



HELPING TO CREATE SAFER BUILDINGS

STANDARDS, REGULATIONS AND GUIDANCE

OWAcoustic® Fire resistant ceilings range 2019

OWA

Overview of the main OWAcooustic® fire resistant ceiling systems



Corridor Pro

A smart, easily demountable, concealed grid system with plank size panels spanning the corridor offering good levels of acoustic absorption and 60 minutes fire resistance to steel beam concrete floors.

See page 8 for more details



Steel Pro

An attractive, cost-effective, standard modular ceiling system that meets the acoustic requirements for schools and achieves 60 minutes fire protection to steel beam concrete floors.

See page 9 for more details



Timber Pro

Meets the challenging requirements of providing 60 minutes fire resistance to timber floors, including refurbishments.

See page 9 for more details



Mezz Pro

Protects mezzanine floors for 60 minutes (typically used in shops and warehouses).

See page 10 for more details



Specialist Systems

OWA systems have achieved successful results in hundreds of separate fire tests covering dozens of systems including monolithic ceilings.

See page 10 for more details

Preface - and purpose of this document

Introduction

The report of Dame Judith Hackitt following the tragedy at Grenfell Tower, in 2017, urged building materials manufacturers to take more responsibility in clarifying the complex subject of fire safety – to clearly describe the fire performance of their products, prove compliance, recommend tested systems, not just components, and to take responsibility to ensure that the right products are delivered and then installed correctly.

A common and uninformed question in the ceiling sector is “are your ceilings fire rated?” and the level of knowledge is often inadequate or un-specific as to whether the requirement relates to Reaction to Fire, or Resistance to Fire.

The Hackitt Review identified a lack of leadership within the construction and fire safety industries as a contributory failure on building safety. I want the construction industry to drive action on building safety now, leading from the front and changing practice and behaviour.

(Secretary of State for Housing, July 2018)

OWA UK has responded accordingly and in this brochure presents a range of fire resistant ceiling systems, branded according to their application to avoid misunderstandings, each with current test certification and drawings. The aim is to demystify the subject and to clearly explain the relevant standards and regulations in the UK, in order to ensure compliance and to reduce risk for clients. OWA approved installers and customers are offered structured training to increase the chances that the specified system is delivered and built properly to protect the building occupants and also preserve the building fabric.

The environmental effects of a serious and fully developed fire can be seen for miles around. The toxic smoke and pollution can be clear to see. Less visible is the emotional effect on children who have lost their school, or the financial impact and disruption to organisations. This terrible waste of resources and the subsequent costs of re-building might be avoided through good practice and informed choices of materials.

- One in twenty Schools has a fire each year
- 60% of school fires are started deliberately
- The average cost is > £100,000

OWAcoustic® mineral ceiling systems – naturally effective in fire situations

OWAcoustic® ceiling systems perform exceptionally well in fire situations due to their formulation of fire safe raw materials consisting mostly of mineral wool made from silica (sand) and limestone, mixed with clay. Clients can draw on OWA's experience to improve their knowledge and help them to navigate through the complexity of information concerning suspended ceilings and fire safety. OWA understands the behaviour and performance of ceilings in fire situations and is the market leading manufacturer of mineral ceiling systems in Germany, where the standards for fire resistance exceed those of most other developed countries. Whether there is a need for the ceiling system to provide specific periods of Resistance to Fire, or simply to be 'Fire Safe' with regard to 'Reaction to Fire' tests, it may be reassuring to know that the natural formulation of OWAcoustic® materials offers superior fire resistance and can help contain fires and add to the fire protection of the ceiling void and of the floor above.



Comparison of common ceiling material types and reaction to fire

Most of the popular suspended ceiling tiles produced by major European manufacturers are safe in the event of fire and are typically classified A2-s1, d0, according to BS EN 13501-1 and Class O to UK building regulations, easily surpassing the requirements of UK building regulations (AdB) or fire codes for healthcare (HTM 05-02) or education (BB100).

Comparison of common ceiling material types and their resistance to fire

The fire resistance performance of commonly used ceiling tiles varies considerably and depends upon the composition, porosity and density of the material. Mineral ceilings of medium density, with high levels of mineral wool composition and clay fillers can provide effective fire resistance for periods of up to 180 minutes, tested above furnaces with temperatures over 1,100°C. Mineral tiles with low levels of mineral wool and high cellulose (paper) content are not likely to perform as effectively. Meanwhile, low density glass wool tiles have a limiting temperature of less than 300°C, and will melt at temperatures between 400–700°C, so will not generally be capable of achieving fire resistance tests for periods of e.g. 60 minutes. Low density mineral tiles might have high limiting temperatures but their open structure can allow heat to move through the ceiling tile and fail the fire insulation requirement. Similarly, steel starts to lose its strength above 400–600°C so most standard metal suspended ceiling systems are not capable of providing long periods of fire resistance, without protection.

the chosen suspended ceilings or other elements of a building comply with Building Regulations has changed in recent years and, following governmental deregulation and the Regulatory Reform (Fire Safety) Order 2005, regulations are intended to be less prescriptive. The responsibility to check compliance or suitability can be delegated to other competent persons to perform an assessment of risk, to determine whether the design of the building is safe for its occupants in the event of fire. This responsibility may rest with the architect, client, builder, distributor, installer, building owner or tenant, or whoever has accepted the responsibility to recommend the solution, to ensure that the building is safe for its occupants. Any person who has some level of control in premises must take reasonable steps to reduce the risk from fire and make sure people can safely escape if there is a fire. This includes any deviation from the system specified.

An individual product or system should be fit for purpose within the context of the design of a building and its intended final use. In addition to impacting compliancy and warranty, if the original specification/guidance is not followed or approval gained to deviate from the original specifications from the relevant party (ie architect, fire engineer, main contractor or client) design liability will pass to the party implementing any changes.

(FIS, 2018)

The Building Regulations – What is the legal requirement for fire safety in buildings?

The legal responsibility is simply to provide reasonable standards of fire safety for people in buildings and Approved Document B provides guidance about certain ways in which this might be achieved.



Building Regulations – Guidance - Approved Document B, Volume 2, 2010

Building Regulations Approved Document B provides practical guidance on meeting the fire safety requirements of the Building Regulations 2010 (England and Wales) and Building (Scotland) Regulations 2004 respectively.

Multi storey buildings require greater periods of structural fire resistance as illustrated in the extract below from Approved Document B Table A2, Minimum Periods of Fire Resistance (minutes).

Height of top floor above ground level				
	<5m	<18m	<30m	>30m
Block of flats	30	60	90	120
Offices	30	30	60	120
Shops	30	60	60	120

Who is responsible to ensure compliance?

The Hackitt report (2018), following the Grenfell Tower tragedy, highlights a lack of clarity and transparency about responsibility for ensuring fire safety in buildings. The responsibility to check whether

Reaction to Fire

Building Regulations require that internal linings such as ceilings in non-residential buildings shall adequately resist the spread of flame over their surfaces; and if ignited shall have a limited rate of heat release or rate of fire growth. In the circulation spaces of commercial buildings, including the common areas of blocks of flats, ceilings should achieve a minimum performance level to the national classification 'Class O' or to the European classification B-s3, d2 according to BS EN 13501-1. Lining materials should prevent the rapid development and spread of a fire in its early stages.

"The choice of materials for walls and ceilings can significantly affect the spread of a fire and its rate of growth" (BB100, 5.1.3.1). The European Standard BS EN 13501-1 provides performance criteria to measure reaction to fire characteristics of materials such as ceilings.

Reaction to fire - BS EN 13501-1	Euroclass	Example
Do not lead to flashover	A1	Brick
Do not lead to flashover	A2	Mineral Wool
Do not lead to flashover	B	Birch plywood FR1
Flashover after 10 minutes	C	Birch plywood FR2
Flashover after 2-10 minutes	D	PIR foam + alufoil facing
Flashover in less than 2 minutes	E	PUR Foam + flexible laminate facing
Unclassified	F	Expanded polystyrene type N

BS EN 13501-1 goes further than BS476 'Class O' and also requires tests in fire situations for levels of smoke emission and of burning droplets that might cause fires below. Smoke is often the main cause of injury in fires.

Reaction to Fire BS EN 13501-1	Level of smoke generation
S1	Little or none
S2	Medium
S3	Heavy

Reaction to Fire BS EN 13501-1	Level of burning droplets
d0	none within 600 seconds
d1	form in <600 seconds do not burn for >10 seconds
d2	exceeds d1 limits

British Standard BS 476 part 6 describes tests to establish levels of fire propagation of materials, whilst part 7 describes tests for the surface spread of flame. These tests will produce similar results to the Euro classes described above.



When the fire starts in an enclosed space, hot smoke-laden gases will rise to the ceiling and form a layer which will flow under the whole ceiling at first and if not controlled it will then deepen and eventually fill the whole space.....The flames will grow in length, increasing in height until they reach the ceiling where they will be deflected horizontally"

(BB100, 2.1.3)

Resistance to Fire

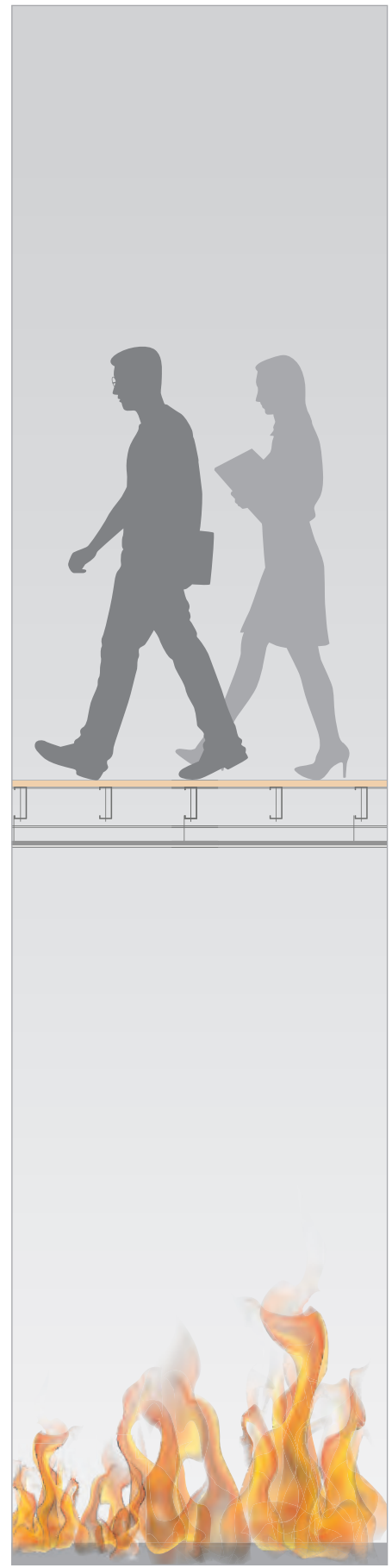
Testing a complete floor and ceiling to resist fire for e.g. 60 minutes requires a structure to be built above a furnace which generates temperatures of up to 900°C.

This type of test is much more challenging to achieve than a simple reaction to fire test. It tests whether an entire floor construction and ceiling can protect people and property above the floor in conditions that aim to replicate a real fire.

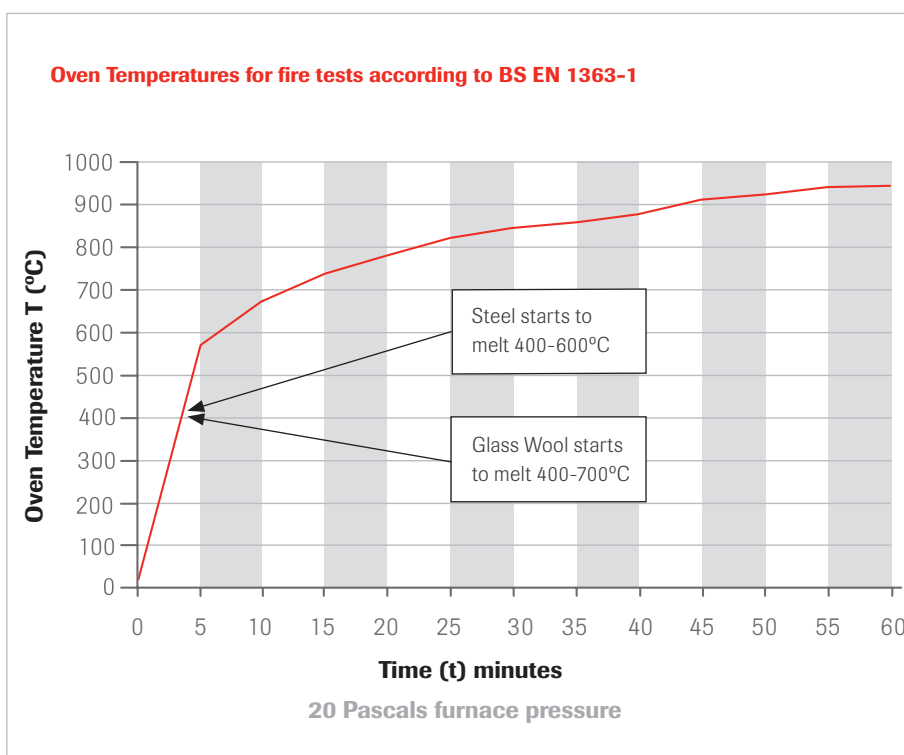
The 2018 revision of Approved Document B will reference both the European standard and the corresponding British Standard relating to fire safety. Both the European Standard BS EN 13501-2 and the British Standards BS 476, when testing the fire resistance of construction elements, require tests to be undertaken for the whole floor or roof structure, including the suspended ceiling. In BS EN 13501-2 there are three requirements (R, E and I) which must all be met to achieve a pass for the specified period, (e.g. 60 minutes).

- R. Tests whether the structural element will collapse or deflect beyond the permitted levels when subjected to the applied load.
- E. Measures the integrity of the room which must be maintained and no breakthrough of flames is permitted.
- I. Measures the temperature difference on the floor above a fire, the non-exposed side of the structural element, which must not rise by more than 140 °K above ambient as an average and by no more than 180 °K at any one location.

BS 476 parts 21 and 22 provide methods to determine the fire resistance respectively of load bearing, or non- loadbearing, elements of construction.



Furnace Temperature Curve - Fire Resistance Tests

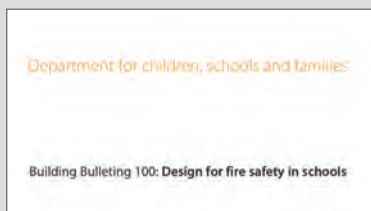


Fire Guidance for Educational buildings (BB100)

The design of fire protection of schools should recognise the extraordinarily high frequency of fires in schools, mostly as a result of arson, so whilst life safety remains the main focus of most fire guidance, in educational buildings there is a strong additional need to try and limit the development of fire. The design of fire safety in schools is covered by Building Bulletin 100 (BB100) (England and Wales) published by the DfES and Fire Safety in Schools (Scotland). BB100 stresses the importance of protecting both the fabric of the building as well as life safety. Each year around 1 in 20 schools experiences a fire and nearly 60% of school fires are started deliberately. In secondary schools, where fires are a frequent occurrence, 43% report a fire occurring in one year with the average loss being £100,000 (CLG Research Bulletin No 10 – Survey of school fires 2006). “The short-term effects of loss of facilities and equipment can be calculated, but the longer-term effects of loss of coursework, disruption of classes and lowering of morale are much harder to quantify. However, it is clear that a major fire is likely to disrupt a child’s education for many months”.

The guidance provided in Tables A1 and A4 is for the prime purpose of life safety. Levels of fire resistance for protection of the building fabric and its contents may need to be modified accordingly, either for longer resistance times or higher levels of performance. This may be appropriate to provide enhanced resilience of the structure against the effects of fire over longer exposure times in post flashover conditions than are routinely considered normal for the provision of safe escape.

(BB100)



BB100 Table A2 requires 30 minutes fire protection of structures for single storey schools where sprinklers are installed and 60 minutes for multi storey schools and where there are no sprinkler systems. In schools up to 18m in height, fire-protecting suspended ceilings for floors in escape routes are required to provide 60 minutes protection for compartment floors and achieve ‘Class O’ reaction to fire on both surfaces. “In order to reduce the extent of property damage, all floors in unsprinklered schools should be compartment floors” (BB100 6.3.2.1).

Fire Guidance for Healthcare buildings HTM 05-02

Hospitals and other healthcare environments by their very nature contain people who are more likely to be at risk from fire and who may not be able to be evacuated quickly so the design of fire protection may extend beyond the requirements of Approved Document B of building regulations. Health Technical Memorandum (HTM) 05-02, 2015 covers the fire safety design of healthcare facilities. It implies a need for additional considerations about fire safety requirements. Areas may be divided into fire safe compartments, accommodating up to thirty people, whilst the hospital street, a corridor greater than 3m wide, is often an important route for safe evacuation in the event of fire.



The minimum performance in HTM 05-02 regarding reaction to fire in most spaces is European classification B-s3, d2. For resistance to fire the structural elements must be protected to remain stable in fire situations depending on the height of the building; for example, 30 minutes for single storey premises increasing to 90 minutes for buildings over 30m tall (see Table 5 HTM 05-02). A compartment floor must be protected for 60 minutes from below. Whilst a suspended ceiling should not be relied upon to provide this, a ceiling system with limited combustibility, and a system tested for fire resistance, will provide additional protection.



A clear principle of HTM 05-02 is the creation of separate compartments with fire resistance to all compartment walls and floors in order to provide temporary protection for zones in the event of a fire. Materials used to meet this requirement are those of ‘limited combustibility’.

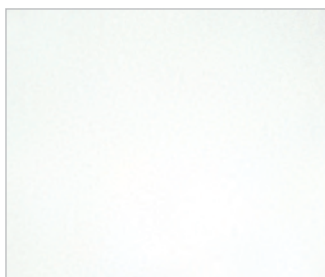
OWAcoustic® Corridor Pro 15mm – system S6a – test No. 285879/6380/CPD & others REI 60

Communal spaces including corridors are likely to be a means of escape in the event of fire so particular attention should be shown to their protection, as specified in building regulations. OWA offers the Corridor Pro system illustrated as an attractive and very practical solution, providing 60 minutes fire resistance as well as Class C sound absorption, easy demounting and a concealed grid system. Planks are supported by metal channel No. 36/70 installed in a concealed slot along the long edges and the short edge simply sits on the heavy duty wall trim, so there is no need for wire suspension which can interfere with building services in the void. Each tile is fully and easily demountable provided the void depth is > 200mm. Penetrations, including luminaires, require fire protection and additional considerations with regard to loading and deflection.

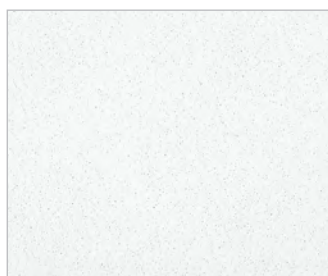
Sizes 1600x300 or 2000x300 x 15mm, trimmed to fit to actual corridor width on site.



Surface patterns available

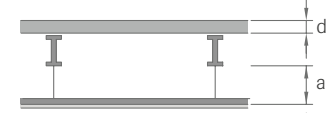
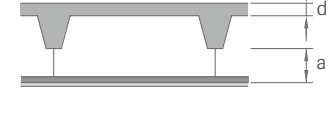



Corridor Pro – Sinfonia
A smooth fleece covering



Corridor Pro – Cosmos Needed
Spatter texture with fine needling

Loadbearing Construction

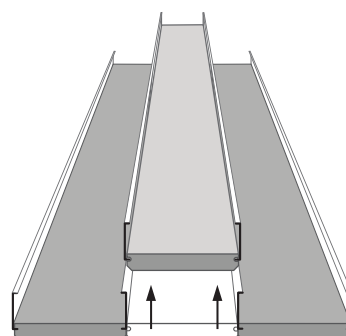
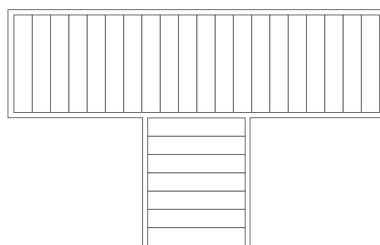
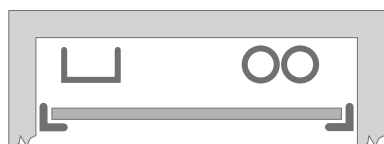
	Steel beam floor/concrete floor KIT-11-01/2008
	Steel beam floor/concrete floor KIT-28-01/2015 – S3
	Steel beam floor/concrete floor KIT-19-01/2011 – S6a

Perimeter

OWA Corridor Pro 1mm thick wall perimeter angle can be fixed to solid walls, lightweight EI 30-Gypsum board walls, EI 30-Gypsum board perimeters* or EI 30-Ceiling level changes*.

Ask OWA UK for detailed guidance and K40 specifications.

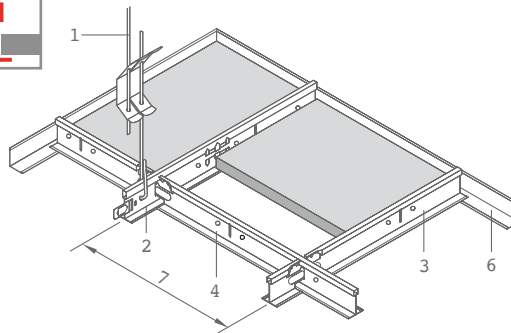
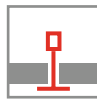
NB Timber shadow batons are NOT fire resistant



OWAcoustic® Steel Pro 15mm – test report No. 3686/137/10-CR & others REI 60

A cost effective standard modular ceiling system that will meet the acoustic requirements for sound absorption in schools according to BB93 and provides easy accessibility. The suspension system used is OWAconstruct system S3.

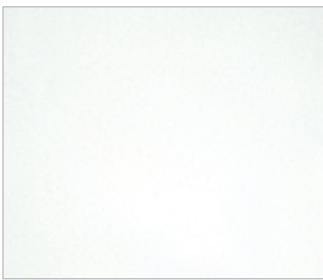
Sizes 600x600x15mm standard modular ceiling system



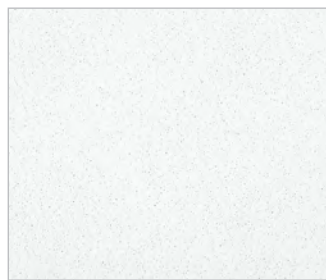
OWAconstruct system S3

- 1 Hanger no. 12
- 2 Main tee no 45, slots at 100 mm, 152.4 mm or 156.25 mm
- 3 Cross tee no 46
- 4 Cross tee no 47
- 5 Cross tee no 48
- 6 Wall angle no. 50G
- 7 Module distance

Surface patterns available



Steel Pro - Sinfonia
A smooth fleece covering



Steel Pro - Cosmos Needed
Spatter texture with fine needling

Loadbearing Construction

	Steel beam floor/concrete floor KIT-11-01/2008
	Steel beam floor/concrete floor KIT-28-01/2015 - S3
	Steel beam floor/concrete floor KIT-19-01/2011 - S6a

OWAcoustic® Timber Pro Sinfonia 20mm – test report WARRES No. 132741 & others REI 60

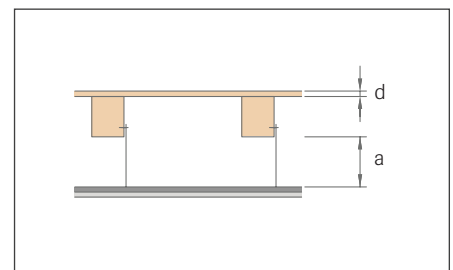
Older buildings might be more challenging to protect and OWAcoustic® Timber Pro suspended ceilings might help to achieve added protection to timber floors. The suspension system is S45G Premium, the same as for Steel Pro above. The tile thickness is 20mm and the main runners of the suspension system need to be installed at 600mm, (rather than the usual 1200mm centres for standard suspended ceiling systems), reflecting the extra challenge of protecting timber floor constructions compared with steel or concrete.

Surface patterns available



Timber Pro - Sinfonia
A smooth fleece covering

Suspension System



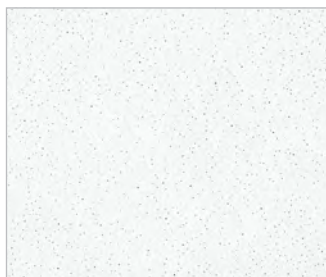
OWAconstruct system S3

- 1 Hanger no. 12/.../2 Main tee no 45, slots at 100 mm, 152.4 mm or 156.25 mm
- 3 Cross tee no 46
- 4 Cross tee no 47
- 5 Cross tee no 48
- 6 Wall angle no. 50G
- 7 Module distance

OWAcoustic® Mezz Pro 15mm – test report WF 106961 others REI 60

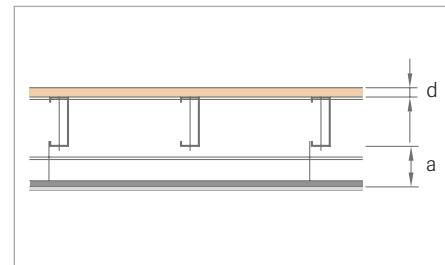
OWAcoustic® Mezz Pro has been specially formulated to offer the best OWA solution for the fire protection of Mezzanine Floors. Mezzanine Floors are constructed from light-weight (often 2mm thickness) steel sections, a far more lightweight structure than a typical steel beam floor and in the fire test a complete floor is constructed above a furnace, protected only by a suspended ceiling. This is an especially demanding test for a suspended ceiling. The loaded mezzanine floor must stay in place and not collapse beyond certain criteria for 60 minutes.

Surface patterns available



Mezzo Pro - Sandila N
Sand covered surface, needled

Mezz Pro System



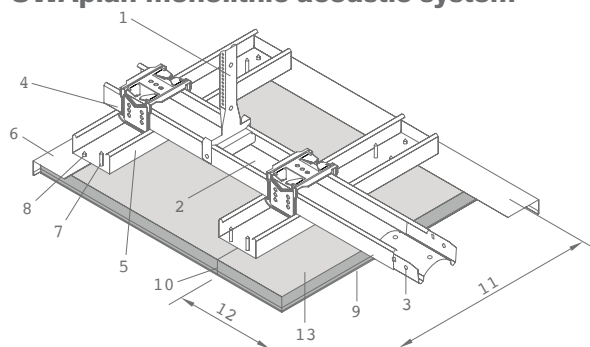
OWAconstruct system S3 (see page 9)

- 1 Hanger no. 12
- 2 Main tee no 45, slots at 100 mm, 152.4 mm or 156.25 mm
- 3 Cross tee no 46
- 4 Cross tee no 47
- 5 Cross tee no 48
- 6 Wall angle no. 50G
- 7 Module distance

Other Systems

The products and systems listed above are a small part of a very broad range of fire resistant ceiling systems from OWA, which include many more modular systems as well as other options for spanning corridors and also systems for special applications, for example, OWApplan and S18p concealed systems shown below.

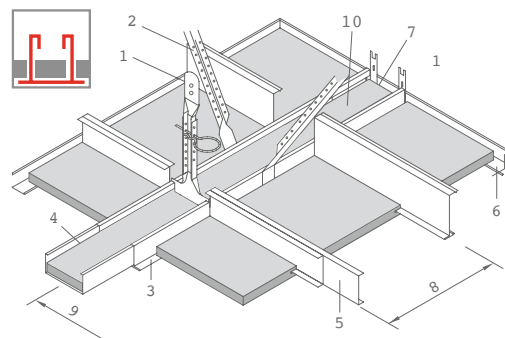
OWApplan monolithic acoustic system



OWAconstruct system S7

- 1 Nonius hanger no. 2001, distance ≤ 1000 mm
- 2 CD profile support grid no. 2003, distance ≤ 1000 mm
- 3 Longitudinal connector no. 2005
- 4 Cross connector clip no. 2004
- 5 CD profile tile grid 60/27 no. 2003, distance ≤ 400 mm
- 6 Wall profile no. 51/22 (example)
- 7 Drywall screw no. 2007, distance ≤ 150 mm
- 8 Metal screw no. 2008
- 9 Surfacing mat + plaster coating
- 10 Tile glue no. 99/24
- 11 Tile width
- 12 Tile length
- 13 OWApplan plaster base tile

Bandrastrer system



OWAconstruct system S18p

- 1 Nonius hanger no. 79/, Nonius hanger extension no. 16/ and safety pin no. 76
- 2 Angle brace no. 17/8
- 3 Bandrastrer profile no. 80/...
- 4 Connector no. 82/...G
- 5 Reinforcement splines for tiles, depending on the span width
- 6 Wall angle no. 51/25 or shadow wall angle no. 50/15G or no. 50/22
- 7 Wall anchor no. 75/...G
- 8 Tile support module distance
- 9 Bandrastrer module distance
- 10 Minowa Strip (15mm thickness)

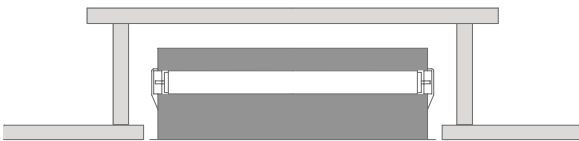
Care with compliance with fire tests – penetrations, deviations, loadings

Ceilings must be installed exactly as the system that was tested. No deviations to the tested system, substitution of components, additional penetrations, nor additional loadings can be deemed to be suitable and perform in the same way as the tested system.

Light Fittings

When installing recessed luminaires in an OWAcoustic® Fire Resistant Ceiling an OWAcoustic® fire box should be installed to ensure continuity of fire resistance. It is important to ensure that the performance of the fire box matches that of the installed OWAcoustic® ceiling.

Recessed light fitting



The recessed light fittings are encased in a 15 mm thick MINOWA® Firebox. When using 20 mm thick OWAcoustic® premium tiles, 21 mm thick MINOWA® tiles should be used.

For details, see OWA Installation Guide no. 9801 e. Also see information sheet on Fire Protection Enclosure no. 9905 e.

Perimeter trims

For Fire Resistant Ceilings the perimeter trims should be installed in accordance with corresponding test report. Only approved fire resistant wall fixings should be used.

Fixing centre \leq 250 mm.

Suspension wire

All tests referred to in this brochure were tested with pre-stressed wire of minimum thickness 2.0mm with fixing ends bound at least three times.

Please refer to the OWA installation guide for more detailed information about each system.



OWA UK Approved Installer Training – fire resistant ceiling systems

OWA UK recognises its responsibilities according to guidance in Building Regulations Approved Document B (AdB) and similar recommendations in Building Bulletin 100 (BB100), the fire guidance for educational buildings. "Since the fire performance of a product, component or structure is dependent upon satisfactory site installation and maintenance, independent schemes of certification and accreditation of installers and maintenance firms will provide confidence in the appropriate standard of workmanship being provided" (AdB). "Third party accreditation of installers of systems, materials, products or structures provides a means of ensuring that installations have been conducted by knowledgeable contractors to appropriate standards, thereby increasing the reliability of the anticipated performance in fire." (BB100). The OWA UK Approved Contractor Scheme for the installation of fire resistant ceiling systems was launched in 2018.

Product Performance, CE marking and DoPs

The European Construction Products Regulation (CPR), 2013, requires the use of CE labelling for construction products sold in the EU. The label shows key performance properties of the product and more detailed information is found in the Declaration of Performance (DoP) issued by the manufacturer.

For fire resistant ceiling systems the CE labels and DoP's are required to cover the whole kit that was tested, including the ceiling tiles and suspension system, according to BS EN 13964 ZA 1.1.

OWAcoustic® ceilings fire performance

OWAcoustic® ceilings offer a very safe choice with regard to performance levels in terms of 'Reaction to Fire'. All OWA ceilings and suspension systems have limited combustibility, achieve Class O to Building Regulations and to European classification, achieve A2-s1, d0 having very low flame spread and low fire propagation (A2), low smoke emission levels (S1) and do not create burning droplets (d0).

The OWAcoustic® systems described in this brochure all achieve 60 minutes fire protection to the stated floor construction BS EN 13501-2.

Further Information from OWA

Technical Support

Technical Experts at OWA UK are also available to guide specifiers to make safe choices when it comes to suspended ceilings and fire safety. Contact us for further information and copies of test report data.

K40 Specifications

Please contact us to discuss your requirements and for a copy of the appropriate K40 specification for a fire resistant ceiling system.

Technical CPD Seminars

OWA UK's Technical CPD seminar 'Fire and Suspended Ceilings' is also now available, covering the key points in this document.

Approved Installers

Contact us for a list of Approved Installers in your area.

e-mail technical@owa-ceilings.co.uk
Telephone +44 (0) 1784 431 393



OWA Group Head Office and Production Facility, Amorbach, Germany

References:

Building Regulations Approved Document B (Page 4)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/441669/BR_PDF_AD_B2_2013.pdf

Building Bulletin 100: design for fire safety in schools (Page 7)

<https://www.gov.uk/government/publications/building-bulletin-100-design-for-fire-safety-in-schools>

Fire safety in the design of healthcare premises (HTM 05-02). (page 7)

<https://www.gov.uk/government/publications/guidance-in-support-of-functional-provisions-for-healthcare-premises>

OWA Installation Guide (Page 10)

owa-ceilings.co.uk > service and downloads > general brochures > installation guide

OWAlifetime collection

owa-ceilings.co.uk > service and downloads > OWAlifetime collection

Independent Review of Building Regulations and Fire Safety (Dame Judith Hackitt Report) (Page 3)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/707798/Building_a_Safer_Future_-_print.pdf

FIS Guidance

<https://www.thefis.org>

Regulatory Reform (Fire Safety) Order 2005 (Page 4)

<http://www.legislation.gov.uk/ukxi/2005/1541/contents/made>



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