load-bearing capacity. However, ceiling perforation puts this load-bearing capacity at risk. If an unprotected installation of downlighters fails to keep fire out of the cavity for 20 minutes a premature collapse could occur. This is a risk that should not be taken.

Regulation compliance

The compliance to the *Building Regulations* of fire-rated structures is carried out on a case-by-case basis. Sometimes it is difficult to visually judge whether protection or protected types have been installed, and if this has been done correctly. It is better then to remove the doubt and make downlighter protection the acceptable standard.

Also, as now being highlighted by *Building Regulations Part E*, this ceiling membrane has a critical role to

Far right: Electro-Technik's Snaplite and Staylite downlighters have integral protection for fire and sound. They are fitted from below



Right: Typical installation diagram of a downlighter



Above and right: The clean lines of downlighters suit many contemporary interior designs and applications. However, care must be taken to ensure that the fire and acoustic protection of the ceilings are not reduced as a result of their installation.



ceiling level, therefore has no function in respect of floor tests to *BS 476 Part 21 or 22*.

A lighting cover with a one hour rating to *BS476 Part 23* may only be able to protect a timber decked/joisted floor for 15 to 25 minutes because of the positive pressure used in a *Part 21* test. This is far too short to provide the 90% cover required for a loaded, lightweight, joisted floor, if it is to achieve the 1 hour separation rating.

It is also essential that the downlighter and fire cover are tested as a total component. In a recent fire test, downlighters of reasonable quality fell out of the ceiling within six minutes of the fire starting. In this situation, a cover would be ineffective against the pressure of the fire, giving the flames, fumes and smoke immediate access to the upper structure.

Some down lighters get very hot in use, with temperatures at the rear of the fitting exceeding 200°C. Fire covers can protect the fitting from being in contact with flammable or insulating materials in the void. Also, as they are manufactured from intumescent fibre material, they have good acoustic properties.

Fire covers, however, can cause overheating of the downlighter, with a resultant significant reduction in lamp

life. If they are of the vented style to prevent this overheating, they then lose their acoustic performance.

Providing protection

The simplest, most economical and safest (the protection having been properly installed) solution is to select downlighters that:

- have inbuilt protection;
- have been tested in representative ceiling/floor structures to *BS476 Parts 21 or 22*;
- have had a full acoustic test;
- are capable of being in contact with materials in the void without creating a fire hazard or over heating problems.

Such a range has been developed and patented by FL Patents and is being manufactured under licence and marketed by Electro-Technik.

This low voltage downlighter range is available in fire ratings up to 1.5 Hours; meets all the above test criteria; can be installed from below; is approved by Lantac, Zurich Building Guarantees; and meets the requirements of the relevant NHBC Standards.

New guidance

Regulation or guidance is urgently needed for Electrical Contractors so that they are aware of the downgrade they can cause by perforating the ceiling structure, and if the fire resistance of that structure is not restored, any liability for consequential fire spread may rest with them.

The 2004 revision of Approved Document B will likely consider this in detail. In the meantime, Approved Document P may prove to be the ideal vehicle to reinforce the current Building Regulation and provide the guidance needed.

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For more information on these products, contact [Electro-Technik Ltd](http://www.electro-technik.com) on 01527 831794