

The Guide to



Acoustic Metal Frame System

There is no single best choice for the house soundproofing. On the UK construction market, there are various effective acoustic solutions both for residential and commercial projects. The regulation covering the soundproofing sector is included in:

- Approved Document E (Part E)
- Section 5
- BB93
- BS 8233:1999
- Planning Policy Guidance 24

We can distinguish between sound absorp-

tion solutions and sound transmission solutions. Absorption solutions for walls and ceilings are acoustic wall panels, partitions, insulation, ceiling baffles and suspended sound absorption materials, spray on acoustic plaster, isolating devices, etc. Transmission solutions consist of resilient batens, acoustic cradles, acoustic overlay boards, and a comprehensive range of resilient layers like pre-cast concrete floors, cast in-situ concrete floors and beam and block floors. Sound get to the room from various directions and sources.

First of all, it is essential to understand sound

transmission class (STC) ratings when choosing construction materials. STC rates the materials according to their soundproofing properties. It is recommended to aim for STC rates 30-40. The range of soundproofing solutions consists of acoustic panels, partitions, insulation, cavity closers, spray-applied plastering systems or isolating devices. The structure-borne noise can be reduced with isolating strips, DPC cavity closers and clips. Insulation, plasterboard, soundproof paints or soundproofing doors and windows will block the sound transmission between internal stud walls.

Table 0.1b Rooms for residential purposes – performance standards for separating walls, separating floors, and stairs that have a separating function

	Airborne sound insulation sound insulation $D_{nT,w} + C_{tr}$ dB (Minimum values)	Impact sound insulation $L'_{nT,w}$ dB (Maximum values)
Purpose built rooms for residential purposes		
Walls	43	-
Floors and stairs	45	62
Rooms for residential purposes formed by material change of use		
Walls	43	-
Floors and stairs	43	64

Table source: Approved Document E 2010)

Here we will focus on the sound insulation of walls and ceilings with the soundproofing metal frame system. With the metal stud wall and metal grid ceiling, we can achieve the excellent noise reduction. Noise reduction is achieved by redirecting sound waves or lower the sound waves via the objects intervening the path of sound.

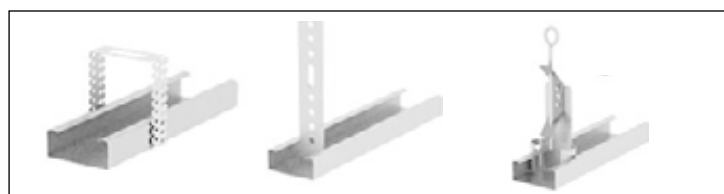
Metal stud wall

Measure and mark the guidelines on the floor, walls and ceiling where to install the wall channels (profile C) and ceilings and floor tracks (profiles U). Mark the opening of the doorway and where to install the vertical channels (profile C). Use the snips to cut the profiles where required. Screw the

floor tracks with TEX screws no more than 600mm apart. It is recommended to use an acoustic tape for insulation. Fix the wall channels and secure them with screws placed no more than 600mm apart. Fit the ceiling tracks again with screws 600mm apart. To create the doorway insert the timber into the floor track for extra support and position the channel for the door head with drywall KSGM or KSGD screws. Insert the vertical channels into the tracks- you can properly fix them with TEX screws. Fix noggins if you require extra support. Attach plasterboards to both sides of the wall.

Dry-lining a soundproofed wall means attaching the acoustic plasterboard to a wall, which results in a smooth surface ready to decorate.

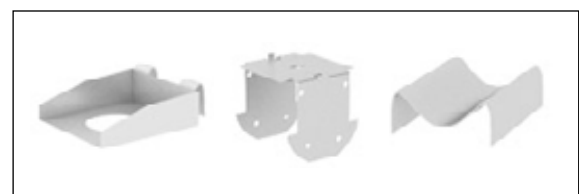
Insert insulation before fixing plasterboard what will add the soundproofing qualities. It's quicker and easier to get a perfect finish this way than with wet plaster. Using acoustic plasterboard is essential. It usually comes in blue colour, with higher density core to provide the sound blocking features. It complies fully with BS EN520 and is categorised as Types A, D. When used with resilient bars in soundproofing metal frame system it will prevent the passage of sound vibrations. To find out how to dry line check April 2016 issue of IBB Builder here: https://issuu.com/ibbbuilder/docs/ibb_builder_single_pages Fix the acoustic plasterboard to the studs or profiles with nails or screws.



hanger ES

hanger WKK

hanger WSO



connectors

Metal frame ceiling

Built with metal profiles, channels, connectors and brackets. For the ceiling grid construction most frequently are used metal profiles CD60 mounted in one- or two- level cross. Suspended ceiling hangers are ES brackets, hangers WSO with wire or joist hangers WKK. The ceiling can be lowered with ES brackets for profiles CD60 which are used to lower the ceiling from 75mm to 225mm. ES brackets are attached to joists or battens. To lower the ceiling from 10cm up to 2000mm-3000mm use the ceiling revolving hanger WSO and suspension wire. To create sloped ceiling use joist hangers WKK. Attach wire to joists or battens and connect with WSO hanger. In the case of ceilings with fire protection hangers, WSO nonius or ES should be used, while for the acoustic ceilings the acoustic hangers. Metal frame ceiling is constructed with the metal channels attached to the existing joists. Using spirit level or laser, mark guide lines on walls for the new ceiling. Follow steps for the required ceiling type:

Single metal grid ceiling system - Install wall metal edge channels (perimeter profile UD27 or UD30), then fix brackets to the joints at intervals of 400mm for 2400 x 1200mm plasterboards. Attached channels to the brackets (main profile CD60) and then apply plasterboard with metal screws.

Bracket high can be altered to level the ceiling appropriately.



Single metal cross grid ceiling system - Install wall metal edge channels (perimeter profile UD27 or UD30), then fix brackets to the joints at intervals of 400mm for 2400 x 1200mm plasterboards. Install channels (profile CD60) on brackets every 1.2-1.5meter and add additional metal channels (profile CD60) every 400mm on the cross brackets. Install plasterboard and dry lined. Bracket high can be altered to level the ceiling appropriately.

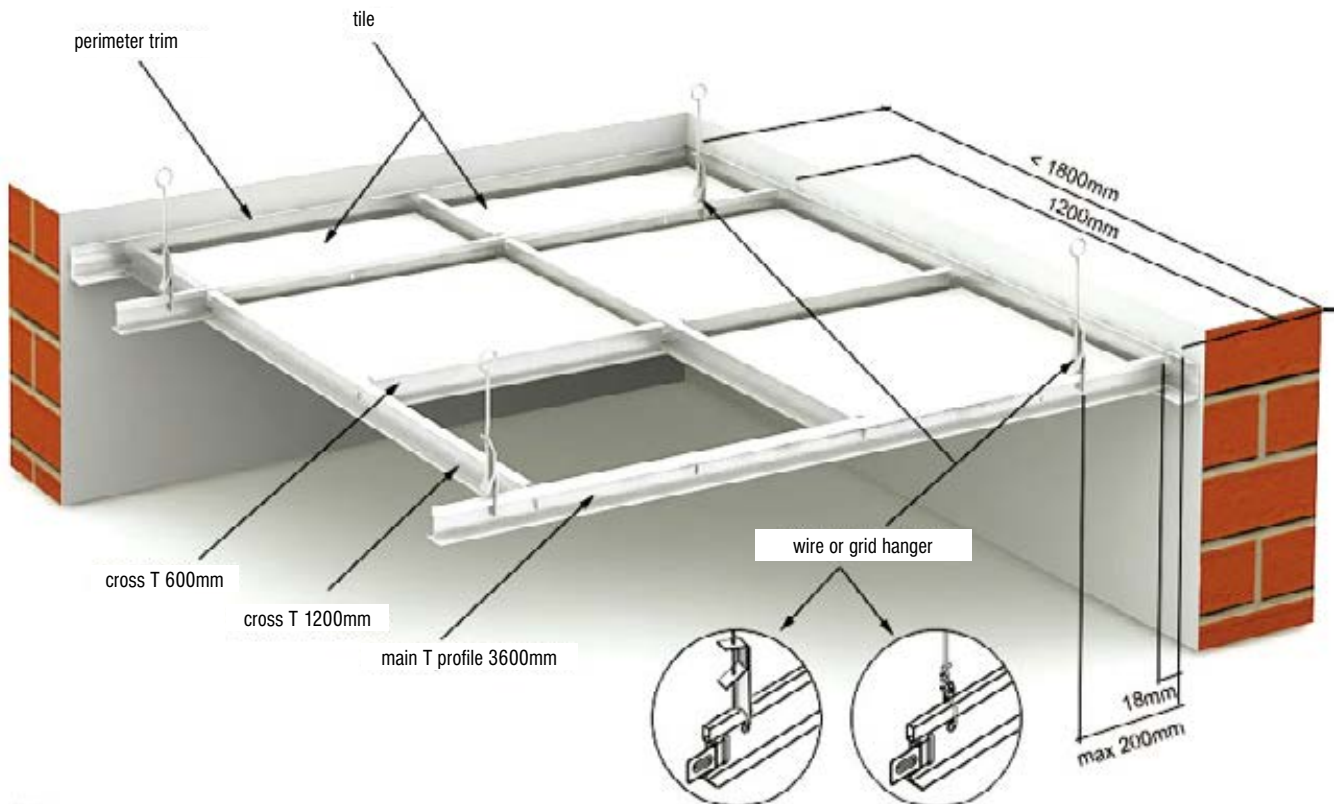


Double metal cross grid ceiling system - Same as the single metal cross grid system but on double

metal channels (profile CD60). To achieve stronger ceiling construction use cross side connectors between main channels (profiles CD60). Such ceiling system is used for higher loading, for double plasterboards.



Resilient metal grid ceiling system - Resilient bars are designed to upgrade ceilings to Building Regulations Approved Document Part E acoustic standards, which will virtually eliminate the possibility of movement problems. Resilient metal grid improves the acoustic performance of the suspended ceiling. Resilient bars are installed directly onto the joists. Plasterboard is then fixed directly to the resilient bar, so there is no connection between plasterboard and the joists. This allows the resilient bars to vibrate and absorbs sound. This metal bar can provide the sound reduction of 10dB. Install resilient bars every 400mm directly to ceiling joists, the first gap from the wall should have no more than 200mm.



Attach plasterboards to resilient bars with screws. Acoustic hangers provide the option of resilient suspension. They do a similar job as resilient bars by stopping the direct connection of plasterboard which is fitted to the metal grid. Acoustic hangers allow for deeper depth between the suspended ceiling and the ceiling structure what allows the increased sound insulation. They reduce the airborne noise which gets to adjoining rooms or from the floor above.

Acoustic tape - a self adhesive acoustic sealing tape is used to decouple studs from surrounding surfaces. Available in thicknesses 30mm, 50mm, 75mm and 100mm. By inserting the acoustic tape in between the stud wall and the floor or surrounding walls and ceiling, the system is much more isolated. Tape reduces the vibration and flanking noise. The acoustic tape can not replace the resilient bar but efficiently increase the walls performance against low frequency vibrations and loud noise.

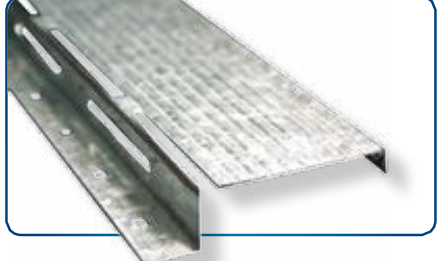
Acoustic insulation - helps achieve Part E Regulations. It is a sound absorbing infill for the reduction of airborne sound between joists, stud partitions, suspended ceiling or with resilient bar for soundproofing ceilings & walls. The first choice material for stud walls & ceilings insulation is the acoustic mineral wool. It gives the proper sound insulation if used as a part of the soundproofing system. The better alterna-

Solution	Ceiling height loss	Performance	Impact Improvement	Airborne sound
Acoustic hangers	85-91mm (ceiling retained)	Good Airborne (4db better than resilient bars)	Preferred over resilient bars when impact sound is high	Approx 18db improvement
Resilient bars	29-35 (ceiling removed)	Medium airborne	Good	Approx 16db improvement

Acoustic hanger



Resilient bar



tive to mineral wool is the sound blocker quilt (both blocks and absorbs sound) or acoustic thermal fleece (more eco-friendly option). The insulation has to be installed into joists of floors and stud partitions.

Mineral wool - Rockwool RWA45 acoustic mineral wool designed to gives the excellent sound absorption when installed into floors, walls and ceilings. It absorbs airborne sound and when used as a part of the system meets the Part E regulation requirements.

Additionally, it will give thermal and fire insulation.

Acoustic roll - Knauf insulation acoustic rolls have been specially developed to utilise the sound absorption properties of glass mineral wool. Acoustic performance of the Knauf rolls is the added benefit of the primary purpose of the thermal insulation. Acoustic roll reduces airborne sound transmission, reduce impact sound transmissions and sound reverberation in the specialist environment.

