An assessment of the fire performance of Halers Lighting downlights

Prepared for:
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23 July 2010

Assessment report number
CC 261898B

Protecting People, Property and the Planet

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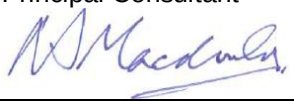
Signature 

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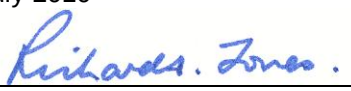
Signature 

Date of this report 23 July 2010

Date of next review 23 July 2015

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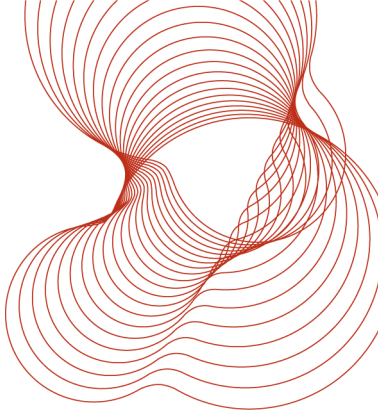


1 Introduction

Two timber floors have been tested in accordance with BS EN 1365-2: 1999. An additional indicative test on a smaller unloaded timber floor has been carried out using the heating conditions of BS EN 1365-2:1999. The ceilings to the floors incorporated a number of downlights marketed by Halers Lighting Ltd. This report considers the likely fire performance of the fittings when mounted in other ceiling systems secured to the underside of a variety of timber floor constructions. The expected fire performance of variations of the tested downlights is also considered.

2 Scope

This report considers the fire resistance of timber floor constructions underlined with fire protection ceiling systems incorporating Halers Lighting downlights when tested to BS EN 1365-2: 1999 or BS 476 : Part 21 : 1987.

3 Supporting Data

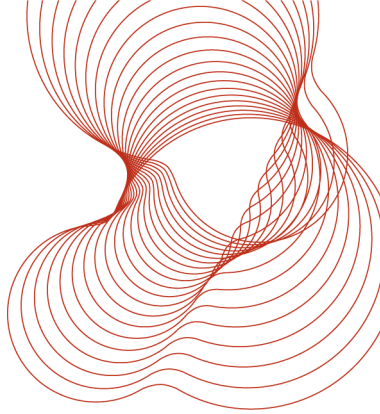
3.1 BRE Test Report 250516

A timber joist floor, 4500mm-long x 3500mm-wide, incorporating twelve CW185 FIRELED adjustable downlights supplied by Collingwood Lighting Ltd, was submitted to a fire resistance test in accordance with BS EN 1365-2:1999 for the duration of 95 minutes on Thursday 12th February 2009 at BRE Laboratories, Garston, whilst supporting an imposed load of 1.5kN/m^2.

The test specimen was installed within the aperture of a BRE concrete lined furnace test frame and was constructed from seven softwood timber joists, each nominally 215mm deep x 45mm thick, spaced at nominal 600mm centres and spanning the length of the aperture. Timber cross noggings were located at nominal 1200mm centres. Each end of the timber joists were seated on concrete ledges within the test frame, with an unsupported specimen span of 4150mm long x 3500mm wide (nominal internal aperture dimensions of the furnace test frame) directly exposed to the furnace throughout the full test duration.

The upper surfaces of the timber joists were clad with a single layer of 22mm-thick tongue and grooved chipboard.

The underside of the joists was covered with three layers of 12.5mm-thick British Gypsum Gyproc FireLine plasterboard, each layer nailed through the underside of the timber joists and timber noggings. Twelve CW185 fireLED adjustable downlights were installed through apertures made into the Gyproc Fireline



plasterboard, and an imposed load of 1.5kN/m^2 applied evenly across the surface of the chipboard floor (unexposed face).

The floor achieved the following fire resistance:

Integrity	Cotton Pad	95 minutes- no failure, test terminated at request of sponsor
	Gap Gauge	95 minutes- no failure, test terminated at request of sponsor
	Sustained Flaming	95 minutes- no failure, test terminated at request of sponsor
Insulation:		95 minutes- no failure, test terminated at request of sponsor
Loadbearing capacity:		95 minutes- no failure, test terminated at request of sponsor

3.2 BTC Test Report BTC 12486F

A timber joist floor, 4000mm-long x 3000mm-wide, was submitted to a fire resistance test in accordance with BS EN 1365-2:1999 for the duration of 90 minutes on 9th April, 2003, whilst supporting an imposed load of 0.94kN/m^2.

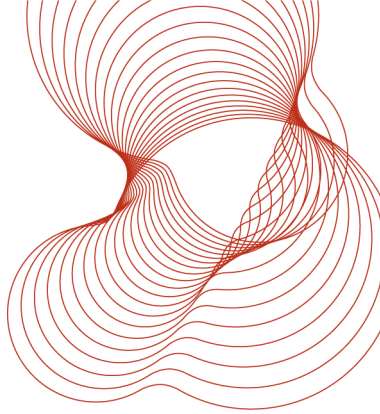
The test specimen was installed within the aperture of a concrete lined furnace test frame and was constructed from six softwood timber joists, each nominally 195mm deep x 38mm thick, spaced at nominal 600mm centres and spanning the length of the aperture. Timber cross noggings were located at nominal 1200mm centres. Each end of the timber joists were seated on concrete ledges within the test frame, with an unsupported specimen span of 4000mm long x 3000mm wide (nominal internal aperture dimensions of the furnace test frame) directly exposed to the furnace throughout the full test duration.

The upper surfaces of the timber joists were clad with a single layer of 21mm-thick tongue and grooved flooring.

The underside of the joists was covered with three layers of 12.5mm-thick British Gypsum Gyproc FireLine plasterboard, each layer nailed through the underside of the timber joists and timber noggings.

The floor achieved the following fire resistance:

Integrity	Cotton Pad	90 minutes - no failure, test terminated at request of sponsor
	Gap Gauge	90 minutes - no failure, test terminated at request of sponsor
	Sustained Flaming	90 minutes - no failure, test terminated at request of sponsor
Insulation:		90 minutes - no failure, test terminated at request of sponsor
Loadbearing capacity:		90 minutes - no failure, test terminated at request of sponsor



3.3 BRE Test Report 258346

An indicative fire resistance test was carried out on an unloaded 1.8m x 1.8m timber floor fitted with two different downlighters, on 16 December 2009 for a duration of 93min. The furnace heating regime, appropriate procedures and criteria of BS EN 1365-2 : 2000 were utilised for the test.

This test result relates to an investigation which utilised the test methodology given in BS EN 1365-2 : 2000; the full requirements of the standard were not, however, complied with. The information is provided for the test sponsor's information only and should not be used to demonstrate performance against the standard nor compliance with a regulatory requirement. The test was not conducted under the requirements of UKAS accreditation.

The floor had a timber framework made from 215mm-deep x 45mm-wide timber joists which were nailed together to form a framework with two equal apertures; the underside of the framework was fitted with three layers of 12.5mm-thick Gyproc Fireline plasterboard and the top finished with 22mm-thick flooring grade tongue-and-groove chipboard. The downlighters were installed through 65mm-diameter holes made in the plasterboard to coincide with the centre of the two apertures in the timber framework.

Two downlighters were used in the test construction. One comprised a Halers Lighting Ltd. EvoLed CW202 unit supplied without a fascia or LEDs; the other comprised a Collingwood Lighting Ltd. CW133 unit supplied complete with a fascia and LEDs.

Thermocouples were suspended in the air cavity above each downlighter so as to be mid-way between the underside of the floor and the fitting. A similar thermocouple was also installed in the air cavity within the remaining aperture in the timber framework. The temperature of the top surface of the chipboard flooring was also measured.

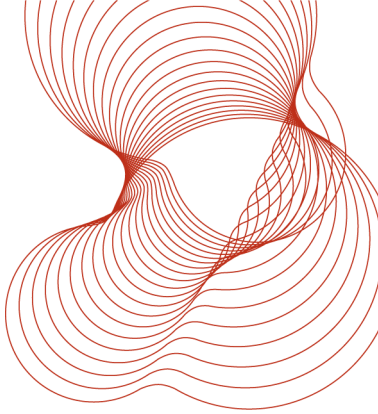
3.4 BRE Test Report 260284

A floor and ceiling assembly was subjected to a fire resistance test conducted in accordance with BS EN 1365-2:2000 on 17 February 2010. The test was conducted at the BRE Laboratories, Watford for a duration of 31min. with an imposed load of 1.5 kN/m^2 applied to the floor.

The test specimen was installed within the aperture of a BRE concrete lined furnace test frame and was constructed from seven softwood timber joists spaced evenly across the test frame and spanning the length of the aperture. Each end of the timber joists were seated on concrete ledges within the test frame, with an unsupported specimen span of 4150mm long x 3500mm wide (nominal internal aperture dimensions of the furnace test frame) directly exposed to the furnace throughout the full test duration.

The unexposed side of the timber joists were clad with a single layer of 22mm-thick tongue and grooved chipboard.

The exposed side of the joists were covered with a single layer of 15mm-thick Knauf standard wallboard. Fifteen EvoLED downlights were installed through apertures made in the plasterboard ceiling.



The floor achieved the following fire resistance:

Loadbearing capacity:		31min*
Integrity:	Sustained flaming :	30min
	Gap gauge :	31min*
	Cotton Pad :	30min
Insulation:		30min

* No failure, the test having been discontinued at the request of the sponsor

4 Description of the Proposed System

4.1 Halers Lighting Downlights

The fittings that can be used are the Halers Lighting range with the following codes:

Current name of Halers product	Brief description & comparison with other lights	Name when tested CW202
DL/XX/F/NW	Fixed unit with ABS fascia with NW LED	CW202
DL/XX/F/WW	Fixed unit with ABS fascia with WW LED	CW202
DL/XX/F/NW/DIM	Fixed unit with ABS fascia with NW LED with a dimming driver	CW202
DL/XX/F/WW/DIM	Fixed unit with ABS fascia with WW LED with a dimming driver	CW202

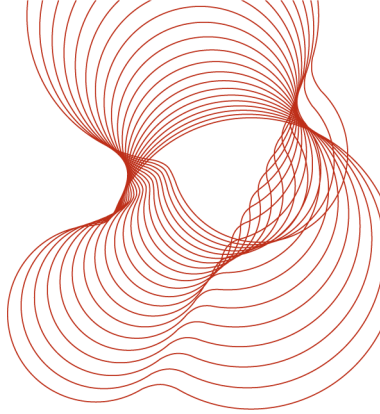
Drawings showing the design of the downlights are held in a BRE confidential file.

The maximum permissible distance between downlights is 500mm in one direction and 1000mm in the other. The outer surface of any downlight casing must not be closer than 100mm from any joist.

These fittings have the same overall design; the only difference is their appearance and some are IP-rated versions. The fittings require a nominal cut-out in the ceiling of 65mm.

4.2 Types of floor and ceiling

These Halers Lighting downlights can be used with any structurally suitable timber floor protected with a single or multiple layer ceiling of type F or type A gypsum wallboards (to BS EN 520:2004) manufactured in



the UK by Lafarge, British Gypsum, or Knauf. The ceiling must be at least 15mm thick for 30 minute applications, at least 25mm thick for 60 minutes applications and at least 30mm thick for 90 minutes applications. The floor and ceiling combination must have been successfully tested for the required period in accordance with either BS EN 1365-2:2000 or BS 476 : Part 21 : 1987.

All details of the floor and ceiling system must be the same as successfully tested by the board manufacturer, and the joists must be solid softwood or hardwood timber joists.

5 Assessment

5.1 General

As stated in section 4.2 of this report, the floor and ceiling combination into which the downlights are being installed in practice can vary, but it must have been successfully tested for the required period in accordance with BS EN 1365-2:2000 or BS 476 : Part 21 : 1987. All details of the floor and ceiling system must be the same as tested.

It has been noted that the names of the products tested have been changed to those listed in section 4.1 for marketing reasons. It has been stated by Halers Lighting that there has been no change in the design of the downlights or the materials used.

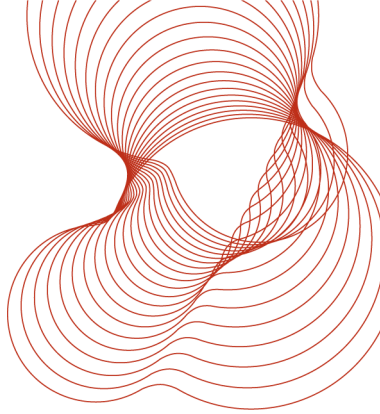
5.2 Floors with 60min. or 90min. fire resistance

It is proposed to replace the downlight CW133 with the new Halers Lighting fitting, DL/XX/F/XX. An indicative comparison test has been carried out as described in BRE test report 258346. Both lights remained in situ for the duration of the 93-minute test and the temperatures measured in the cavity above the ceiling clearly demonstrated that the new design of downlight can be expected to perform at least as well as the CW133 design. Although the CW202 fitting did not have a fascia or LED we consider that this would not have had a noticeable affect on the fire performance of the test specimen.

We consider that the downlight, CW133, has a similar fire performance to the CW185 downlight that was tested as described in BRE test report 250516, as the CW133 downlight is identical to the fitting that was tested except that the diameter of the CW133 downlight is less and it is lighter and therefore it will apply less stress to the ceiling system.

The tested floor and ceiling system which incorporated the CW185 downlights (see section 3.2) is similar to the system tested as described in section 3.1 of this report, which did not incorporate any fittings. The two floor and ceiling systems had a fire resistance of at least 90 minutes. Therefore the addition of the downlights did not have a noticeable affect on the overall fire performance of the test specimen.

There were some differences in the design of the test specimens described in sections 3.1 and 3.2 but we do not consider these differences are significant when considering the affects, if any, of the downlights for the following reasons. The differences in the two tested constructions (BRE 250516 with the CW185 downlights and BTC Test Report BTC 12486F with no downlights) were the size and span of the joists, and



the type of flooring. Although the floor & ceiling with the downlights had slightly larger joists, it had a greater span and was subjected to a greater applied load. In our opinion this more than compensates for the slightly larger joist size. The chipboard flooring can be expected to perform in a similar manner to the softwood flooring used in the test without the downlights.

The tested downlights remained in situ for the duration of the test. The air temperatures measured within the floor cavity immediately above some of the downlights were similar to those located away from any downlights. The ceiling boards in both tests performed in a similar manner with regards to cracking and falling away from the joists.

The downlights will not be fitted closer to each other than tested and therefore the applied stress on the fire protection ceiling system in practice will not be greater than tested. The location of any downlight will not be closer to a joist than tested and therefore the joists in practice will not be subjected to any excessive localised heating.

Although the downlights have not been tested in a floor & ceiling system with a fire resistance of 60 minutes, we are confident that they would not have a noticeable detrimental affect on the fire performance of such floors & ceilings, providing the ceiling is at least 25mm thick, and comprises of the gypsum boards specified in section 4.2. Our opinion is based on the overall fire performance of the downlights in the 90-minute floor & ceiling system and our general knowledge of the fire performance of such ceiling systems.

5.3 Floors with 30min. fire resistance

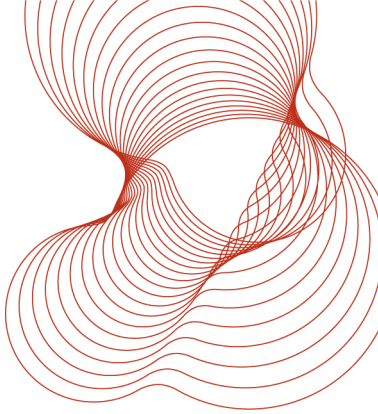
The performance of the lights when mounted in a timber floor and ceiling construction which has a nominal fire resistance of 30 minutes when tested to BS EN 1365-2 : 2000 is demonstrated in the BRE test report 260284, summarised in section 3.4 of this report. Although the test specimen only satisfied the integrity performance criterion for 29 minutes 39 seconds, we consider that the affect, if any, of the downlights on the fire resistance of the test specimen is insignificant when we compare this result with those of similar floor and ceiling systems which have been tested without downlights. These floor and ceiling systems typically only exceed the required 30 minute period by a minute or so. In addition, we have carefully studied the overall fire performance of the ceiling and the downlights, including the temperatures measured within the cavity above the ceiling, and we have concluded that the slight shortfall in the fire resistance period achieved is not caused by the downlights.

5.4 Testing to BS 476 : Part 21 : 1987

In our opinion these conclusions can also apply to similar floor and ceiling systems that have already been successfully tested to BS 476 : Part 21 : 1987 as the heating conditions of this standard are generally regarded as being less onerous than BS EN 1635-2 : 1999.

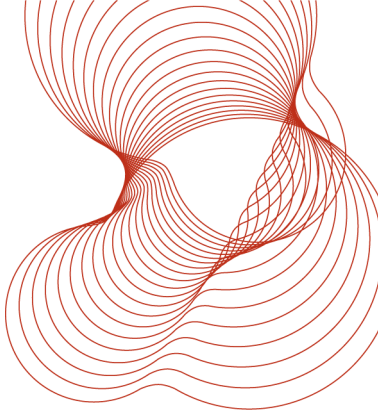
5.5 Variations on the DL/XX/F/XX downlight

All the variations in the DL/XX/F/XX downlight that are listed in section 4.1 are stated to be the same as tested in BRE test report 260284 except for different paint decorations on the front face of the product, or IP-rated versions. We do not consider that these variations will have a noticeable affect on the overall fire performance of the fitting.



6 Conclusion

We have considered the general fire performance of the Halers Lighting downlights DL/XX/F/XX and its variations, when mounted in a fire protection ceiling secured to the underside of a timber floor construction and have concluded that these fittings can be installed in any timber floor and ceiling system as described in this report, which has already been successfully tested for at least 30 minutes, 60 minutes or 90 minutes to BS EN 1365-2 : 1999 or BS 476 : Part 21 : 1987, without having a noticeable affect on the overall fire resistance of the floor and ceiling system.



7 Validity of the Assessment

7.1 Declaration by applicant

- We the undersigned confirm that we have read and complied with the obligations placed on us by the UK Fire Test Study Group Resolution No. 82 : 2001.
- We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which this assessment is being made.
- We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.
- We are not aware of any information that could adversely affect the conclusions of this assessment.
- If we subsequently become aware of any such information we agree to cease using the assessment and ask BRE Testing to withdraw the assessment.

Signed:

For and on behalf of:

This assessment report is not valid unless it incorporates the declaration duly signed by the applicant.

7.2 BRE Testing declaration

This assessment is issued on the basis of test data and information to hand at the time of issue. If contradictory evidence becomes available to BRE Testing the assessment will be unconditionally withdrawn and the applicant will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence over an expressed opinion. The assessment is valid for a period of five years after which it should be returned for review to consider any additional data which has become available or any changes in the fire test procedures. Any changes in the specification of the product will invalidate this assessment.

This assessment has been carried out in accordance with Fire Test Study Group Resolution No. 82. It relates to the fire performance of the product and does not cover aspects of quality, durability, maintenance nor service requirements. This assessment relates only to the specimen(s) assessed and does not by itself infer that the product is approved under any Loss Prevention Certification Board approval or certification scheme or any other endorsements, approval or certification scheme.

Next review date: 23 July 2015

==========REPORT ENDS==========