in association with Kinetics USA

KINETICS Noise Control

anutone® makes you feel good™

Set

ANTI-VIBRATION SYSTEMS

www.anutone.com/set.htm

Set Brochure 1.3
March 2011

The coming together of Anutone and Kinetics augurs well for the building community of South Asia. Anutone is well-known for deploying scientific methodologies to resolve noise/vibratioin issues in architectural spaces. Anutone straddles the complete value-chain - from design to objective testing. Kinetics is well-known for a rich heritage of innovative products and systems for anti-noise/vibration issues. Anutone and Kinetics together present a select range of high technology anti-noise/vibration products that will usher in quietness to architectural spaces. However severe the problem of noise/vibration - a birthing suite in a speciality hospital, premium suites above the banquet hall in a hotel, executive offices adjacent to an engine room, a call centre below a discotheque - Anutone and Kinetics are sure to have a solution. Starting early during project concept enables an economical snag-free finish. With Anutone, getting precision results right the first time and every time, is never a challenge but a habit!

CONTENTS

Vibration isolators including siesmic restraint

anutone
makes you feel good

Spring

APPLICATION

When the building design calls for the placement of quiet spaces, such as executive offices, conference rooms, theatres, recording studios, hotel guestrooms etc., near noisy mechanical equipment rooms, manufacturing spaces, kitchens, banquet halls etc, true floating floors can be incorporated into the buildings to reduce the transmission of noise and vibration to an imperceptible level.

Spring Floating Floor System consists of load bearing, high density precompressed moulded fibre glass or neoprene isolation pads encased within a cast steel housing.

The cast steel housings incorporate side lugs for reinforced concrete attachment and levelling screws for the raising and final leveling of the floating floor.

Perimeter isolation, isolated floor drains, temporary waterproofing, and factory engineering are all part of the Spring system.

Alternate poured-in-place construction systems or dry systems are also available depending on the requirements of the project. Where high transient or concentrated loads are anticipated, the more cost-effective, pour-in-place system is recommended (see Stand RIM floating floors).

DESCRIPTION

Spring Floating Floor System is primarily specified for areas with irregular perimeter contours or where light to moderate imposed loading is expected.

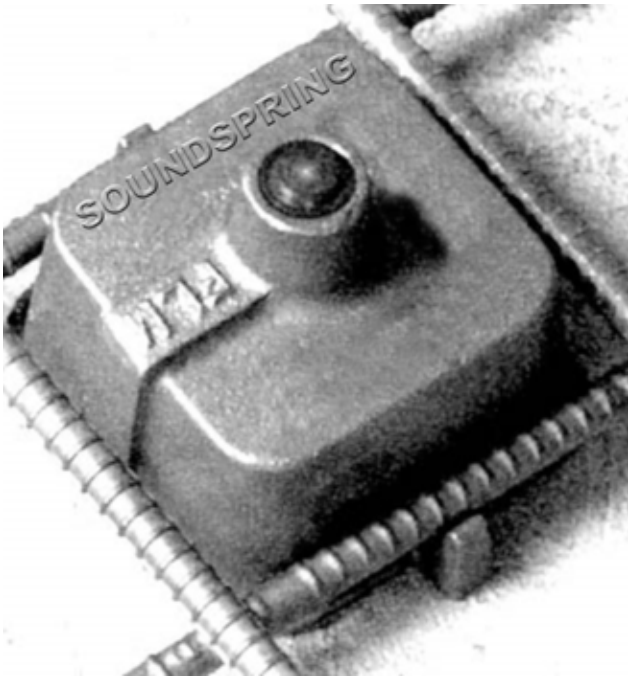
The system uses Spring Mounts which are placed 600 mm to 1200 mm on centres each way on top of a polyethylene bond breaker which has been laid on the structural floor.

Reinforcing bars are then installed across rows of isolators and the concrete is poured. After curing, the slab is raised to operating height using built-in jack screws.

As a final operation, the jack holes are grouted and the perimeter sealed.

The Spring Mount consists of a cast housing with a 50 mm thick high density precompressed moulded fibreglass or neoprene isolation pad, levelling screw, and support lugs for attachment to the reinforcing bars.

Typical Spring Floating Floor Systems have airborne sound transmission class ratings exceeding STC 70 with a 25 mm air space. The STC will increase with a 50 mm or greater air space. The IIC rating for impact noise will meet or exceed IIC 68 based on laboratory testing.



SPECIFICATIONS

The isolator shall be enclosed in a cast steel housing incorporating devices which will enable reinforcing bars to be attached to the isolator assembly. Each assembly shall be furnished with a 20 mm lifting screw to permit lifting of the floating slab to operating level after the concrete is cured. A temporary plug shall be provided to prevent concrete from entering the threaded hole.

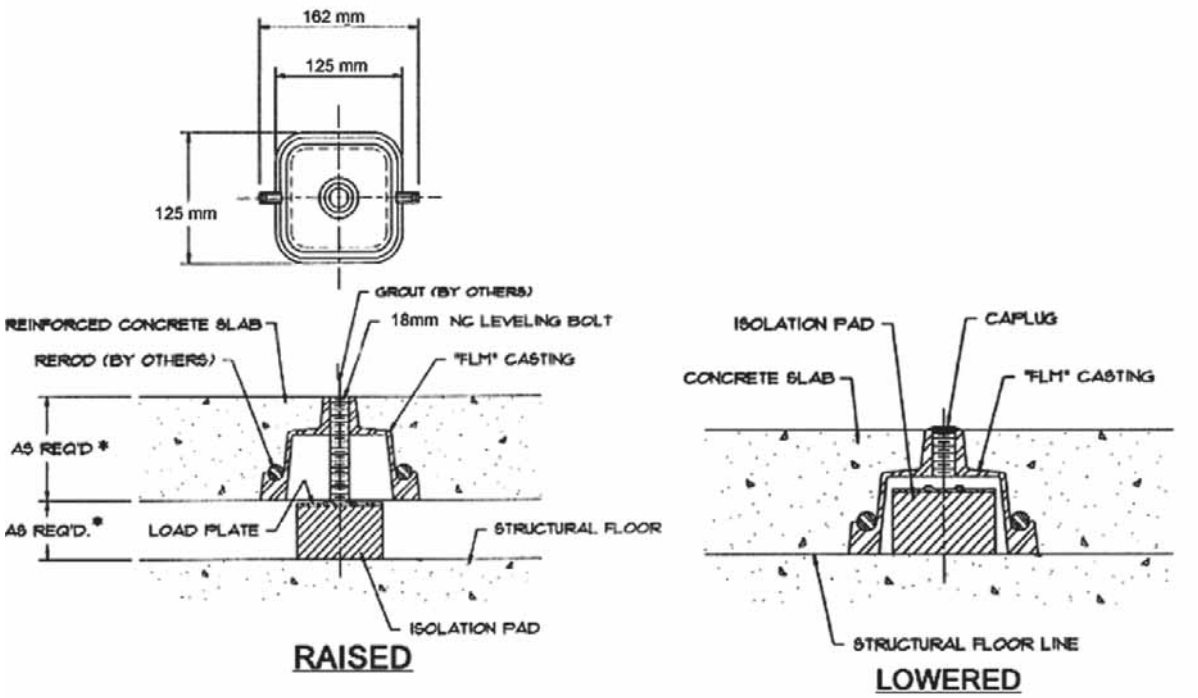
The Lift Slab floor system shall be Spring by Anutone.

Spring Floor Isolation System shall consist of high density moulded pads, each coated with a flexible elastomeric membrane. Isolation pads shall be 50 mm thick and shall be spaced as recommended by the manufacturer but not greater than 1200 mm centres both ways.

Fibreglass pads shall be manufactured from annealed glass fibres stabilised by precompression during manufacture. Fibreglass pads shall be designed to safely withstand a minimum imposed load of 975 kgs/m2 in all high load areas. Fibreglass pads shall have satisfactorily passed WMATA Section 3.49 dynamic test for isolation performance.

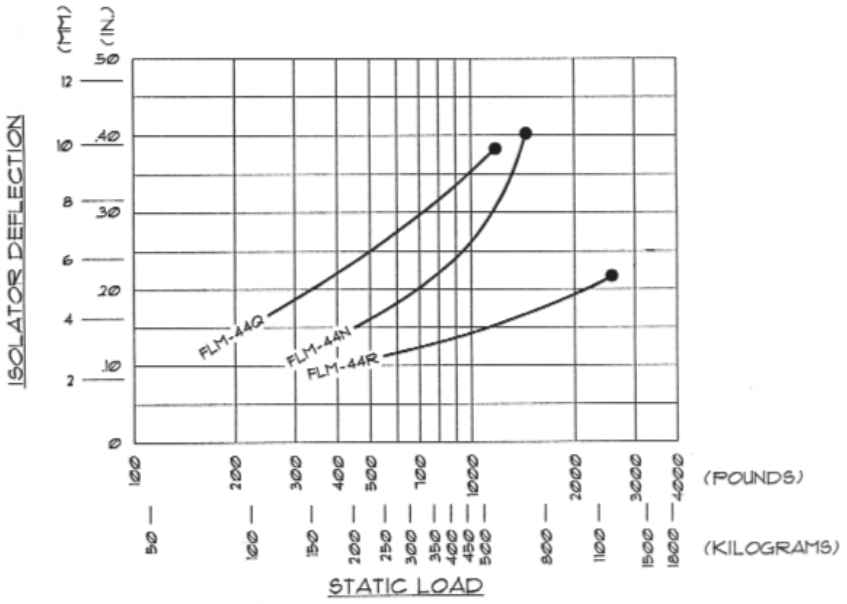
Alternately, high quality neoprene isolation pads can be provided. Standard neoprene pads are bridge bearing 60 durometer, and other durometer and compounds are available upon request.

TYPICAL INSTALLATION



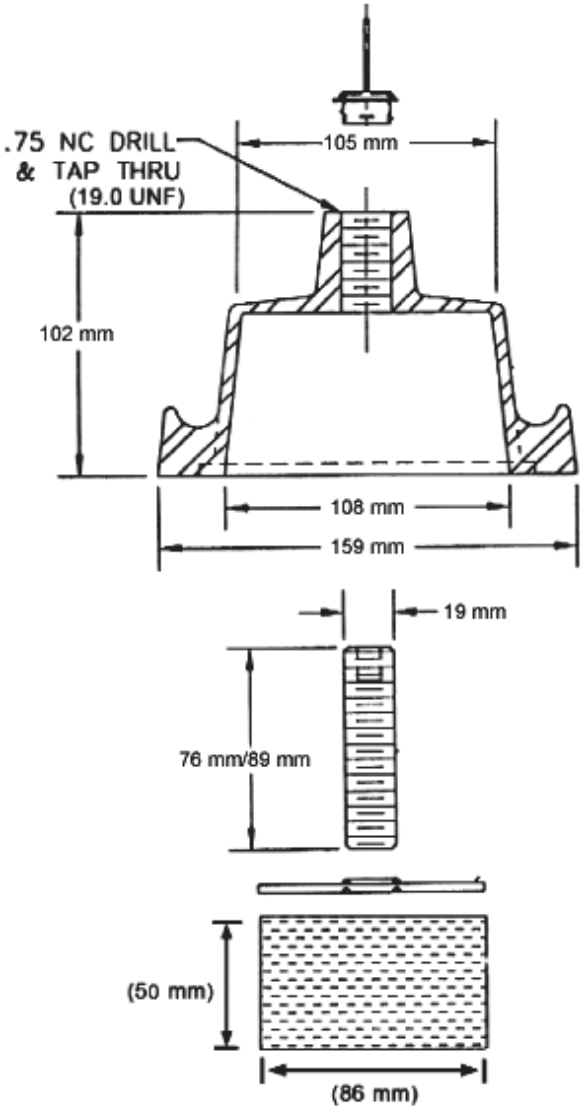
*standard thicknesses are 100 mm concrete and 25 mm or 50 mm air gap lift.

LOAD/DEFLECTION CURVES

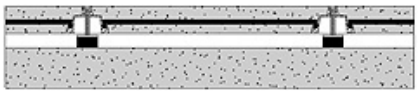
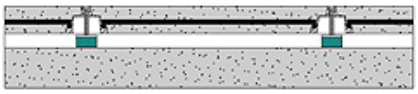
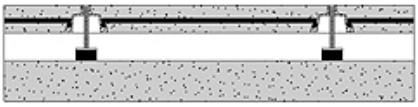


Model	Isolator Pad Type	Air Gap Life mm	Maximum Isolator Capacity kg	Typical Isolator Spacing mm	Maximum Load Capicity kg/m²
FLM44N-25	60 durometer neoprene	25 25 25	680 680 680	600 900 1200	1830 815 465
FLM44N-50	60 durometer neoprene	50 50 50	680 680 680	600 900 1200	1830 815 465

SPRING DIMENSIONS

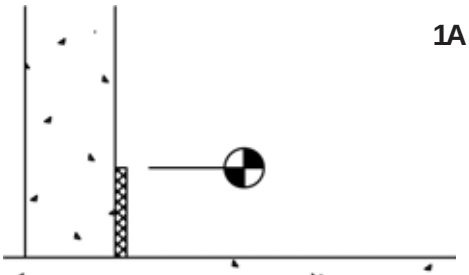


ACOUSTICAL PARAMETERS

Description	Acoustical Properties STC	IIC	Sections
100mm Reinforced Concrete Slab **Spring with Neoprene Pad** 50mm Air Space 150mm Structural Slab	69	61	
100mm Reinforced Concrete Slab **Spring with Fibreglass Pad** 50mm Air Space 150mm Structural Slab	69	61	
100 Reinforced Concrete Slab **Spring with Neoprene Pad** 100mm Air Space 150mm Structural Slab	71	63	

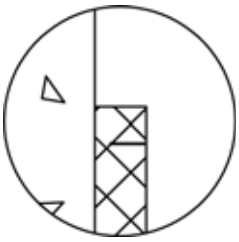
INSTALLATION GUIDELINES

1A



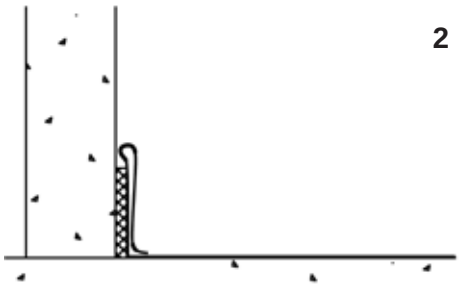
Acousticall Contractor to strike a grid line for top of floating slab and perimeter isolation board (PIB) to meet desired final elevation. Adhere PIB to wall/curb. Ensure top of PIB is at struck gradeline. Adhere PIB to all floor penetrations, columns, pipes, etc...

1B



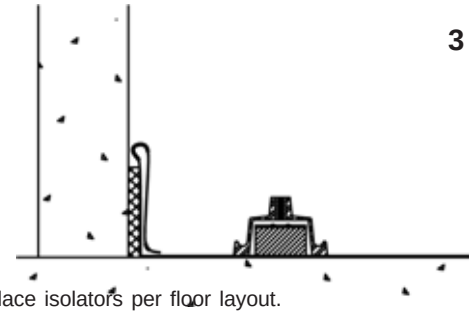
Note: PIB tear strip must be on top with tear slot facing towards floor to be poured.

2



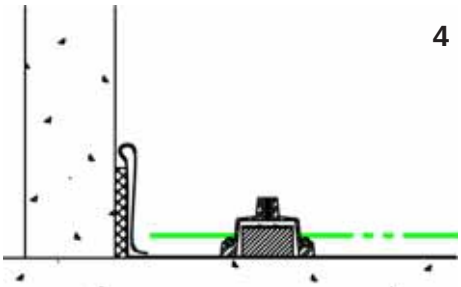
Cover floor with one layer of 6 mil polyethylene film, overflapping seams a min. of 150mm. Extend poly film up and staple or tape to wall or roll back onto floor and tape in place.
Ensure seams are taped to prevent concrete from leaking through.

3



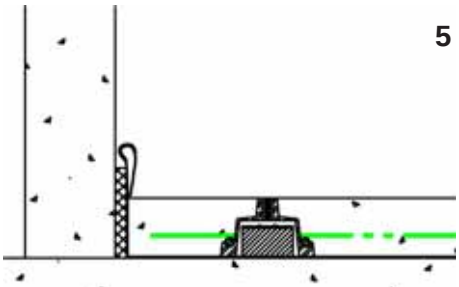
Place isolators per floor layout.
Note: Height of isolators is fixed. The contour/levelness of the structural slab determines the same for the lift slab.

4



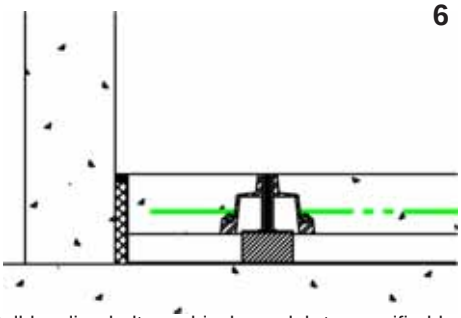
Concrete reinforcement to be placed as per project drawing and design specifications. Start by placing bars on supports on the sides of the isolators.

5



Pour floating concrete slab as per project drawings and design specifications.

6



Install leveling bolts and jack up slab to specified height. Remove PIB tear strip and excess poly film at slab perimeter caulk slab perimeter using Silica sealant per manufacturer's instructions.

Notes:
Concrete must cure to a minimum 3000 PSI compressive strength. After that turn levelling bolts. Turn each bolt 2 turns (max.) in sequence until design operating height has been reached.

Do Not overturn individual bolts or turn them out of sequence, doing so may cause damage to concrete or isolator.

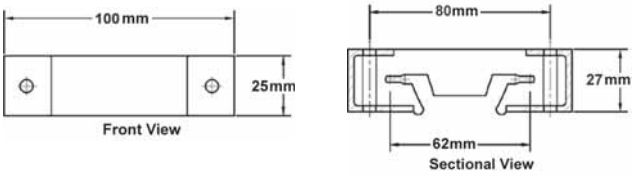
Sway

WALL AND CEILING NOISE ISOLATION

Structurally isolated wall and ceiling systems remain a popular method for mitigating noise and vibration problems. Resiliently mounted noise isolation panels like Smart Septum / Slate / MAT BSB or double wall assemblies are constructed to minimise noise and vibration transmission from one space to another.

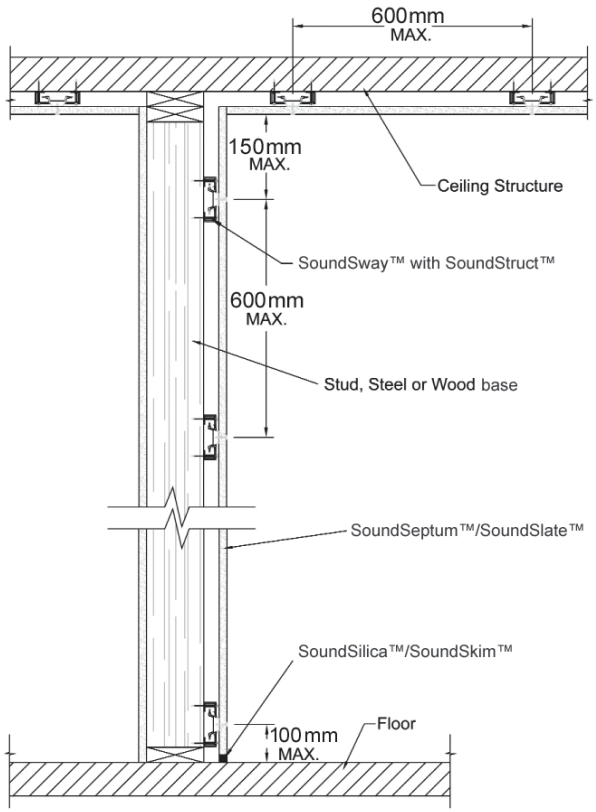
Incorporating Sway, designers can create simple, easy to build walls and ceilings that do not require expensive resilient channel, complex double-wall construction, and/ or additional layers of the heavyweight Septum / Slate / MAT BSB.

Increasing the air cavity and resiliently decoupling the mass of Septum / Slate / MAT BSB from the non-isolated building structure (e.g. civil masonry, wooden joists, steel studs) effectively and economically controls noise and vibration transmission.



APPLICATION

Designers wanting low-cost, space saving ceilings and walls that provide superior noise control employ Sway clips. Sway, attached to ceiling joists, wall studs, or block masonry, simply and easily secures Strut CC22 channels. One or more layers of Septum / Slate / MAT BSB are fastened onto the CC22 channel using common construction practices.



ADVANTAGES

Offering higher STC values, especially in the lower frequencies, than Septum / Slate / MAT BSB attached to other systems, Sway also ensures that installers will not inadvertently screw through the “resilient” leg of other channels or pads into the stud.

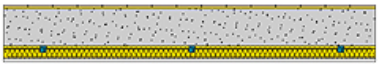
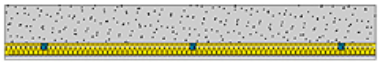
Given the frequent occurrences where resilient channel or neoprene pads are accidentally rendered ineffective because it is hard-attached or ‘bridged’, this feature cannot be underestimated when designing and constructing ceilings and walls for noise and vibration control. This is very useful in low-frequency induced structure-borne vibration conditions, as in subwoofers that have a frequency response of 25Hz to 100Hz, robustly played in night clubs, banquet halls, multiplexes, studios, home theatres etc.

In other words, Sway is scientifically engineered to be ‘idiot-proof’ to site conditions as prevalent in India and rest of Asia.

BENEFITS

- Highly effective noise and vibration control at the lowest installed cost.
- The only product currently in the India market for structureborne vibration (induced in architectural spaces by low frequency propagation) transmission control.
- Very quick and easy to install with Strut CC22 channels.
- Weight capacity - 20 to 27 kgs maximum Load Design, see installation guidelines
- Maximises available occupied space with low-profile design - allows more working space.
- Performance range of STC 57 to STC 64 as per acoustical laboratory tests
- A scientifically engineered product - a substantial improvement versus traditional systems.
- Eliminates problem of 'bridging' that is a common problem in wet construction.

ACOUSTICAL PARAMETERS

Description	Acoustical Properties STC	IIC	Sections
150mm Concrete Slab	53	27	
9mm Wood Floor **5mm Stand** 150mm Concrete Slab **Sway** Strut HCC38 50mm Synth PF 15mm Slate	61	58	
150mm Concrete Slab **Sway** Strut HCC38 50mm Synth PF 15mm Slate	66	44	
15mm Slate 50x100mm Wood Stud Wall Synth PF **Sway with CC22** 15mm Slate	57		
15mm Slate 50x100mm Wood Stud Wall Synth PF **Sway with CC22** 15mm Slate - two layers	61		
15mm Slate - two layers 50x100mm Wood Stud Wall Synth PF **Sway with CC22** 15mm Slate - two layers	64		
15mm Slate - three layers 50x150mm Wood Stud Wall Synth PF **Sway with CC22** 15mm Slate - two layers	65		

15mm Slate 50x100mm Wood Stud Wall 15mm Slate	33		
15mm Slate 50x100mm Wood Stud Wall 15mm Slate **Sway with CC38** 46 Synth PF 15mm Slate			
15mm Slate 50x100mm Wood Stud Wall 15mm Slate **Sway with CC38** 52 Synth PF 15mm Slate - two layers			

Sway Low Frequency Sound Transmission Loss (dB)					
Test Number	Frequency (Hz)				
	31.5	40	50	63	80
E2a	14	21	17	16	24
E2b	16	22	20	23	30
E2c	15	22	24	30	36
E2d	14	24	32	39	38

Transmission Loss (TL) values were calculated at these additional test frequencies. Although the measurements were made in accordance with the procedures described in ASTM E90-99, they do not qualify as part of the standard. Since the results for these low frequencies are representative of the test environment only, they are unofficial and intended for research and development guidelines rather than for commercial purposes.

SPECIFICATIONS

Part 1 – General

1.01 Work Included

A. Furnish all labour, materials, tools, and equipment to install noise isolated walls and/or ceilings. Construct walls and/or ceilings using Sway clip where shown on contract drawings.

1.02 System Description

A. Noise isolation panel like Septum / Slate / MAT BSB or approved equivalent shall be attached to resiliently supported channel like Strut CC22 or approved equivalent to noise isolate the material from the wall or ceiling structure. This resilient attachment substantially reduces sound transmission through the wall or ceiling.

1.03 Quality Assurance

A. The resilient Sway sound isolation clips shall be designed and fabricated at the facilities of a manufacturer having a minimum of five years' experience in furnishing similar noise control products.

1.04 Submittals

A. Submit product data

1. Catalogue cut sheet.
2. Sound Transmission Loss Test Report per ASTM E90-99 documenting a minimum STC 57 wall assembly for a 50x100mm wooden stud wall with one layer of 15mm gypsum board on each side. Also submit same report for a 50x100mm wall assembly with two layers of 15mm gypsum board on each side achieving a minimum STC 64.
3. Sound test reports must be from an independent laboratory, internationally accredited.

Part 2.00 – Product

2.01 Materials

A. Noise isolation clips specified shall be supplied by Anutone. Product shall be Sway Sound Isolation Clips.

B. Vertical Load capacity. Clips shall have sufficient capacity to support wall or ceiling weights as constructed. In a vertical load test comparable to a ceiling installation, the clip shall have a minimum design load capacity of 16 kgs using 0.45mm channel.

The minimum design load capacity when using 0.9mm channel shall be 22 kgs. Design Load capacity shall be based on a safety factor where the load to failure, defined as pullout of the channel from the clip, is a minimum 2.5 times the allowable maximum Design Load. Anchors for attachment of the clips to the substructure shall be selected to support wall and/or ceiling weights at each clip.

C. The isolation clips shall consist of a rubber element into which a standard galvanized steel channel, 22mm. x minimum 0.45mm, is captured. The channel legs snap fit into the rubber element without any metal-to-metal or other rigid contact with building elements.

D. The isolation clip is attached to the wall / ceiling framing or other structural substrate through galvanized steel brackets on each side of the rubber isolation element. The brackets shall be of sufficient strength to carry the wall or ceiling weight without bending or failure.

Part 3.00 – Execution

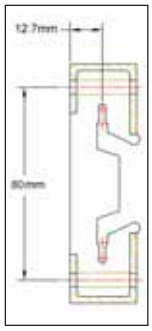
3.01 Installation

A. General – Install work in accordance with the manufacturer's approved installation procedures.

B. Spacing and location of noise isolation clips shall be determined based on wall or ceiling type. Installation drawing details shall be provided to assure optimum noise control and structural integrity of the system.

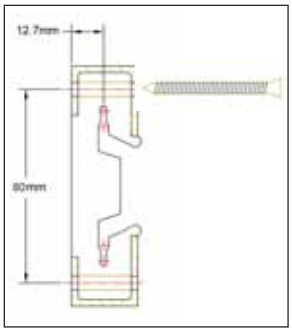
Installation Guidelines

Step 1



Attach Sway as per Anutone Layout guidelines for walls or ceilings.

Step 2



Secure Sway with a single fastener on one end only.

Wood -Use #8 x 64mm coarse thread fasteners - Stitch WB.

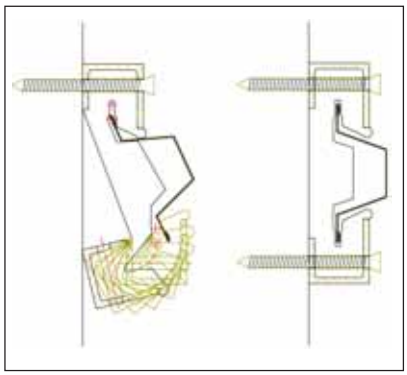
Steel -Use #7 x 30mm or 40mm self-tapping screws - Stitch CSK/DD730/745.

Concrete or Masonry - Use 4.5mm dia x 60mm anchor bolts - Stitch PB.

Optional: Snap clips onto channel. Hand slide clips to proper location on the furring channel. Fasten both ends of the clip to secure the channel.

Step 3

Grip unsecured rubber end, snap in channel. Secure with second screw/ anchor.



Channel Requirements - Strut

Minimum	–	0.45mm sectional thickness with hemmed edges. (HCC for 0.9mm thk)
Standard	–	22mm depth (CC22)
Optional	–	38mm depth for additional airgap (CC38)

Splice Strut channel with a 150mm overlap and secure overlapped pieces with screws (Stitch BTH813) per standard industry practice.

Load Specification for Sway

Sway is designed to carry a Strut channel (hat track) with one or more layers of Septum / Slate board attached.THE LOAD CAPACITY OF SWAY DEPENDS ON THE SECTIONAL THICKNESS OF THE ANUTONESTRUT CHANNEL USED. Lighter, 0.45mm channel carries less load than 0.9mm channel.The maximum design load capacity for Sway in shear (wall application) or in tension (ceiling application) is as follows. Design load calculations are based on tested loading to failure where the Strut channel deforms and pulls out.

	Design Load Maximum for Wall or Ceiling Application	
	2:1 safety factor	2.5:1 safety factor*
Sway with 0.45mm Strut channel	20 kgs	16 kgs
Sway with 0.9mm Strut channel	27 kgs	22 kgs

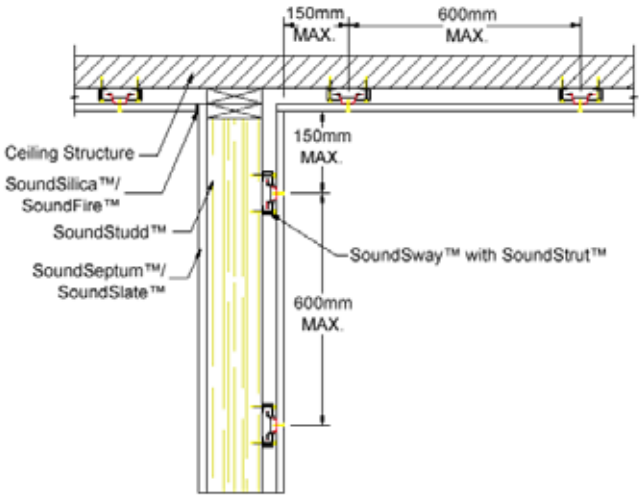
Note : 15mm thick Slate weighs 11 kgs/m2. 12.5mm thick Slate weighs 9 kgs/m2.
*Suggested safety factor of 2.5:1 is for more critical life safety applications like hospital ceilings.

Installation of Sway on Walls and Ceilings

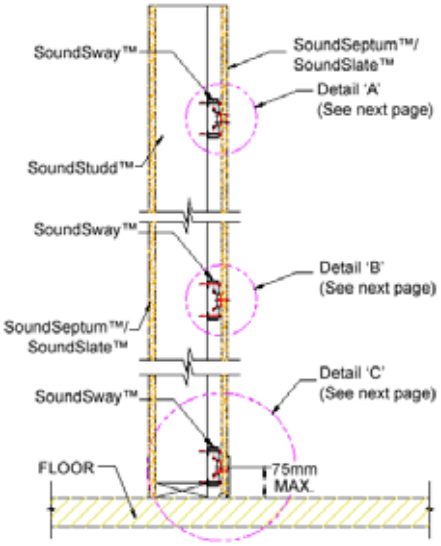
- Spacing of Sway on Strut channels shall be a maximum of 1200 mm.
- Spacing of Strut channels shall be a maximum of 600 mm.
- Use only the required size and sectional thickness of Strut channel per the Channel Requirements section and Load Specification section of this Product Data Sheet (PDS).
- (Walls only) The first layer of Septum / Slate / MAT BSB shall align on the centerline of the Strut channels.
- (Walls only) The bottom row of Sway with Strut channel(s) should be a maximum 75 mm to the centre of the channel from the floor. The top row should be within 150 mm of the ceiling.
- (Walls only) The first row of Septum / Slate / MAT BSB at the bottom of the wall shall be installed with the long dimension supported on a 5 mm thick continuous resilient isolation strip, Stand.
- (Ceilings only) Sway should be within 300 mm of the ceiling perimeter at the end of the Strut.
- (Ceilings only) The first row of channel at the ceiling perimeter should be a maximum 150 mm from the wall.
- Strut channels are installed perpendicular to the framing members.

General Information

- All potential noise leaks like gaps around outlets, doors and window frames, plumbing penetrations etc must be sealed with a non-hardening resilient caulking compound like Silica or Fire.
- All potential flanking noise transmission paths like HVAC ducts, glazing mullions etc must be suitably treated.
- The services of an independent professional acoustical consultant is recommended.

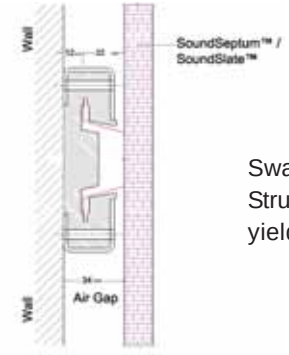


WALL/CEILING SECTION



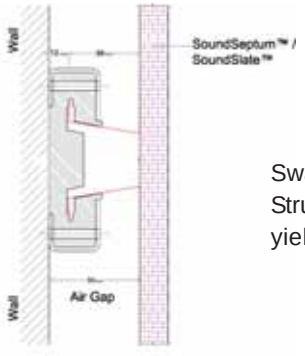
WALL/FLOOR SECTION

Approximate airgap realised for acoustic infill like Synth PF 10x25 with Sway



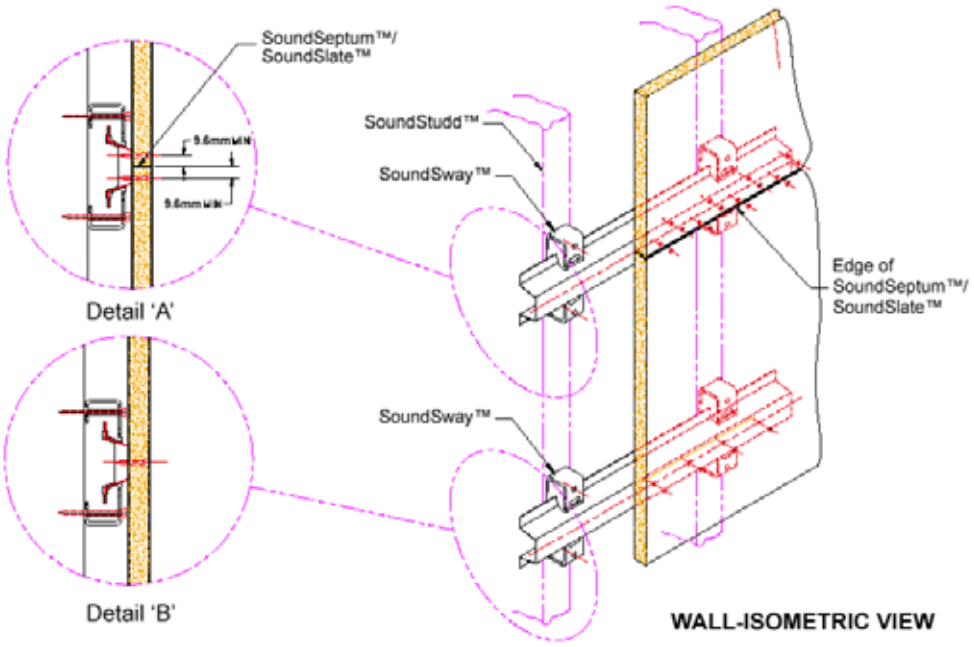
SoundSway™ with SoundStrut™ CC22

Sway with Struct CC22 yields 34mm airgap

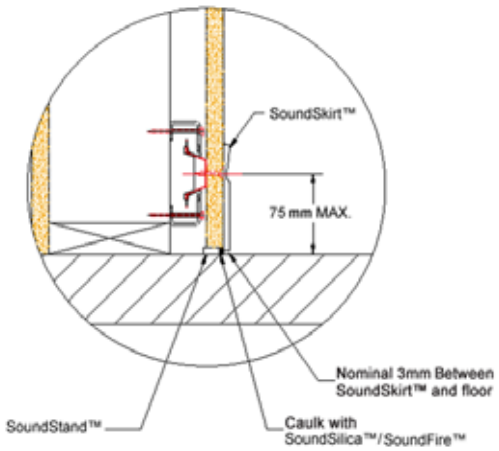


SoundSway™ with SoundStrut™ CC38

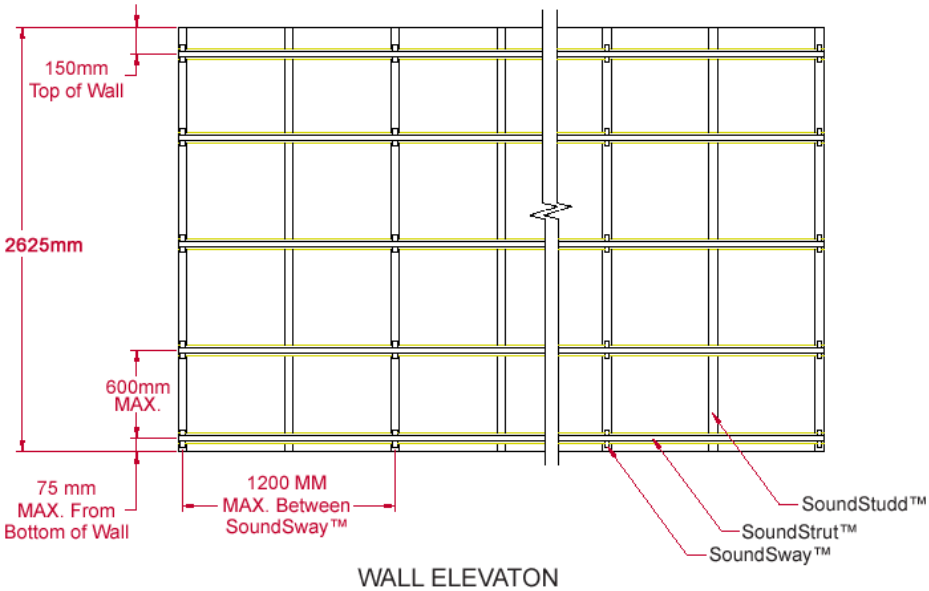
Sway with Struct CC38 yields 50mm airgap



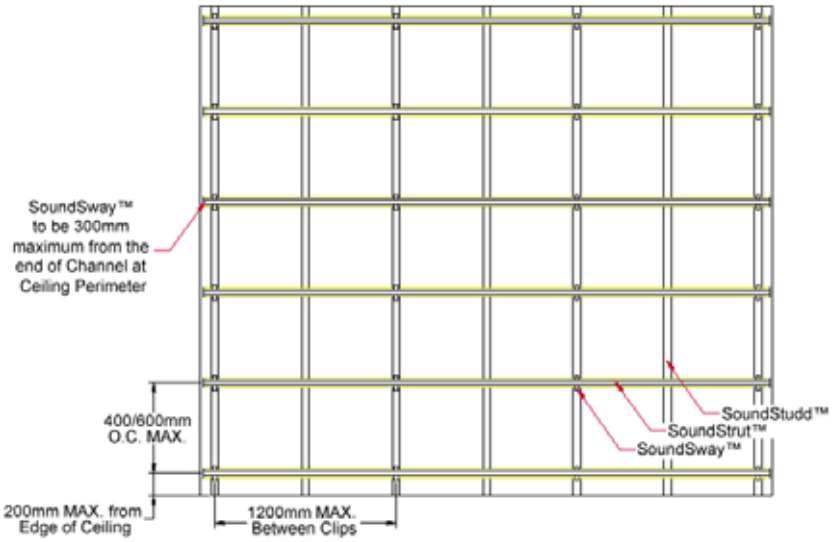
WALL-ISOMETRIC VIEW



Detail 'C'

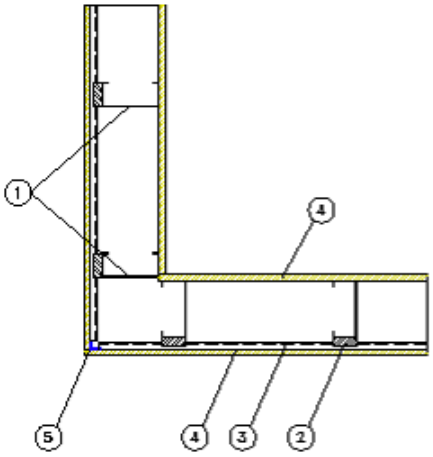


WALL ELEVATON

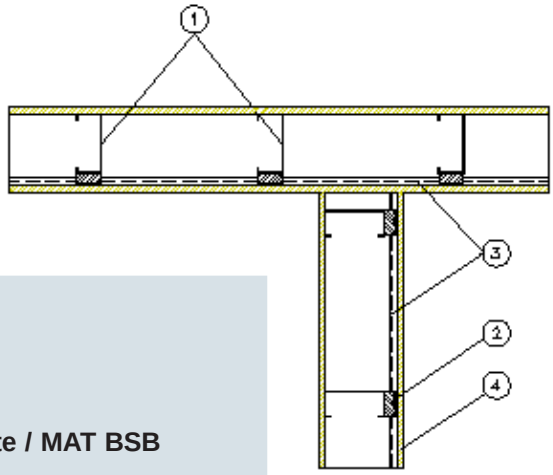


REFLECTED CEILING PLAN

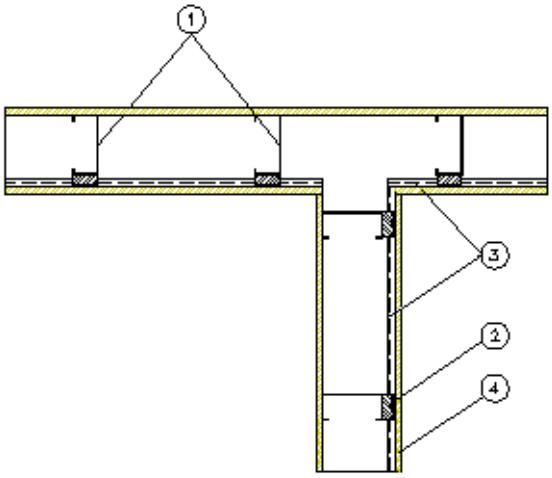
NOISE ISOLATING WALL WITH CORNER JUCTION



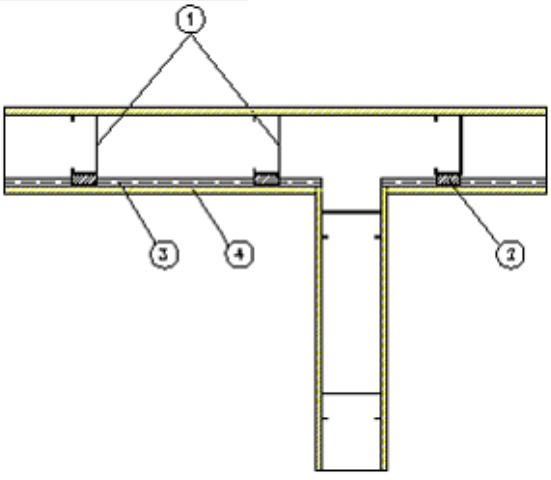
NOISE ISOLATING WALL INTERSECTION - BOTH WALLS ISOLATED 1



1. Studd
2. Sway
3. Strut
4. Septum / Slate / MAT BSB
5. Space angle (other)



NOISE ISOLATING WALL INTERSECTION - BOTH WALLS ISOLATED 2



NOISE ISOLATING WALL INTERSECTION - ONE WALL ISOLATED

Suspend AF

Description

Suspend AF acoustical ceiling hangers are specifically designed as a vibration isolator for use in wire/rod supported, suspended ceiling systems like Skelet.

Suspend AF are a combination of uniquely permanent, very high density fibreglass and a zinc-plated metal assembly. This creates a combination that is essentially non-corrosive in all typical building environments.

The incorporation of galvanized 12-gauge wire adapts Suspend AF directly into the standard tie wire system used by acoustical ceiling installation contractors.

Suspend AF is available in two load ranges:

- Suspend AF-100 load range, 9-46 kgs, used for lightweight acoustical tile ceilings like MAT.
- Suspend AF-200 load range, 23-90 kgs, used for heavyweight gypsum board and plaster ceilings like MAT BSB / Slate.

Both will carry a 500% overload without failure.

Application

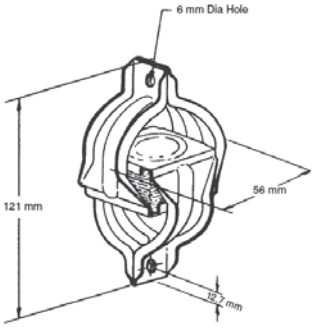
Suspend AF is recommended for use in acoustically isolated ceiling systems.

MAT tile ceilings can be supported by Suspend AF-100 to stop high frequency “buzzing” of the ceiling grid work, caused by equipment such as transformers, chillers, and other mechanical equipment sources in the audible frequency range.

Heavy ceilings of MAT BSB / Slate gypsum board can be supported by ASuspend AF-200 to increase the overall sound transmission loss.

Still heavier multiple layers of Slate gypsum board are supported by Suspend ICC or Suspend KSCH (see next pages).

Suspend AF is delivered fully assembled and ready for use.



Specifications

Hangers shall consist of a fibreglass isolator encased in an antishort-circuit reinforced steel bracket which will accommodate up to # 8 suspension wire or a 6 mm bolt screw.

The fibreglass isolator shall be 25 mm thick, pre-compressed, moulded fibreglass composed of glass fibres produced by a multiple flame attenuation process which generates nominal fibre diameters not to exceed 5.6 microns and shall have been stabilised by recompression 10 times to 3 times the maximum rated load of the material used.

The hanger assembly shall be zinc-plated reinforced steel and shall carry a 5 times maximum rated load overload without failure.

Hangers shall be Suspended AF as supplied by Anutone.

Features

- Permanently resilient fibreglass isolator pad
- Constant natural frequency in wide load range
- Load capacities - 9 kgs to 90 kgs
- 500% overload fail-safe assembly

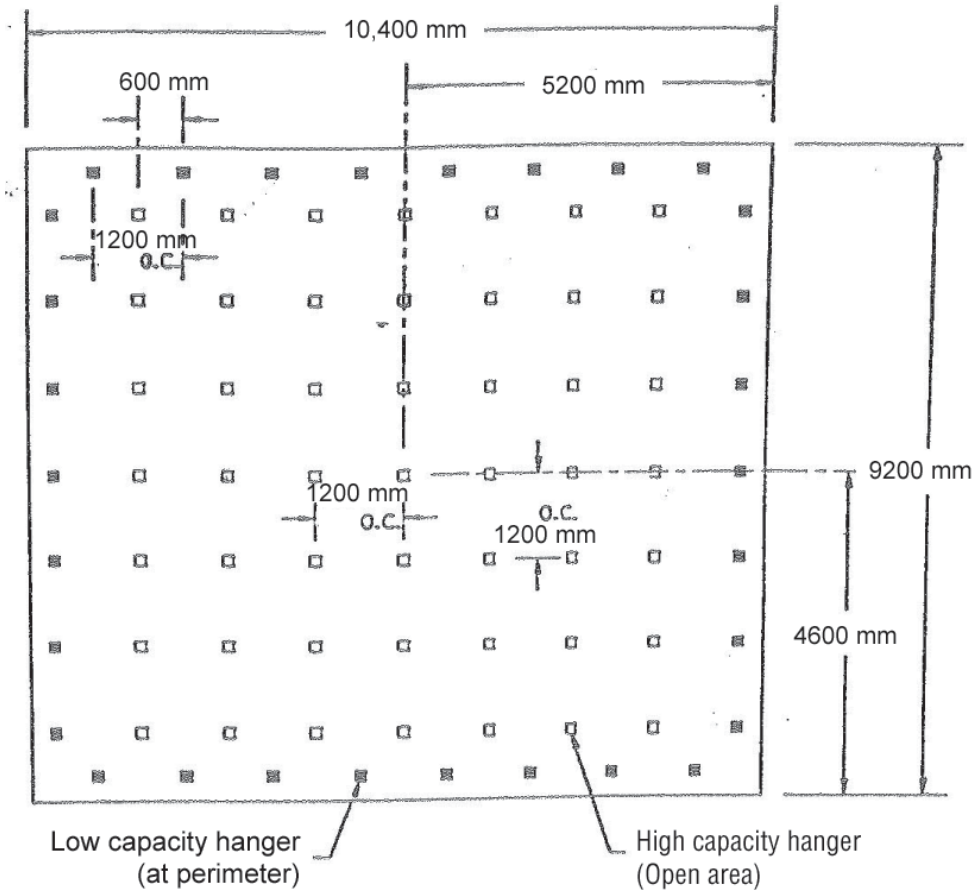
Hanger Model	Load Range	Max. Deflection
AF-100	9-46 kg	6 mm
AF-200	23-90 kg	4 mm

Installation Guidelines

Basic guidelines for the construction of a noise and vibration isolated suspended ceiling.

- Ceiling is constructed to be supported by Suspend AF nominally spaced at 1200mm centres.
- There should be no rigid contact of the acoustical tile or board to other structures (walls, ductwork, etc.).
- A grid typically made of Strut MC45 spaced 1200mm on centres and Strut CC25, 600mm on centres, forms the framework for the MAT BSB or Slate board attachment. The grid is hung by the Suspend AF ceiling isolators.
- Where a plaster finish coat is used, space Strut CC25 channel on 400mm centres for added stiffness.
- Because the resiliently hung ceiling should not make rigid contact with the structure, Silica acoustical caulking compound is used at the perimeter or where penetrations HVAC, fire plumbing etc occur.
- The Suspend AF ceiling isolators are designed to deflect under the load of the ceiling. Depending on the application and the type of isolator selected, the deflection is normally 6 to 38mm. The layout of the individual isolators as to location and capacity is done to achieve nearly equal deflection across the entire ceiling. This makes a level ceiling which performs effectively as a noise barrier.

Typical Ceiling Isolator Layout



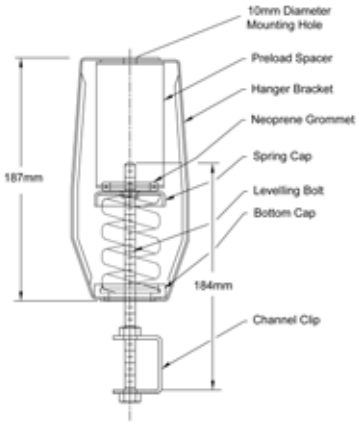
1. Locate centre point of room.
2. Place isolators 1200mm centres each direction.
3. Perimeter isolators should be no greater than 400mm from the wall.
4. Perimeter and corner isolators are normally lower capacity due to reduced ceiling area being supported. This is to maintain a reasonably equal deflection across the entire ceiling.

Suspend ICC

Ceiling Isolation Theory

Resiliently suspended ceiling systems are designed to minimise floor impact noise and airborne sound transmissions through the floor/ceiling structure. Creating airspace and resiliently decoupling the mass of the isolated ceiling from the non-isolated structure can effectively control noise transmission.

Suspend ceiling isolation products use various types of resilient decouplers including springs, rubber or fibreglass pads, and combinations of pads and springs to improve the airborne Sound Transmission Class (STC) and the structureborne Impact Insulation Class (IIC) values.



Application

Secured to concrete, metal deck, or structural framing, Suspend ICC incorporates a 25mm rated deflection spring in series with a neoprene cup to resiliently support one or more layers of Septum, Slate, MAT BSB or similar noise isolation ceiling panels. Attachment can be direct to concrete or metal deck with Stitc, or it can be suspended from threaded rod that is properly anchored.

A channel clip / levelling rod assembly is designed to carry a single piece of 38x12x0.9mm, Strut MC38 (or 1.6mm for HMC38). Strut CC25 channel, 25x50x0.45 (or 0.9 for HCC25), is attached to the Strut MC38. The system provides the installer with a means for levelling the isolated ceiling framing.

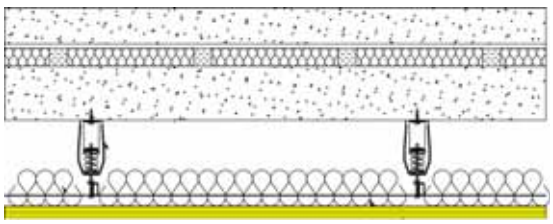
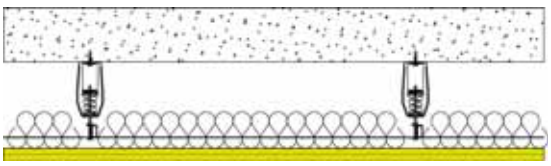
Septum or An Slate panels attach quickly and easily thanks to a preload spacer that holds the isolator rigid until the weight of the panel compresses the spring.

Incorporate Suspend ICC into any isolated ceiling design where 25mm rated spring deflection and a 250mm airspace are needed for superior performance.

Benefits

- Maximum natural frequency of 4.4 Hz under lightest typical load conditions.
- STC 80, IIC 70 with two layers of Slate suspended under a 150mm concrete slab with 90mm Synth PF in the airspace.
- Multiple features incorporated into the design ensure inexpensive installation.
- Spring / neoprene cup combination improves performance against low-frequency noise.
- Actual installed load can vary between 75% and 150% of rated load without significant impact to ceiling performance.

Acoustical Parameters

Description	Acoustical Properties STC	IIC	Sections
100mm Concrete Slab 12mm Sonator **Stand RIM** 150mm Concrete Slab **Suspend ICC** Strut framework 90mm Synth PF 2 Layers 15mm Slate	94	82	
150mm Concrete Slab **Suspend ICC** Strut framework 90mm Synth PF 2 Layers 15mm Slate	84	70	

Specifications

Part 1 – General

Work Included

Furnish all labour, materials, tools and equipment, and perform all operations necessary for the installation of resiliently suspended ceilings shown on contract drawings.

System Description

Resiliently suspended board ceilings, where shown on drawings, shall be isolated from the building structure in order to increase their ability to reduce airborne sound and impact noise transmission.

Quality Assurance

The resilient isolation hangers and perimeter isolation material shall be designed and fabricated at the facilities of a nationally recognized manufacturer.

Submittals

Product performance data shall be submitted to the designer for review and shall include an Airborne Sound Transmission Loss Test Report and an Impact Sound Transmission Loss Test Report for measurements conducted in accordance with ASTM E90-90 and ASTM E492-90, respectively.

Test reports shall document a minimum STC 80 and IIC 70 for a resiliently suspended ceiling attached below a 150mm thick concrete slab and that consists of two layers of 15mm thick gypsum board with 90mm thick fibreglass wool blanket in the cavity between the concrete slab and the top layer of gypsum board.

Sound and impact test reports shall be from an independent laboratory.

Part 2 – Products

Materials

- The sound isolation materials specified herein shall be supplied by Anutone.
- Ceilings suspended below either concrete and / or metal deck composite construction or structural framing shall be supported by resilient isolation hangers Suspend ICC. Resilient hangers shall have sufficient capacity to sustain continuously applied ceiling weight without settling after initial deflection.
- The isolation hanger shall be a combination high-deflection steel spring in series with a resilient, moulded neoprene noise and vibration isolation pad. The steel spring and neoprene pad shall be incorporated into a stamped steel hanger assembly that resiliently supports the isolated ceiling.
- The hanger assembly bracket shall be designed to allow fifteen (15) degrees of vertical alignment of the suspension member without making metal-to-metal contact between the suspension and hanger assembly members. The hanger bracket shall be designed with an integral spring pre-load bracket selected to minimise change in elevation once a load is applied to the hanger and to hold the isolator assembly steady during attachment of gypsum board. The hanger assembly bracket shall consist of a leveling rod with an attached channel carrier designed to accept 38x12mm, 16-gauge cold-rolled steel channel. The isolation hanger deflection shall be selected by the manufacturer to provide a maximum natural frequency of 4.4 Hz. The steel spring element shall have a minimum Kx to Ky of 1 at its 25mm rated deflection.
- Resiliently suspended ceilings shall be separated where non-isolated building components abut. Isolation material shall be 10mm thick Stand Neo perimeter isolation board. Stand Neo shall not be penetrated by nail, screw, or similar fastener. Stand Neo shall be adhered to non-isolated structure. Resiliently-suspended ceiling shall be constructed against Stand Neo. Stand Neo shall be sealed using resilient, non-hardening caulk, such as Silica.

Part 3 – Execution

Installation

- The installation of all sound isolation materials specified herein, including those installed under other sections of the specifications, shall be in accordance with procedures submitted by the isolation material manufacturer, and approved by the Architect.
- All building components supported by the isolation hangers shall be free from rigid contact with any part of the non-isolated building structure to prevent unwanted sound flanking.

Installation Guidelines

These suggested installation guidelines represent generally accepted procedures for successful installation of Suspend ICC Deck-Suspended Ceiling Hanger for ceiling system isolation. These suggestions may be followed, modified, or rejected by the owner, engineer, contractor, and/or their respective representative(s) since they, not Anutone, are responsible for planning and executing procedures appropriate to a specific application. Anutone reserves the right to alter these suggestions and encourages contact with the factory or its representatives to review any possible modification to these suggested guidelines prior to commencing installation.

1. Installation of an isolated ceiling system that uses Suspend ICC Ceiling Hangers requires following materials (as specified and purchased separately):
   - 38x12mm Struct MC38/HMC38 main channel.
   - Strut CC25/HCC25 ceiling channel.
   - Stitch anchors for mounting into non-isolated ceiling substrate (threaded rod if required).
   - 12.5mm or 15mm thick Slate / MAT BSB.
   - Appropriate tools and equipment for installation.

   Please note: If submittal drawings have been prepared for the installation, review drawings for completeness

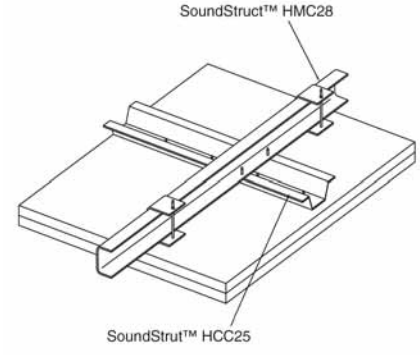
and accuracy; otherwise, refer to Selection Guidelines for selecting ceiling hangers.

2. Mark grid pattern on existing non-isolated ceiling using the following criteria:
   - Isolators installed at the perimeter must be located not more than 400mm from the edge of the isolated ceiling; maintain at least a 75mm clearance from the perimeter.
   - Isolators may be located up to 1200mm along the perimeter of the isolated ceiling.
   - Isolators mounted mid-room (i.e., those isolators not at the perimeter) may be located upto 1200mm centres; mid-room isolators should be spaced evenly in each direction.

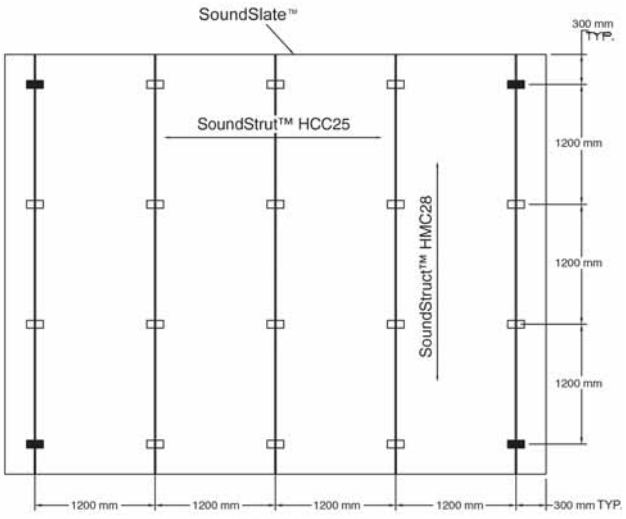
   Please note: Submittal drawings, if provided, override general location guidelines provided above.

3. Remove Suspend ICC from carton. Confirm capacity of each isolator to ensure proper location in grid (See chart below). The spring colour can be used as a guide to model number. The blue spring is an ICC-24, green an ICC-50, grey an ICC-100 and brown an ICC-210. If provided, submittal drawings will identify location of specific hanger by capacity rating. After determining the direction the Struct HMC38 main channel will run (orientation is not important acoustically), locate the isolators or threaded rod at the intersect points on the grid. Anchor isolators to non-isolated ceiling using appropriate fastener through the 10mm diameter opening at the top of the pre-load spacer and hanger bracket. Slide Struct CC38/HMC38 through the channel clip of the leveling bolt. Position the cold-rolled channel to prevent contact at partition/wall/column or any other non-isolated structural component. Inter-connect ends of cold-rolled channel using appropriate practices for ceiling grid installation.

Model ICC	Spring Colour	Capacity Range (kgs)	Deflection Range (mm)
24	Blue	5-11	12-25
50	Green	11-22	12-25
100	Grey	22-45	12-25
210	Brown	47-95	12-25



4. Attach Struct CC25/HCC25 channel to Strut MC38/HMC38 and inter-connect the ends of the ceiling channel using appropriate practices for ceiling grid installation. No channel can contact non-isolated structural components.
5. After assembling the ceiling grid, check for levelness. By loosening or tightening the bottom nut of the levelling bolt/channel clip, the grid can be adjusted to level. Do not overly loosen. A minimum 6mm of threaded rod should be exposed above the threaded spring cap.
6. Install 10mm thick Stand Neo perimeter isolation board at partitions/walls, columns, and around any non-isolated building components to create a 10mm wide resilient layer that ensures the isolated ceiling remains decoupled from the non-isolated structure. As Slate / MAT BSB board is attached to the grid, the springs will compress (12mm to 30mm nominally depending on spring capacity) allowing the ceiling system to lower into final position. Position the Stand Neo to account for this change to final elevation. Trimming the Stand Neo may be required following installation of the Slate / MAT BSB board. If an alternate method for ensuring that the isolated ceiling remains decoupled is employed (e.g., using resilient backer rod), be sure to maintain a 10mm gap from non-isolated structural components.
7. Install the Slate / MAT BSB board using accepted practices for attaching to the grid system. Be certain to maintain a 10mm gap between non-isolated structural components and the isolated ceiling to ensure that the gypsum board does not contact any non-isolated structural components. Do not allow Slate / MAT BSB board to rest on top edge of Stand Neo; it should abut the perimeter isolation board. Do not allow the Stand Neo to become compressed against the non-isolated structure. In some cases, additional adjustment of the gypsum board may be necessary to achieve levelness, consult factory for procedures.
8. Trim Stand Neo as required and caulk gap using Silica resilient, non-hardening caulk.



Selection Guidelines

These suggested selection guidelines represent generally accepted procedures for properly selecting Suspend ICC Deck-Suspended Ceiling Hangers for ceiling system isolation. These suggestions may be followed, modified, or rejected by the owner, engineer, contractor, and/or their respective representative(s) since they, not Anutone, are responsible for planning and executing procedures appropriate to a specific application. Anutone reserves the right to alter these suggestions and encourages contact with the factory or its representatives to review any possible modification to these suggested guidelines prior to commencing selection.

1. Define ceiling area being isolated and sketch a layout showing the ceiling hanger locations per the following criteria (refer to layout diagram below):

   Isolators installed at the perimeter must be located not more than 400mm from the edge of the isolated ceiling; maintain at least a 75mm clearance from the perimeter.

   Isolators may be located up to 1200mm along the perimeter of the isolated ceiling.

   Isolators mounted mid-room (i.e., those isolators not at the perimeter) may be located upto 1200mm centres.

   Many room configurations will require non-conventional placement of isolation hangers to support the board ceiling (i.e., every isolated ceiling cannot be laid out in even rows in each direction). Consideration must be given to supporting the gypsum board ceiling adequately; this may require unique spacing arrangements to accommodate installation of the ceiling grid.

2. Once spacing of the ceiling hangers is determined and sketched, three (3) general areas of the ceiling require load calculations: mid-room, along the perimeter, and in the corners. The total number of calculations required depends on how varied the spacing of the hangers is in each of these areas.

3. Determine the total weight of the layers of board and ceiling grid components being supported by the isolation hangers. The chart below is useful in determining common weights for materials used in isolated ceiling construction:

Building Material	Weight (kgs/m^2)
90mm Synth	2.5
Strut channels	2.5
12.5mm Slate	9.3
15mm Slate	11.4

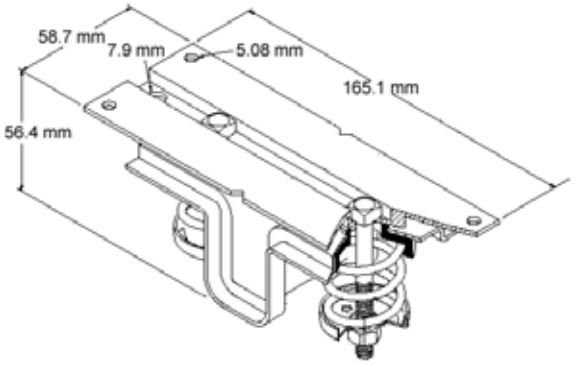
4. Additional items such as lights or a lay-in tile ceiling may be suspended from the gypsum board/ceiling grid assembly. The weight of these items needs to be considered when determining the appropriate number / capacity of hangers required.

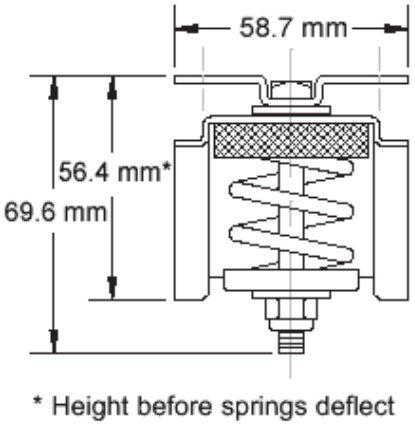
5. Calculate load at each hanger location: _____kgs/hanger = Total kgs/m^2 of ceiling materials x m^2 area carried by hanger

6. Select appropriate hanger for each location from chart below. Designated model numbers indicate the load at which the isolator deflects 25mm. Every hanger has at least a 50% overload capacity; it is possible to slightly exceed the maximum capacity shown in the chart below:

ICC	Spring Colour	Capacity Range (kgs)	Deflection Range (mm)
24	Blue	5-11	12-25
50	Green	11-22	12-25
100	Grey	22-45	12-25
210	Brown	47-95	12-25

Suspend KSCH

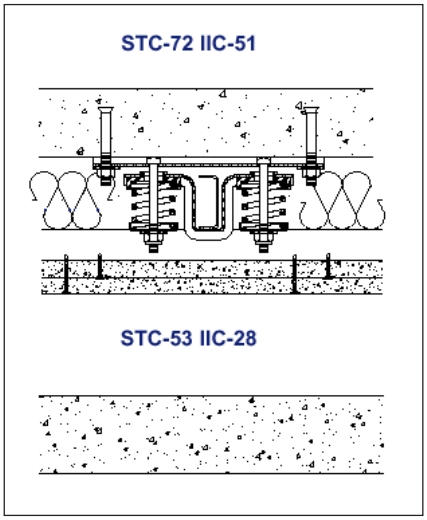




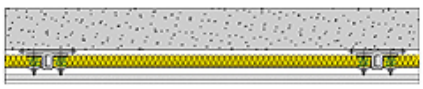
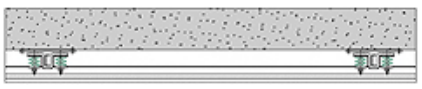
* Height before springs deflect

Features

- Low 90mm airspace using AnutoneStrut CC25/HCC25 channel at 12mm nominal spring deflection.
- Maximum natural frequency of 5.5 Hz under lightest typical load conditions..
- Requires only one (1) piece of AnutoneStrut MC38/ HMC38 main channel.
- Extended mounting bracket allows easy attachment to non-isolated deck.
- Centering notches for flawless alignment..
- Minimal vertical / lateral movement during a seismic event.
- STC 72, IIC 51 with two (2) layers of AnutoneSlate gypsum board suspended under a 150mm concrete slab (75 psf) with 38mm AnutoneSynth AW in airspace — 12mm deflection springs.
- Also available with 25mm deflection springs — increases size of airspace.



Acoustical Parameters

Description	Acoustical Properties STC	IIC	Sections
150 Concrete Slab **Suspend KSCH Ceiling Hanger** Strut HMC38 Channel Strut HCC25 2 Layers 15mm Gypsum Board	59	47	
150 Concrete Slab **Suspend KSCH Ceiling Hanger** Synth PF Strut HMC38 Channel Strut HCC25 2 Layers 15mm Gypsum Board	59	47	

Specifications

Part 1 – General

1.01 Work Included

A. Furnish all labour, materials, tools, and equipment; and, perform all operations necessary for the installation of resiliently suspended ceilings shown on contract drawings.

1.02 System Description

A. Resiliently suspended gypsum ceilings, where shown on drawings, shall be isolated from the building structure to reduce airborne sound and impact noise transmission.

1.03 Quality Assurance

A. The resilient isolation hangers and perimeter isolation material shall be designed and fabricated at the facilities of a nationally recognized manufacturer.

1.04 Submittals

A. Product performance data shall be submitted to the designer for review and shall include an Airborne Sound Transmission Loss Test Report and an Impact Sound Transmission Loss Test Report for measurements conducted in accordance with ASTM E90-90 and ASTM E492-90, respectively. Test reports shall document a minimum STC 70 and IIC 50 for a resiliently suspended ceiling attached below a 150mm thick concrete slab and that consists of two layers of 15mm thick gypsum board with 38mm thick infill in the cavity between the concrete slab and the top layer of noise isolant board. Sound and impact test reports shall be from an independent laboratory.

Part 2 – Products

2.01 Materials

A. The sound isolation materials specified herein shall be supplied by Anutone.

B. Ceilings shall be supported by Suspend KSCH Acoustical Ceiling Hangers. Resilient hangers shall have sufficient capacity to sustain continuously applied ceiling weight without settling after initial deflection.

C. The isolation hanger shall incorporate two 12mm deflection steel springs operating in parallel with each other; and shall provide 50% overload capacity. Each spring shall operate in series with a resilient, molded neoprene noise and vibration isolation pad. The two springs and neoprene pads shall be incorporated into a stamped steel hanger assembly which supports the isolated ceiling.

D. The hanger assembly bracket shall be designed to accept 38x12mm, 16-gauge cold-rolled steel. The isolation hanger deflection shall be selected by the manufacturer to provide a maximum natural frequency of 5.5 Hz. The steel spring element shall have a minimum Kx to Ky of 1 at its 12mm rated deflection.

E. Resiliently suspended ceilings shall be separated where non-isolated building components abut. Isolation material shall be 10mm thick Stand Neo perimeter isolation board. Stand Neo shall not be penetrated by nail, screw, or similar fastener. Stand Neo shall be adhered to non-isolated structure. Resiliently suspended ceiling shall be constructed against Stand Neo. Stand Neo shall be sealed using Silica resilient, non-hardening caulk.

Part 3 – Execution

3.01 Installation

A. The installation of all sound isolation materials specified herein, including those installed under other sections of the specifications, shall be in accordance with procedures submitted by the isolation material manufacturer, and approved by the Architect.

B. All building components supported by the isolation hangers shall be free from rigid contact with any part of the non-isolated building structure to prevent unwanted sound flanking.

Installation Guidelines

These suggested installation guidelines represent generally accepted procedures for successful installation of Suspend KSCH Acoustical Ceiling Hanger for ceiling system isolation. These suggestions may be followed, modified, or rejected by the owner, engineer, contractor, and/or their respective representative(s) since they, not Anutone, are responsible for planning and executing procedures appropriate to a specific application. Anutone reserves the right to alter these suggestions and encourages contact with its representatives to review any possible modification to these suggested guidelines prior to commencing installation.

1. Installation of an isolated ceiling system that uses Suspend KSCH Acoustical Ceiling Hangers requires the following materials (as specified by others and purchased separately):

A. Strut HMC38 - 38x12x1.6mm or MC38 - 0.9, cold-rolled channel.

B. Strut HCC25 - 25x50x0.9mm or CC25 - 0.45 cross channel.

C. Stitch anchors for mounting into non-isolated ceiling substrate.

D. Slate 12.5 or 15mm thick MAT BSB board

E. Appropriate tools and equipment for installation.

Please note: If submittal drawings have been prepared for the installation, review drawings for completeness and accuracy; otherwise, refer to Selection Guidelines for selecting ceiling hangers.

2. Mark grid pattern on existing non-isolated ceiling using the following spacing criteria:

A. Isolators installed at the perimeter must be located not more than 400mm from the edge of the isolated ceiling; maintain at least a 75mm clearance from the perimeter.

B. Isolators may be located up to 1200mm along the perimeter of the isolated ceiling.

C. Isolators mounted mid-room (i.e., those isolators not at the perimeter) may be located at 1200mm centres.

Please note: Submittal drawings, if provided, override general location guidelines provided above.

3. Remove Suspend KSCH Acoustical Ceiling Hangers from box. **Do not disassemble mounting bracket from unit for installation purposes.** Confirm capacity of isolator to ensure proper location in grid (see chart). If provided, submittal drawings will identify location of specific hanger by capacity rating. Slide Strut MC38/HMC38 cold-rolled channel through the channel carrier of the isolator. After determining the direction the cold-roll channel will run, locate the isolators at the intersect points on the grid. Use the locating notches and anchor holes on the mounting bracket to align the isolators properly. Anchor isolators to non-isolated ceiling using appropriate fastener at minimum of two (2) locations through the mounting bracket. Position the cold-rolled channel to prevent contact at partition/wall/column or any other non-isolated structural component. Inter-connect ends of cold-rolled channel using appropriate practices for ceiling grid installation.

4. Attach Strut CC25/HCC25 channel to cold-rolled steel and interconnect the ends of the CC25/HCC25 using appropriate practices for ceiling grid installation. CC25/HCC25 cannot contact non-isolated structural components. Make certain cold-rolled channel is resting on the bottom of the channel carrier bracket and not contacting the mounting bracket.

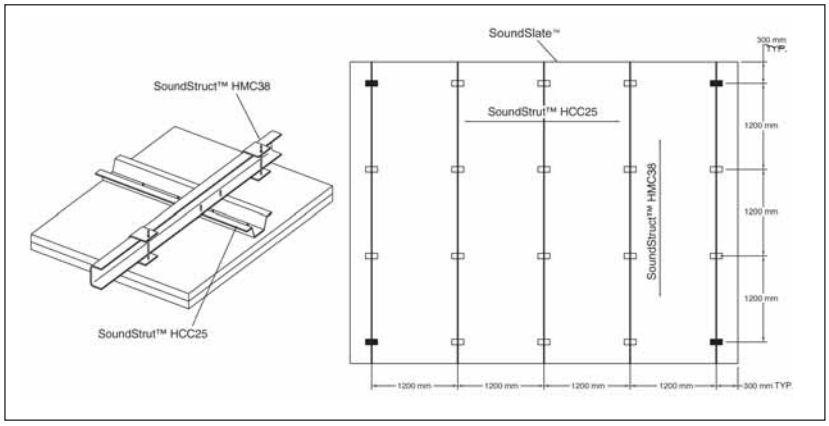
5. After assembling the ceiling grid, check for levelness. By loosening or tightening the nuts on the levelling bolts, the grid adjusts up to 6mm. Shim between the decking and mounting bracket if additional adjustment is required (this may require removal of some of the isolators). Do not bend or twist mounting bracket when shimming and levelling isolator.

6. Install Stand Neo perimeter isolation board at partitions/walls, columns, and around any non-isolated building components to create a 10mm wide resilient layer that ensures the isolated ceiling remains decoupled from the non-isolated structure. As the Slate gypsum board is attached to the grid, the springs will compress (up to 18mm) allowing the ceiling system to lower into final position. Position the Stand Neo to account for this change to final elevation. Trimming the Stand Neo may be required following installation of the Slate / MAT BSB board. If an alternate method for ensuring that the isolated ceiling remains decoupled is employed (e.g., using resilient backer rod), be sure to maintain a 10mm gap from non-isolated structural components.

7. Install the gypsum board using accepted practices for attaching to the grid system. Be certain to maintain a 10mm gap between non-isolated structural components and the isolated ceiling to ensure that the gypsum board does not contact any non-isolated structural components. Do not allow Slate / MAT BSB board to rest on top edge of Stand Neo; it should abut the perimeter isolation board.

   Do not allow the Stand Neo to become compressed against the non-isolated structure.

8. Trim Stand Neo as required and caulk gap using Silica resilient, non-hardening caulk.



Selection Guidelines

These suggested selection guidelines represent generally accepted procedures for properly selecting AnutoneSuspend KSCH for ceiling system isolation. These suggestions may be followed, modified, or rejected by the owner, engineer, contractor, and/or their respective representative(s) since they, not Anutone, are responsible for planning and executing procedures appropriate to a specific application. Anutone reserves the right to alter these suggestions and encourages contact with Anutone to review any possible modification to these suggested guidelines prior to commencing selection.

1. Define ceiling area being isolated and sketch a layout showing the ceiling hanger locations per the following criteria (refer to layout diagram below):

A. Isolators installed at the perimeter must be located not more than 400mm from the edge of the isolated ceiling; maintain at least a 75mm clearance from the perimeter.

B. Isolators may be located up to 1200mm along the perimeter of the isolated ceiling.

C. Isolators mounted mid-room (i.e., those isolators not at the perimeter) may be located at 1200mm centres.

D. Many room configurations will require non-conventional placement of isolation hangers to support the gypsum board ceiling (i.e., every isolated ceiling cannot be laid out in even rows in each direction). Consideration must be given to supporting

the gypsum board ceiling adequately; this may require unique spacing arrangements to accommodate installation of the ceiling grid.

2. Once spacing of the ceiling hangers is determined and sketched, three (3) general areas of the ceiling require load calculations: mid-room, along the perimeter, and in the corners.

The total number of calculations required depends on how varied the spacing of the hangers is in each of these areas.

3. Determine the total weight of the layers of noise isolant board and ceiling grid components being supported by the isolation hangers. The chart below is useful in determining common weights for materials used in isolated ceiling construction:

Building Material	Weight (kgs/m²)
Synth PF	2.5
HMC38 and HCC25	2.5
12.5mm Gypsum Board	9.3
15mm Gypsum Board	11.4

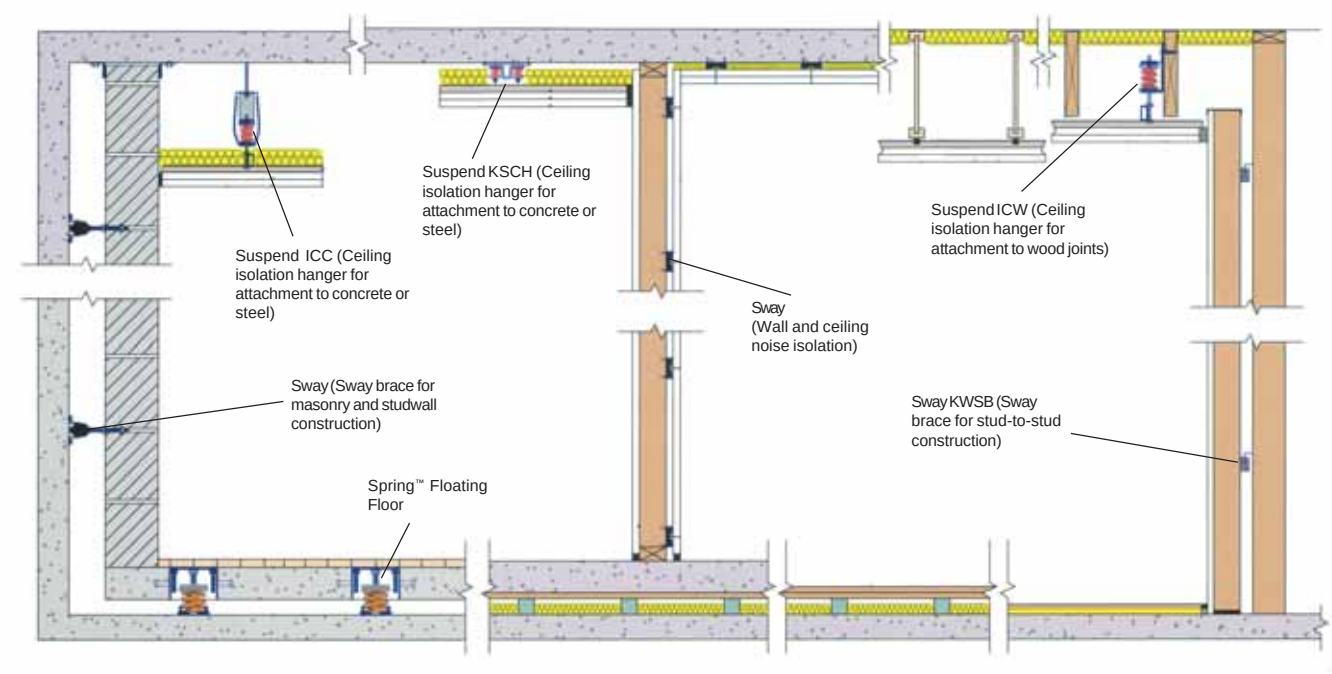
4. Additional items such as lights or a lay-in tile ceiling may be suspended from the gypsum board/ceiling grid assembly. The weight of these items needs to be considered when determining the appropriate number/ capacity of hangers required.

5. Calculate load at each hanger location:

_____kgs/hanger = Total kgs/m² of ceiling materials x m² area carried by hanger

6. Select appropriate hanger for each location from chart below. Designated model numbers indicate the load at which the isolator deflects 12mm (nominal). Every hanger has at least a 50% overload capacity; it is possible to slightly exceed the maximum capacity shown in the chart below:

Model KSCH	Spring Colour	Capacity Range (kgs.)	Deflection Range (mm)
30	Blue	9-20	8-18
60	Grey	16-30	8-16
100	Silver	32-50	8-13
140	Green	45-64	8-11



References

Office

McKinsey	Mumbai
Pappricas Interactive	Bengaluru
NPC Kaiga	Karwar
Symbiosys	Pune

Hospitality

The Park	Bengaluru
Radisson MBD	Noida


The Park, Bengaluru

Applications

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Cinema -
Multiplexes

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Audiometry

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ANUTONE WALLS & CEILINGS
a division of Anutone Acoustics Limited
231, 7th Cross, Indiranagar 1st Stage, Bengaluru 560 038, India
Phone +9180 2520 3114 Fax +9180 2520 3115 info@anutone.com

MUMBAI
+9122 2643 9732

DELHI
+9111 2437 8061

CHENNAI
+9144 4305 4935

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