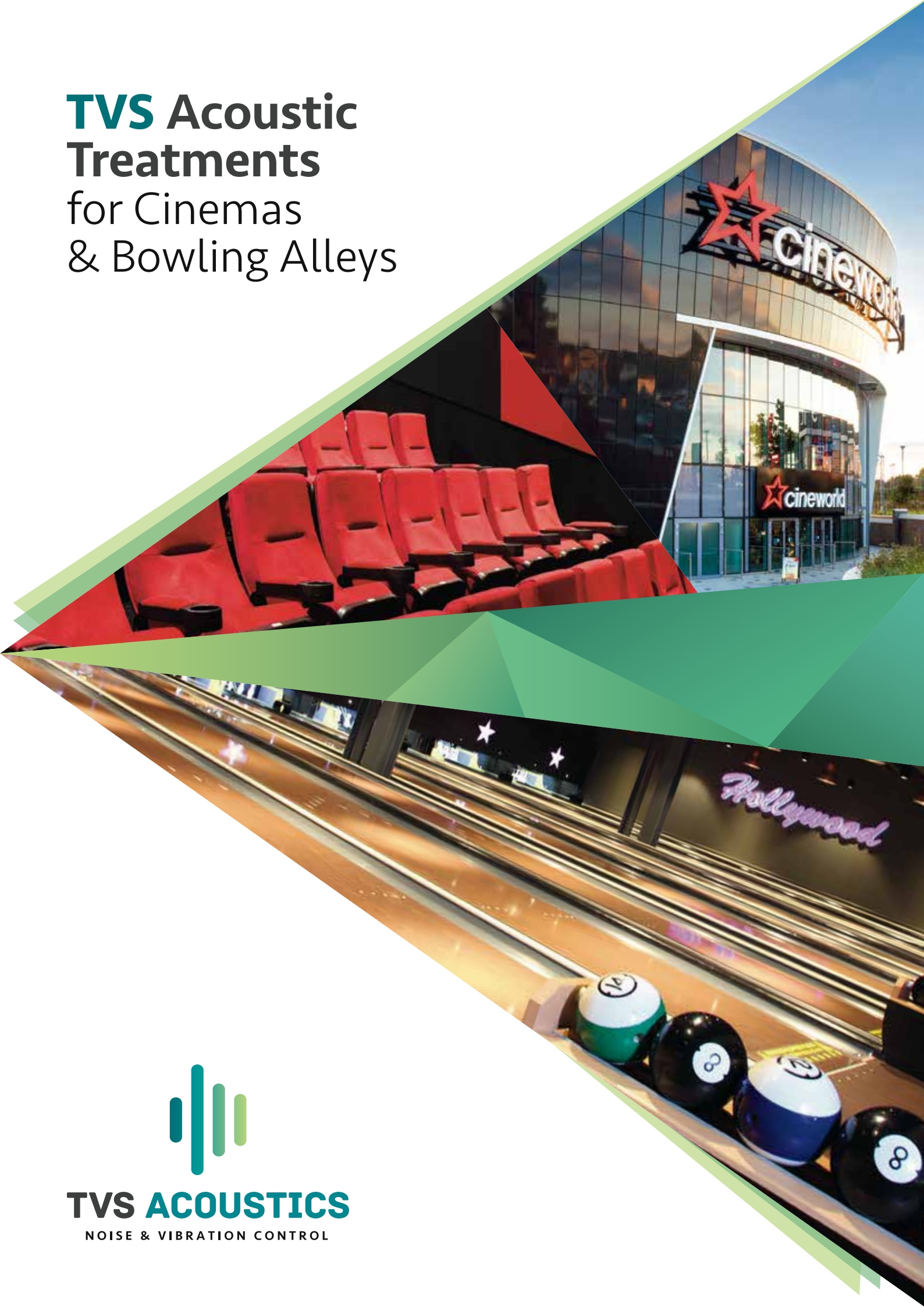
TVS Acoustic Treatments for Cinemas & Bowling Alleys



TVS ACOUSTICS

NOISE & VIBRATION CONTROL

Overview

Specialist skills and industry-wide experience have made UK-based TVS Acoustics a leading player in two of the most demanding markets for acoustic flooring – cinema and bowling alley construction projects. Both require state-of-the-art solutions, which TVS Acoustics is well placed to provide thanks to nearly two decades of work across the entertainment sector and fields ranging from theatres and gyms to commercial and residential buildings.

From initial planning, technical analysis and solution strategies, to the supply and installation of high quality acoustic floating floor solutions, TVS Acoustics can offer a genuinely comprehensive service. This introduction to our extensive acoustic floor and ceiling product range also includes examples of some of the most recent projects in our extensive portfolio.

In order to achieve the high levels of acoustic isolation required by cinema chains and independents, careful consideration must be given to the design of each auditoria. Box-in-box constructions allow for the highest level of acoustic isolation, completely decoupling each screen from the rest of the building structure. Floating floors, resiliently suspended ceilings, along with isolated walls and isolated raked seating, all combine to ensure that there are no solid connections to the main building structure or adjacent screens, leaving clients completely satisfied and customers able to enjoy the latest cinematic releases without disturbance.

TVS ACOUSTICS
NOISE & VIBRATION CONTROL

www.TVS-acoustics.com

An acoustic floating floor provides a secondary floated structure above the structural floor slab, supported by resilient mounts. This could be installed across the full auditoria, however it is more common for this to run from the front of the screen up to the raked seating, with the first couple of rows of seating built off this floated floor.

TVS RESi FF System

Description

TVS RESi FF Systems are designed to create a floating floor or slab to dramatically reduce impact and airborne sound transmission within building structures. The system can be used to support lightweight floors and screeds through to heavy raft foundations, with typical air gaps between floors ranging from 50mm to 150mm plus.

TVS RESi FF Systems will be designed by TVS engineers to meet key project specifications for natural frequency, load/deflection, air gap and ultimately acoustic performance.

Applications

TVS RESi FF Systems provide a cost-effective method of separating two masses in order to dramatically improve the acoustic and vibration isolation efficiency of the floor or slab build-up. Applications for such a system include, but are not limited to the following:

- Cinema Auditorium
- Bowling Alleys
- Recording Studios
- Music Rehearsal Areas & Classrooms
- Audiology Suites
- Theatres & Concert Halls
- Plant Rooms
- Gymnasiums
- Helipads
- Test Cells
- Night Clubs
- Hotels
- Apartments
- Hospitals
- Anechoic Chambers
- Dance Studios
- Machine Foundations
- Offices
- T.V. Studios
- Gyms & Sports Halls
- Multi-Use Rooftop Spaces
- Residential Dwellings

Advantages & Benefits

- Outstanding performance over lifetime of the building
- Natural frequencies down to 5Hz
- Floor thickness from 50mm to 500mm
- Minimal deflection under high loads
- Excellent shock and impact resistance
- Minimal creep
- Air gaps from 25mm to 150mm plus
- Suitable for concrete and timber floating floors
- Can achieve excellent impact and airborne performance
- P.I. backed design service
- Isolators can be custom made to meet project objectives

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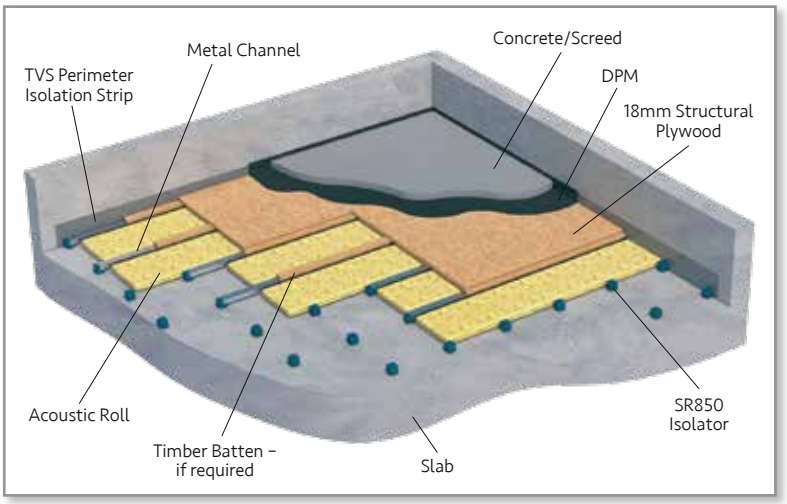
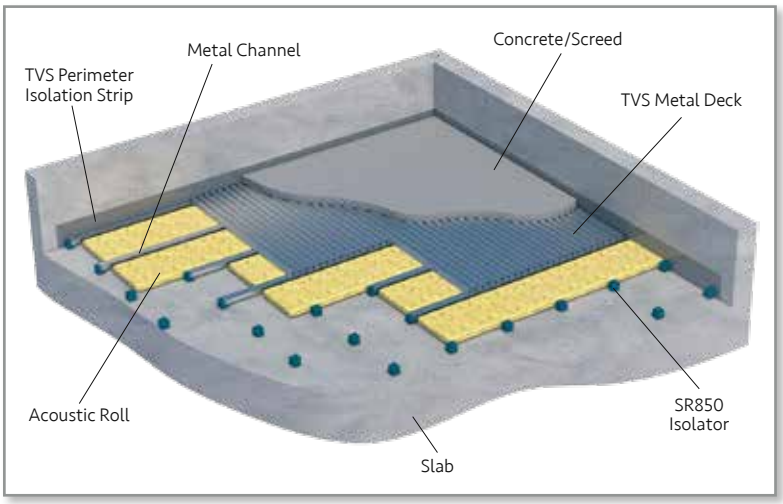
TVS RESi Concrete Systems

Concrete floating floors are the most common type of floated build-up as the additional mass that this system provides offers the greatest acoustic benefit. These systems also offer the greatest strength, whilst the large dead load that the floated slab provides ensures minimal movement under the addition of any live loading.

The **TVS RESi FF System** allows for a 'pour in place' construction, where the acoustic formwork is built and then the concrete is poured at the final design height with no requirement for any additional levelling or 'jacking up'. This is very beneficial in terms of a projects programme and as such is often utilised in cinema auditoria where these floors are the last thing to be constructed before the shell is handed over to the fit-out contractors.

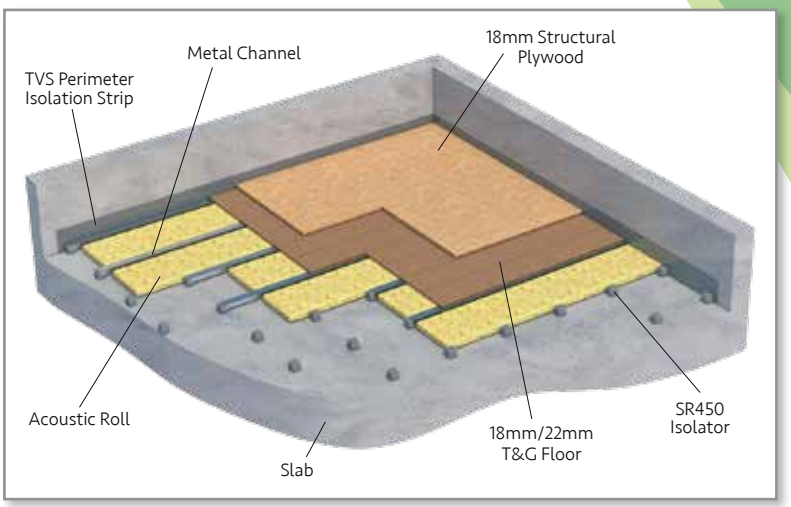


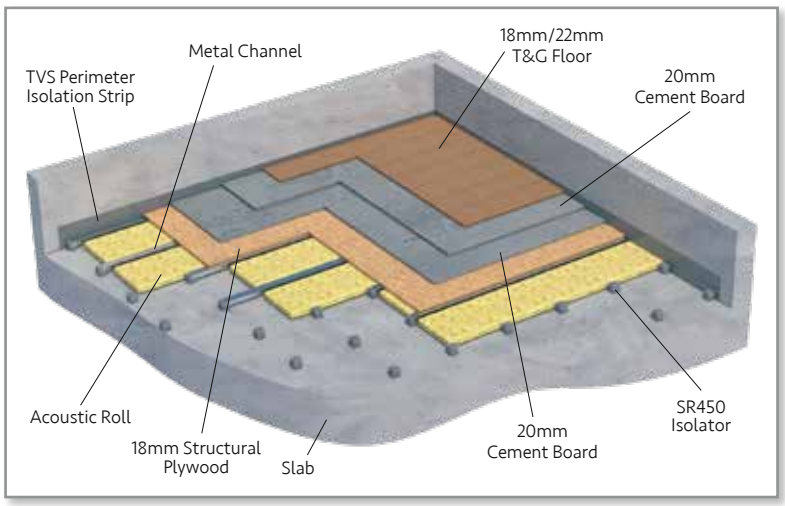


TVS RESi Dry Systems

It is not always possible to install concrete floating floors. The additional mass and point loading that a floated concrete slab can provide often makes it unsuitable, particularly within existing structures. Often there isn't the floor height available to allow the addition of a concrete floated floor.

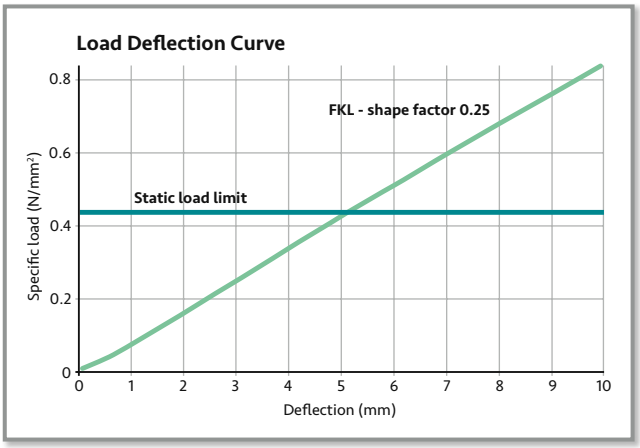
In these cases, layers of plywood, flooring grade chipboard and cement particle board can be combined to provide a stable floated floor. The more mass that can be added to the floating floor the better the performance will be, however the build-up will often be limited by the available space and load capacity of the structure. These systems are often installed within pre-existing buildings with minimal disruption to adjacent areas.

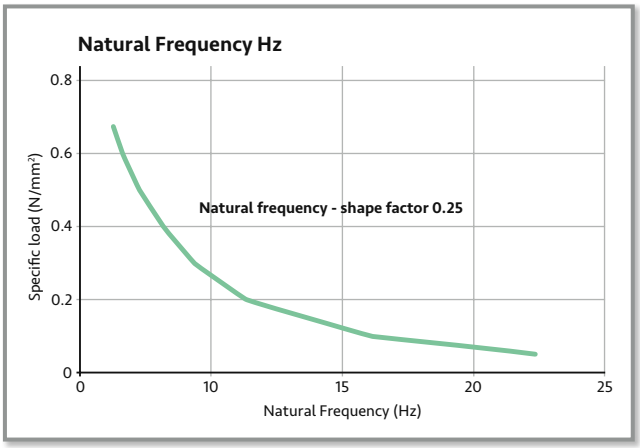




TVS RESi Concrete Systems

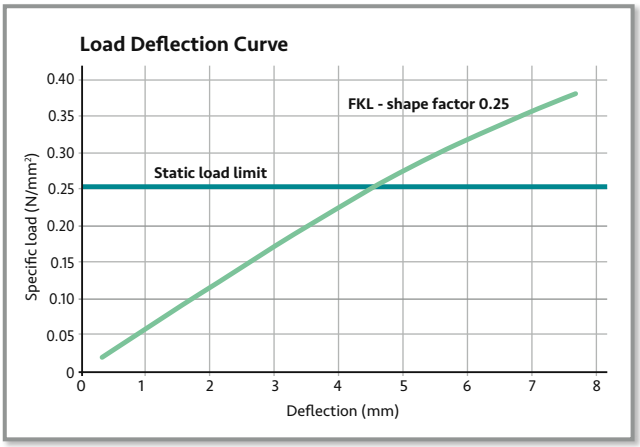
SR850 Performance graphs

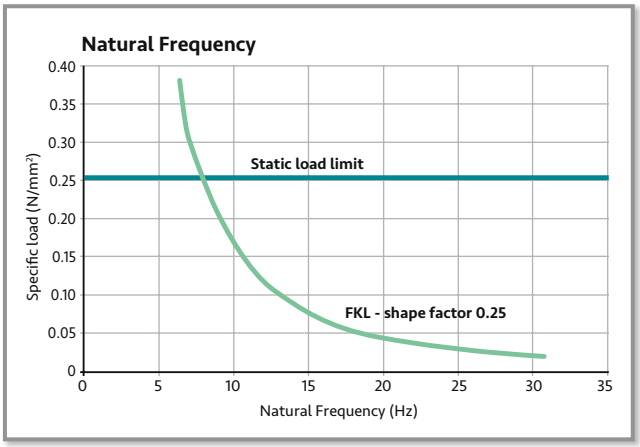




TVS RESi Dry Systems

SR450 Performance graphs





Standard Isolator Dimensions

Elastomer: 50mm x 50mm x 50mm; 50mm x 50mm x 37.5mm; 50mm x 50mm x 25mm
Types: SR850 - Turquoise; SR450 - Grey
Material: 100% Polyurethane

Product Properties		Test Methods	Comment
Flammability	class E	EN ISO 11925-2	normal flammable EN 13501-1
Temperature range	-30°C to 70°C		higher temperatures possible for short periods

TVS Acoustic Mastic

TVS can offer the supply and installation of the specialist acoustic mastic required for your cinema project for the gap between the acoustic floating floor and the perimeter walls.

Typically formed from multiple layers of high density plasterboard, cinema ceilings need to be resiliently suspended to ensure that there are no solid connections between the auditoria and the main building structure. Incorporating a high performance sylomer element in their design, TVS SH Acoustic Hangers can be simply integrated in to a drop-rod or even a metal strap system to provide low natural frequency isolation.

TVS SH Acoustic Hanger

Description

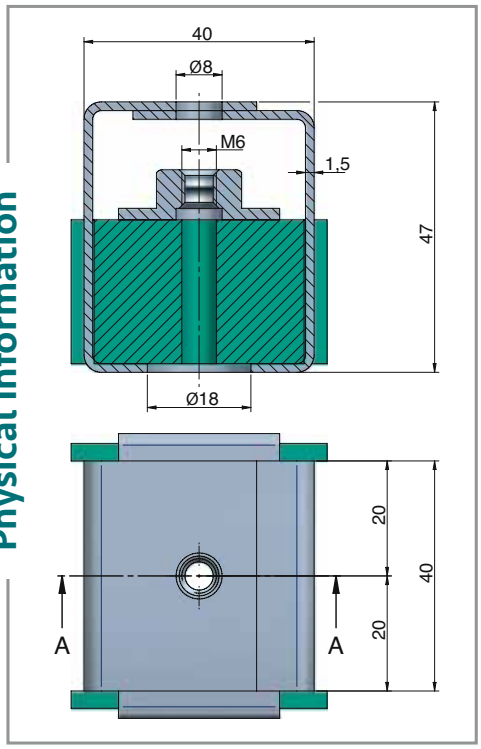
TVS SH Acoustic Hangers offer cost-effective solutions for isolation of suspended equipment and ceiling. Utilising the high performance sylomer material, these hangers are designed to solve both low and high frequency attenuation problems in a protective space or radiating to surrounding locations. Ideal for suspended ceilings, piping, ductwork, air handling units and HVAC equipment.

TVS hangers are shipped fully assembled and ready for installation in threaded rod suspension systems.

Features

- Natural Frequency down to 8Hz
- Load capacities up to 75kg
- Hanger capacities can be mixed to accommodate equipment with uneven weight distribution
- Steel housing provides durability and stability
- Housing supplied with anti-corrosive zinc-plated coat

Physical Information

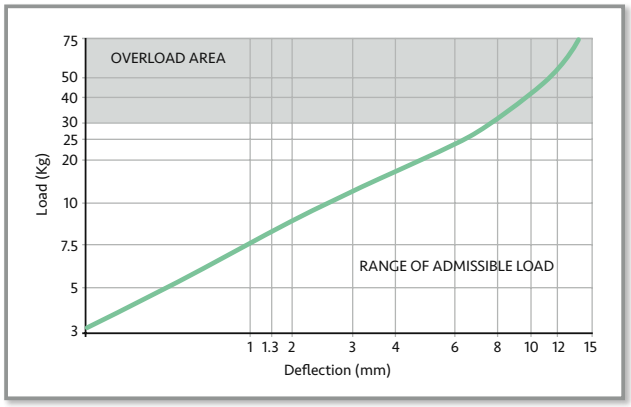


TVS SH Acoustic Hanger

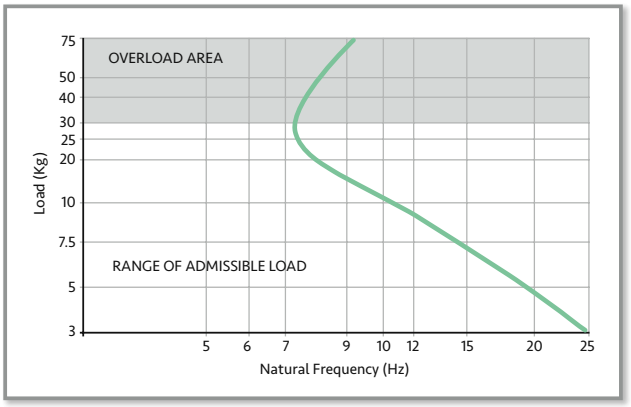
TVS SH Acoustic Hangers come in three different densities, offering a range of load capacities to provide the required acoustic performance in a whole host of scenarios.

Type	Load Capacity (Kg)	Unit Weight (Kg)	Threaded Rod Size
SH30	30	0.104	M6
SH50	50	0.104	M6
SH75	75	0.104	M6

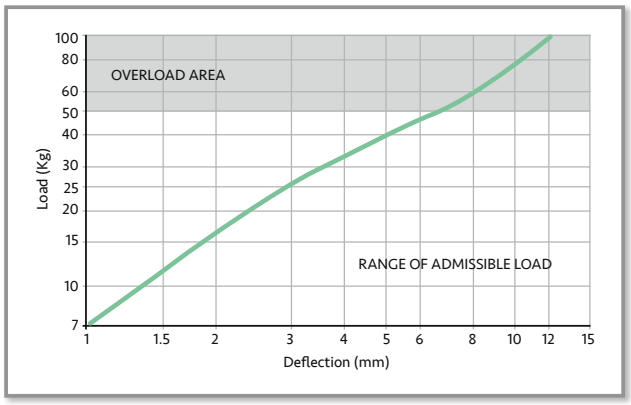
Load Deflection Graph - SH30



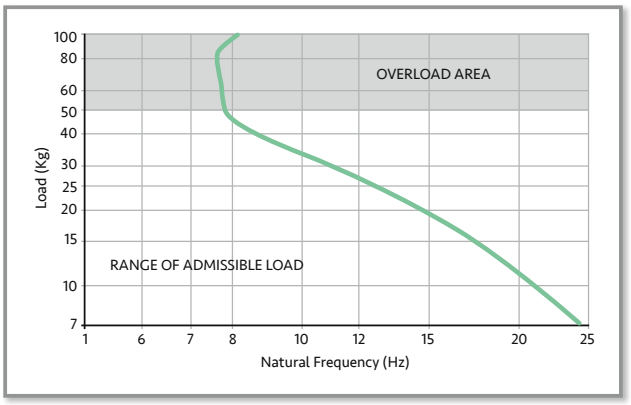
Natural Frequency Graph - SH30



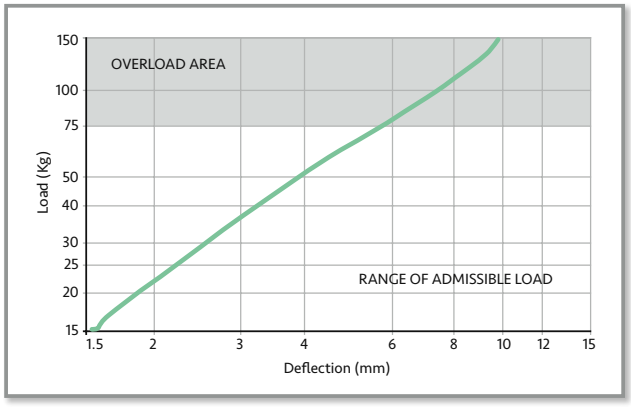
Load Deflection Graph - SH50



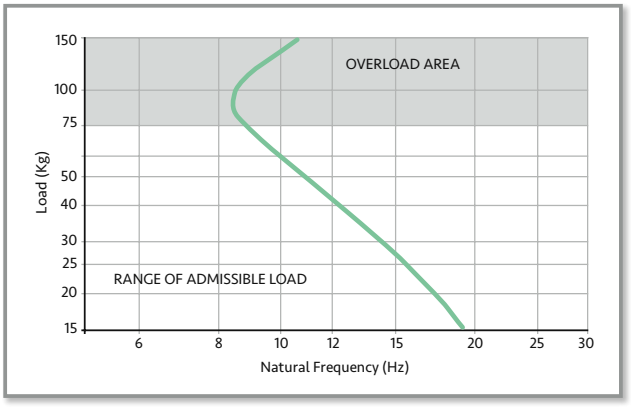
Natural Frequency Graph - SH50



Load Deflection Graph - SH75



Natural Frequency Graph - SH75



TVS Steelwork Isolation

Description

To ensure that the acoustic performance of the cinema screen is not compromised, it is essential to ensure that the raked seating is totally independent of the main structure, the floor slab and any adjacent screens.

TVS Steelwork Isolation Pads, manufactured from the high performance Sylomer and Sylodyn polyurethane materials, provide high levels of isolation either underneath column baseplates or at steel-to-steel connections. Each bespoke pad is sized and produced to match these connection details, whilst the grade of Sylomer or Sylodyn will be selected in accordance with the loading information provided for each connection. This ensures that the acoustic consultant's natural frequency requirements can be met at each location under all load cases.

TVS Resilient Washers ensure that the **TVS Steelwork Isolation Pads** are not 'short-circuited' by the bolts that connect the steelwork or anchor in to the slab.

The integrated centring aid, ensures that the bolt sits flush in the middle of the hole, and prevents any connection between the side of the bolt and the steelwork.

TVS Resilient Washers

Application

Elastic washers are used to decouple structure-borne noise bridges that arise from bolt connections. The polyurethane material Sylodyn® effectively isolates vibrations and retains its material properties over its entire service life. As well as decoupling vibrations, the washers are also electrically non-conductive and resistant to common oils and greases.

Design

As well as the simple design, the washers are also available with a centring aid (groove), to facilitate easier installation and to guarantee the exact positioning of the bolt with the hole. The dimensions are adapted to bolt sizes M8, M10, M12, M16 and M20 and are available in different bearing thicknesses for different efficiencies of insulation.

Advantages

- Effective vibration isolation and vibration decoupling
- Material properties remain constant over the long-term
- No brittleness (free from softeners)
- Range for different bolt sizes
- Variants with centring aid
- Flammability in accordance with DIN EN 13501-1
- Surface protection
- Electrically non-conductive
- Resistant to oils and greases
- Thermally insulating

Elastic washers with and without centring aid (groove)

TVS Isolation Strips

Applications

TVS Isolation Strips are designed to sit beneath all types of studwork and steel track partitions where flanking noise isolation is required. They are also perfect for isolating timber stadia seating. Available in various grades and thicknesses to ensure that the highest acoustic performance is always achieved.

From an acoustic perspective, constructing the walls off the floating slab would provide the best box-in-box solution. However, the additional complications that this would cause in terms of the design of the floated slab, the construction programme and the overall build-ability mean that the most common method of isolating the walls in a cinema is to build these off a resilient strip on the structural slab. **TVS Isolation Strips** provide a low natural frequency solution that is easy to integrate into the wall construction. Any fixings through this material should incorporate a resilient washer to prevent any short-circuiting of the isolation strip.

Features & Benefits

- Offers long-term performance without collapse or 'bottoming out' under high point loads
- Common thicknesses 17-25mm, although other thicknesses are available depending upon performance required
- Grades capable of withstanding loads up to and including 1.5N/mm^2, with low frequency performance achieved
- Resistance to ageing and deformation
- Quick and easy to install
- Minimises construction heights
- High quality and exact material thickness guaranteed

TVS Resilient Wall Ties

Applications

Where it is required to structurally tie an isolated wall into an unisolated structure, there is a potential bridge in the box-in-box design. **TVS Resilient Wall Ties** overcome this problem by integrating a high performance Sylomer element in to the wall tie. Available in a whole host of designs, depending upon the construction of the isolated and unisolated structures that are being resiliently tied (stud work, masonry etc), these ties offer natural frequencies down to 8Hz providing optimal acoustic results. They have a fail-safe rugged metal structure and are recommended for applications where fire or impact resistance is necessary.

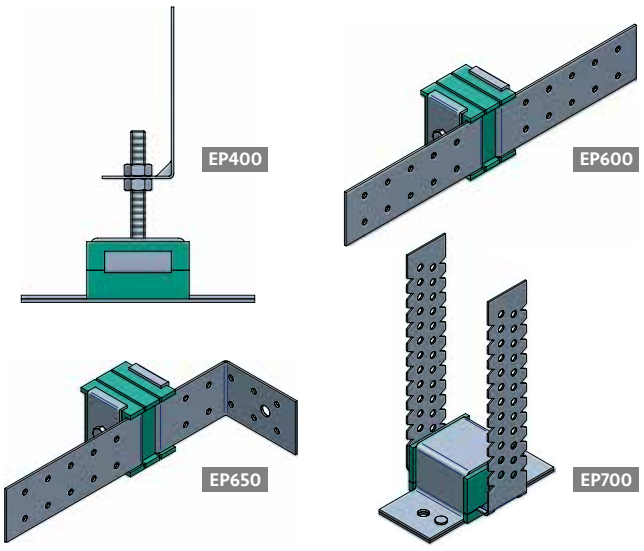


Image: www.kier.co.uk

Acoustic Floating Floor Projects

LIGHT CINEMA

Walsall Waterfront – 8 Screens

TVS supplied and installed acoustic floating floors throughout all the new cinema's auditoriums. TVS also supplied an acoustic resilient strip for the isolation of the timber terraced seating areas and the partition walls.

The Moor Sheffield – 9 Screens

TVS supplied and installed acoustic floating floors throughout the 1st floor cinema complex.

Redrock Stockport – 10 Screens

TVS supplied and installed acoustic floating floors throughout the 1st floor cinema complex.

Bradford Broadway Cinema – 6 Screens

TVS supplied and installed the acoustic floating floors throughout the new 6 screen cinema development. We also supplied a high performance acoustic isolation material beneath the timber seating and steelwork isolation pads and washers for all the required steelwork isolation.


Image: www.aquilaholdings.co.uk

EVERYMAN CINEMA

Chelmsford Bond Street Cinema – 5 Screens

TVS supplied and installed acoustic floating floors throughout the new development at Bond Street. TVS also supplied and installed the acoustic mastic throughout the auditoriums.

Stratford-upon-Avon Cinema – 5 Screens

TVS supplied and installed acoustic floating floors for the new Everyman cinema development in Stratford-Upon-Avon.

Acoustic Floating Floor Projects

ODEON CINEMA

Northwich Cinema – 8 Screens

TVS supplied and installed acoustic floating floors throughout all the new cinema's auditoriums. TVS also supplied an acoustic resilient strip for the isolation of the timber terraced seating areas and the partition walls.

The Crescent Hinkley Cinema – 5 Screens

TVS supplied and installed acoustic floating floors throughout the new cinema complex.

Whiteley Cinema – 9 Screens

TVS supplied and installed acoustic floating floors to the new development.

CINEWORLD CINEMA

Ruislip Cinema – 11 Screens

TVS supplied and installed acoustic floating floors throughout the auditoriums in the new cinema complex. TVS also supplied and installed the acoustic mastic inside each auditorium.

Loughborough Baxter Gate – 8 Screens

TVS supplied and installed acoustic floating floors throughout the auditoriums in the new cinema complex. TVS also installed the void formers in each auditorium and throughout the corridors before the concrete contractor poured the concrete.

Intu Watford – 9 Screens

TVS supplied and installed the acoustic floating floors throughout the 9 screen new cinema complex.

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Image: www.cuemarketing.co.uk

Acoustic Floating Floor Projects

HOLLYWOOD BOWL – BOWLING ALLEYS

Intu Derby Shopping Centre Bowling Alley

TVS Acoustics completed the new Hollywood Bowl at Intu Derby Shopping Centre. This project involved the supply and installation of the acoustic floating floor for the 18 fully computerised ten-pin bowling lanes. TVS also supplied the steelwork isolation pads for the lane pinsetters.

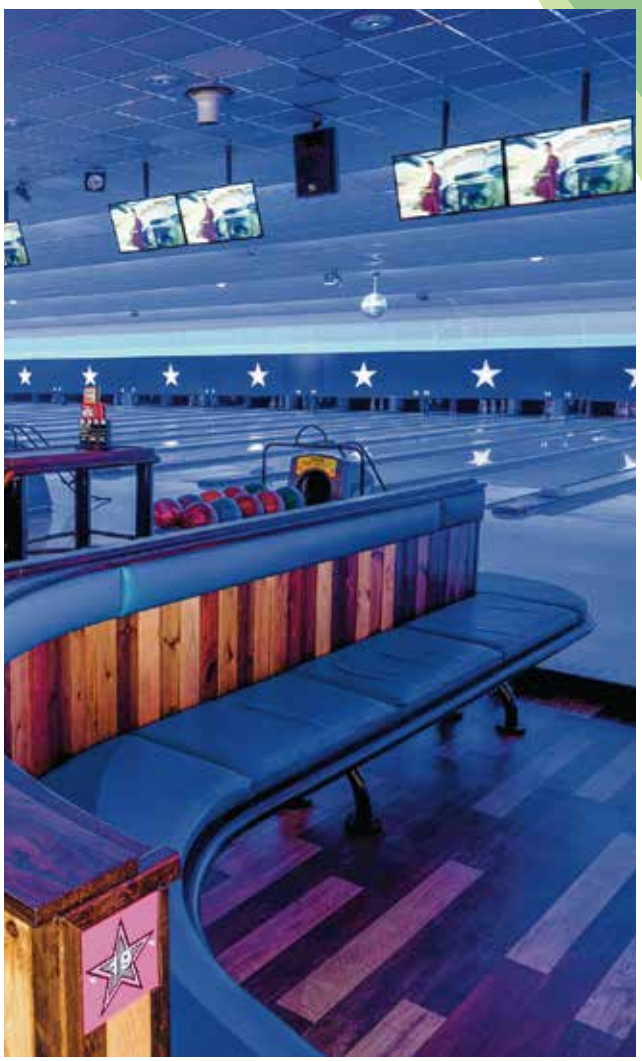
Intu Watford Shopping Centre Bowling Alley

The project included the supply and installation of the acoustic floating floors for the new Hollywood Bowl bowling alley for the fully computerised ten-pin bowling lane.

LANE 7 – BOWLING ALLEY

The Cube, Birmingham

TVS supplied and installed the RESi Floating Floor System for the new 9 lane bowling alley development (including all lanes, pin-setters and walkways). In addition, our team poured the 100mm reinforced floated concrete slab on top of this system to complete our works.



CASE STUDY

Cineworld South Ruislip

Client: Cineworld
Main Contractor: Simons Construction
Acoustic Consultant: Sharps Redmore

Project Information

TVS supplied and installed the acoustic floating floor within each auditorium of the new Cineworld Cinema in South Ruislip. Located on the site of the former Arla Dairies factory, the Citigrove development also included a number of restaurants, shops and apartments.

In order to achieve Cineworld's specification of NR30 within each off the 11 auditoria, it was essential to install a floated concrete floor with a minimum air gap of 50mm, a minimum floated thickness of 100mm, and a maximum natural frequency of 14Hz. TVS RESi Floating Floor System, incorporating Sylomer SR850 isolators with a natural frequency of 8Hz comfortably met this specification.

We were able to offer the full design, supply and installation of the concrete floating floors including the flexible mastic finish around the perimeter of the floated slab.

Product

TVS RESi Floating Floor System
TVS Acoustic Mastic to all auditoriums

Completed: 2017

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©oliver perrott photography

CASE STUDY

Derby INTu Hollywood Bowl

Client: Hollywood Bowl
Main Contractor: Abbott Building
Acoustic Consultant: Sharps Redmore

Project Information

The inclusion of a new bowling alley, operated by Hollywood Bowl, at the new Derby INTu Shopping Centre required careful acoustic planning.

Formed within the existing level 3 car park above the second level retail units, high levels of impact and airborne noise from both the pin setters, and the dropping and rolling of balls on the lanes and run up area, had to be mitigated.

A target of NR35 in the retail units below was set. To achieve this target, the steelwork frame supporting the pin setters, was supported on a number of Sylodyn NF isolation pads at 37.5mm thickness, providing a natural frequency <8Hz, complete with TVS Resilient Washers to isolate the anchor bolts.

Similarly a RESi FFS concrete floating floor of 100mm depth, with a minimum void of 100mm, supported on Sylomer SR850 isolators with a natural frequency of 8.5Hz, provided sufficient isolation to support the bowling lane and run up areas. TVS worked closely with the main contractor to ensure that they were able to integrate the solution in to the existing structure, including a bespoke design of the RESi FFS System supports to cope with a sloping subfloor.

Product

TVS RESi Floating Floor System
Sylodyn NF Isolation Pads
TVS Resilient Washers

Completed: 2016

TVS ACOUSTICS

NOISE & VIBRATION CONTROL

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