

Vibration Isolation Products



SPEIRS ROBERTSON

FEATURES

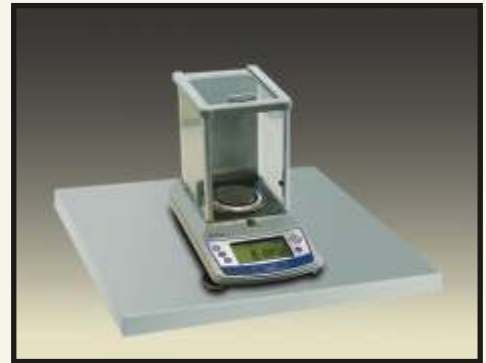
- **2Hz natural frequency built-in air isolators**
- **Active self levelling and passive pump up versions**
- **Highly rigid laminated construction with damping core**
- **Low cost, easy to install and free from maintenance**
- **Ideal for laboratories and clean rooms, will meet Class 10 (Class 1 available)**
- **Simple, compact, easy to use and clean**
- **Wide range of sizes, options and accessories**
- **Applications include: Microscopes, balances, interferometers and semi-conductor test and inspection**



Vibrations limit the performance of sensitive instruments in numerous applications. Thus the need to remove vibrations to optimise performance has become crucial. We have spent many years developing state-of-the-art workstations and platforms, which provide the user with a truly vibration free surface on which the user can place equipment. Our products are available in a wide range of sizes and shapes to support instruments of varying weights and footprints.

THEORY

Elimination of movements from a working surface is achieved by isolating it from any external influences such as the floor and the structure itself is rigid and damps out any induced surface movements (fans etc.). The major sources of external disturbances are vertical and horizontal floor movements.



Analytical Balance

Floor vibrations arise from many sources; road traffic, trains, large machinery, lifts and building sway are among common examples. Typically building vibrations peak in the region of 7 Hz, however a metal frame building of height H has a resonance of roughly $46/H$ hertz, which means that on the fifth floor of a building you can expect horizontal and vertical displacements as low as 3 hertz. Floors almost never exhibit periodic vibrations in the 1 to 3Hz band.

The measure of the effectiveness of an isolation system is given by its transmissibility (opposite). As an approximate rule isolators start to become effective at between two to three times their own natural resonant frequency. Thus to remove vibrations at 7Hz an isolator with a natural frequency of about 2Hz is required.

The performance of an isolator depends on its stiffness and the mass it is supporting. In general isolator performance improves as mass is increased and for optimum

performance one should work close to the maximum load an isolation system is designed to support. As an example, it is bad practice to place a 50kg load on a table designed to support 500kg, whereas a load of 200kg or more would be suitable.



Semiconductor Bond Tester

The load supported by an isolator is calculated by multiplying the air pressure inside the isolator by the area of the piston it is supporting. Thus a piston of 15cm² surface area will support 25kg at 2 Bar. As (pressure) x (volume) for an isolator is a constant at any given temperature, increasing the load on an isolator will cause the piston to drop until the pressure has risen sufficiently to support the load. If one wishes to return the platform to its original level, then one must introduce more air into the isolator at the new pressure.



Confocal Laser Microscope

A self-levelling valve introduces and exhausts air automatically into an isolator and always keeps it at the same height.

CONSTRUCTION

Our platforms combine a highly rigid damped table with an excellent vibration isolation system in one unique package.

It has long been accepted that the best isolation is achieved using pneumatic isolation chambers, which utilise high performance rolling diaphragms. All our isolators contain such a specially designed diaphragms.



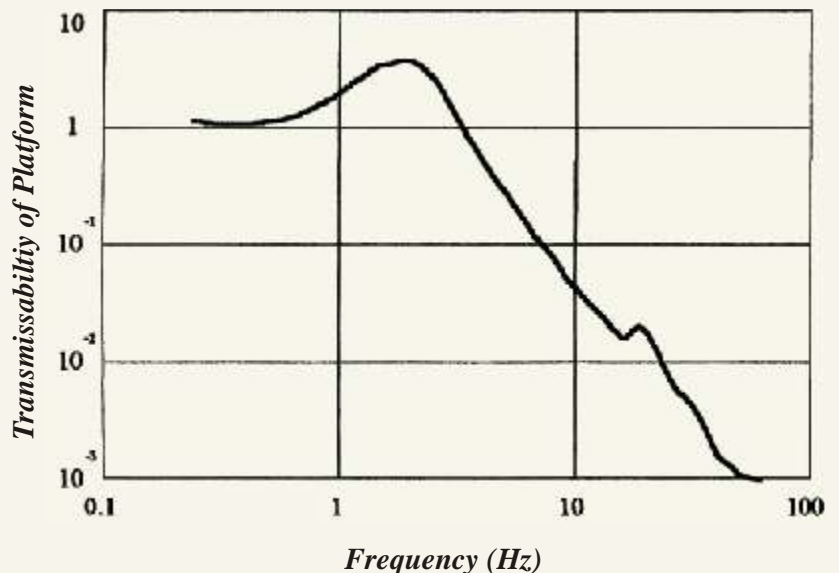
Laboratory Microscope

Our isolators are also connected to a damping volume via a tuned restrictor. The restrictor absorbs system energy by converting air movements into heat as it is forced through the restrictor. This removes the overshoot and oscillations, which occur in isolators without dampening chambers and highly specialised restrictors such as ours.



Materials Tester

We use a low isolation volume to damping volume ratio, which means that the working surface appears stiff to the touch (as all large low frequency disturbances are rapidly damped away). Small higher frequency disturbances are removed by the isolator chamber, these have a resonant frequency (dependant on version and load) typically in the range 1.5 to 2Hz. and whose characteristics are given in the transmissibility curves.



Our platforms feature a seamless steel top finished in either a grey epoxy powder coat or optionally made from dull polished stainless steel. Both finishes meet the Class 10 requirements. The stainless finish may be required in certain environments and we would be pleased to advise on this. The tops are formed by laminating a highly damping core between two steel plates using high strength aerospace grade adhesives, a technique we developed in producing our range of high performance optical tables and breadboards.

Four isolators, airflow restrictors and damping volumes are integrated into the platforms, which allow the working surface to float freely away from its base during operation. The natural frequency is typically 2Hz both vertically and horizontally and is suitable for all but the most sensitive instruments, where our low frequency option should be selected. We offer a choice of active and passive platform versions.

In active platforms, each isolator is connected to a self-levelling arm, which can be externally adjusted to set the height of the platform and level it. They should be chosen when the load on a table is expected to vary frequently. These platforms require a continuous supply of air. This can be provided by a compressor or using a gas bottle (suitable for months of normal operation and ideal for clean room uses).

Passive platforms are designed for applications where load does not vary. This includes balance tables, which are designed for light loads where the platform is weighted to give good performance.

Platforms are manufactured in one location using state-of-the-art automated machinery to guarantee high tolerances and consistency while keeping costs low. Our products are assembled by a highly skilled workforce and rigorous quality control is applied throughout the manufacturing process.

SELECTING A PLATFORM

To select a platform you must first decide on the size of the working surface you require, the load it needs to support and the sensitivity of the equipment to vibrations; from this you can determine the class of product you require. You then need to decide whether you will require it to be floor mounted and what type of air supply would be best suited. We would be pleased to assist you and answer any questions you may have.

(AMF SERIES)

These platforms are self-levelling and ideal for use when loads on the platform are likely to change. They can support up to 160kg and are available in a range of standard sizes from 60x60cm up to 150x90cm. Their low 6cm working height and low weight makes them ideal for use on desks and benches.



Active Platform, AMF 90x60

PASSIVE PLATFORMS (AMP SERIES)

These platforms are designed to be pumped-up and left alone. Simple to use, they are ideal for use with fixed loads or in applications where pressurised air or gas cannot be used. They support loads up to 160kg and sizes range from 60x60cm to 150x90cm with a 6cm working height.



Passive Platform, AMP 90x60

BALANCE TABLES (AMB SERIES)

These passive platforms are weighted to 25kg and are for use with light instruments such as balances. They support loads to 120kg and are available in three sizes, 45x30cm, 40x50cm and 60x60cm. Their small footprint also makes them ideal for use when space is at a minimum. Working height is 6cm.



Balance Table AMB, 45x30

CONTOURED PLATFORM (AMC SERIES)

This light and compact passive platform has been specially designed for instruments such as microscopes. Its T-shape profile allows users to place their arms on either side of the platform while the width at the rear is large enough to support a wide range of instruments. Made entirely from electroless Nickel-plated aluminium parts it is suitable for Class 1 requirements. The top plate is 1cm thick with three damped isolators mounted to the underside.



Contoured Platform

HIGH LOAD WORKSTATIONS (AMH SERIES)

These workstations are designed for heavy instruments such as electron microscopes, which require high degrees of isolation from vibrations. They comprise a highly rigid platform supported on a sturdy isolation frame fitted with levelling feet.

The platform is fabricated by laminating two 5mm thick ferromagnetic steel plates to a 5cm thick aluminium close cell honeycomb core using aerospace grade adhesives.



Hi-Load Workstations

The resultant plate has excellent compliance characteristics and its rigidity is suitable for supporting large loads up to 1500kg.

The vibration isolators are built into the legs of the frame. Each leg contains a low natural frequency rolling diaphragm isolator connected to a damping volume via a tuned flow restrictor, giving a highly damped system with a natural resonance (at high load) of around 1.1Hz. The isolation system is active with a self-levelling arm attached to each leg allowing the platform to be levelled as required and to compensate for varying loads. The isolators are available in two versions, the standard version for loads up to 500kg and a heavy-duty version for loads to 1500kg. The standard platform is available in a range of sizes from 90x90cm to 150 x 120cm.

OPTIONS AND ACCESSORIES

LOW FREQUENCY PLATFORM OPTION (LF OPTION)

Platforms with this option incorporate a specially extended isolator, which has a natural frequency of 1.5Hz vertically and horizontally. It is available only for active platforms. The only difference to the standard versions is that the platform depth is increased to 10cm with a corresponding increase in working height to 11cm.

FRAME

Frames bolt directly to the platforms and are feature a hard grey epoxy powder finish. They are supplied with four levelling feet, giving 3cm of adjustment to ensure the frames stability on the most uneven floors. Frame height 71cm, going to a working height of 78cm.

FRAME SHELF

Frame shelves are made from 2cm laminated board and are suitable for supporting equipment such as computers

PLATFORM GUARD

The platform guard is a sturdy rail (with side rail option) that fully surrounds the platform and protects it against accidental knocks, which would otherwise disturb instruments on the platform.

PLATFORM SHELF

A 30cm wide shelf, which sits on the guard rail over the platform and is quick and easy to remove and replace.

MONITOR STAND

This padded stand will support monitors weighing up to 30kg. It features 360 degree rotation of the arm as well as height adjustment. It mounts to the platform guard.

RETRACTABLE CASTORS

These castors incorporate a foot, which can be raised and lowered using a thumbwheel, allowing the workstation to be wheeled around and then securely mounted to the floor in a new location.



Low Frequency Platform



Frame Option



Frame Shelf Option



Platform Guard and Shelves



Monitor Stand

SILENT COMPRESSOR

These compact and oil free air compressors are virtually silent (30dB/A) versions and suitable for running several platforms.



AIR PREPARATION UNIT

An air preparation unit should be used if compressed air is used which may be damp or contain small particles. The unit will ensure the air supply is properly cleaned and dry before entering the platforms.



STAINLESS WORKING SURFACE

The dull polished stainless steel surface is ideal for stringent environments, such as within the food industry and in medical applications.



MOUNTING HOLES

We can supply platforms with a ferromagnetic steel working surface featuring either M6 holes on a 25mm grid of 1/4-20UNC holes on 1 inch centres.

COMPONENTS

CONCENTRIC AIRMOUNT AM2

This low profile airmount has a working height of only 40mm. Our unique design incorporates an isolation chamber surrounded by a concentric damping chamber. The chambers are connected by a tuned airflow restrictor which gives optimum damping with no overshoot while isolating out floor vibrations.



OEM AIRMOUNT AM3

This low cost isolator has a very small footprint and is designed for incorporation into instruments. It is used in conjunction with a damping chamber, which has the advantage of being placable at some distance from the isolator, as required by the user.



HIGH LOAD ISOLATOR AM7

These high load isolators are capable of supporting loads up to 400kg and have a very low natural frequency as low as 1.1Hz. They are ideal as mounts for heavy sensitive instruments such as electron microscopes.



LEVELLING ARM AM9

The levelling arm introduces and exhausts air into the isolators to maintain a constant working height. Its response time is much faster than that of the isolators and when used with them produces a working surface that not only feels very stiff but actually has an improved isolation performance.

SPECIFICATIONS

PLATFORMS

	ACTIVE	PASSIVE	BALANCE	HI-LOAD	CONTOURED
Sizes (L x W) cm	60 x 60; 60 x 90; 60 x 120 75 x 90; 75 x 120; 75 x 150 90 x 90; 90 x 120; 90 x 150		45 x 30 40 x 50 60 x 60	90 x 90 90 x 120 120 x 120	36 x 54 (Front 20)
Working Height cm	6 (Active with L-F option 11cm)			76	55
Working Surface	Epoxy powder grey Stainless Steel optional			Ferromagnetic Stainless	Elec Ni Aluminium
Isolation Type	Rolling Diaphragm Isolator and Damping Chamber				
Natural Frequency	1.5Hz*	2Hz	2Hz	1Hz	2Hz
Height Adjustment mm	8			15	5
Self-Levelling	Yes	No	No	Yes	No
Load Capacity Kgs	160		120	500 / 1500 option	150
Air Supply	5 to 10 bar	Pump-up		5 to 10 bar	Pump-up
Air Connector	6mm push fit airline	Woods Cycle Valve		6mm push fit airline	Woods Cycle Valve
Weight Kgs	20 to 45		30	120 to 160	5

Natural frequencies may vary dependant on load and other factors. * L-F option

OPTION AND ACCESSORIES

Frame	Yes	Yes	No	Required	No
Height Adjustment cm	2.5		No	5	No
Castor Feet	Optional		No	No	No
Frame Guard Monitor Stand, Shelf	Optional		No	No	No

EUROPE

SPEIRS ROBERTSON LTD

Oakley Road, Bromham

Bedford MK43 8HY

United Kingdom

Tel: (44) 1234 823410

Fax (44) 1234 825819

Email: sales@speirsrobertson.com

USA

SPEIRS ROBERTSON CORP.

4800 Sugar Grove Blvd.,

Stafford TX 77477

USA

Toll free: 1-800-747-4596

www.speirsrobertson.com