



TRELLEBORG

INDUSTRIAL PRODUCTS CATALOGUE



A SAFE CHOICE ALL OVER THE WORLD

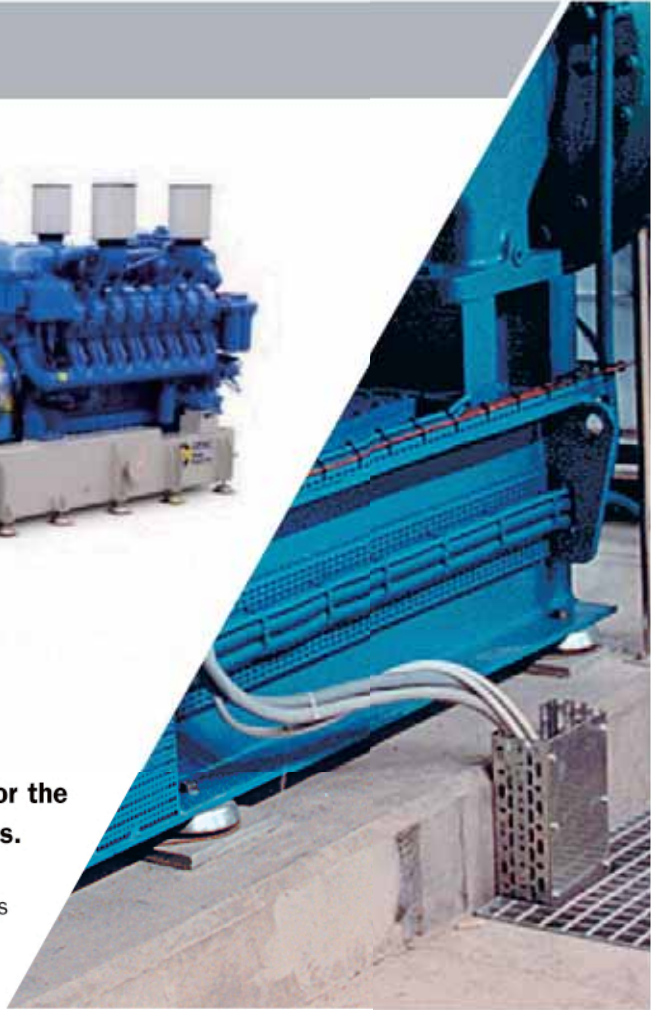


Metalastik®

Novibra®

Trellextreme®

Trelleborg Industrial AVS - global supply and manufacturing of Novibra® and Metalastik® antivibration solutions.



Trelleborg Industrial Antivibration Systems is a global specialist for the supply of rubber to metal bonded antivibration mounts and systems.

Our worldwide network of distributors is ideally placed to meet your global requirements for high quality, cost efficient solutions. With a strong reputation for engineering Trelleborg prides itself on its ability to work very closely with you, the customer, to provide optimal designs and ideal products to solve your specific problem.

Our head office is located in a modern, £10 million plant in Leicester, UK, while production is divided between Europe, North America and Asia, using both our own facilities and those of our sister company Trelleborg Automotive. All plants are approved to ISO:9001:2000 and ISO 14001.

Leicester also houses the main technical center and extensive research and development facilities.

Trelleborg Industrial AVS operates a policy of continuous improvement and development.

We reserve the right to change design and specification of our products without prior notification or alteration of literature.

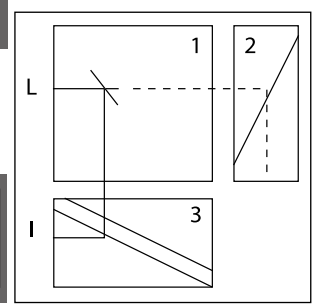
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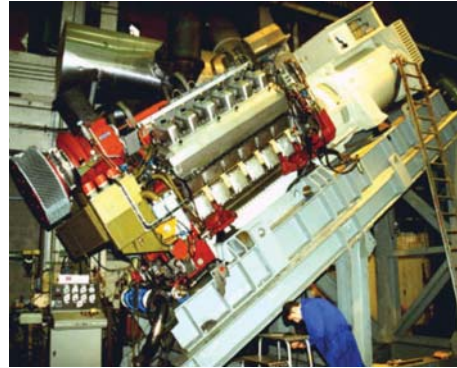
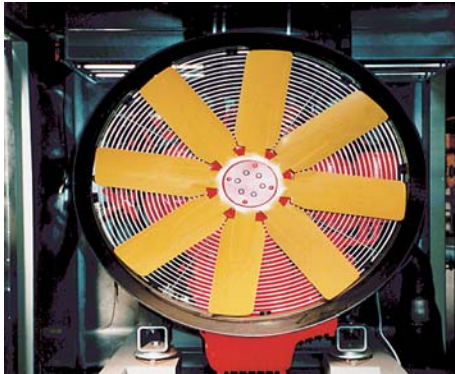
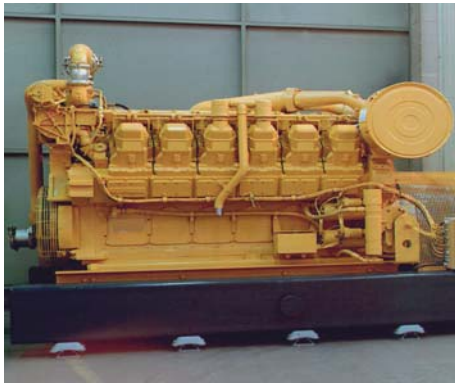


AV Mount Selecting Guidelines

Assistance when choosing anti-vibration mountings

Type of Machine	Type of Mounting	How to Choose
Rotating Equipment Stationary Installations Combustion Engines, Compressors, Generators		Necessary information: <ul style="list-style-type: none"> • Weight • Number of mounts • Rotational speed • Environment
Mobile Installations Vehicle Engines, Compressors, Generators, Marine Engines		Fill in the questionnaire. (p100)
Sensitive Equipment Electronics, Cameras, Fans, Small Pumps		Tear off the questionnaire and copy to our engineers. To select correct mounting, the following data are needed:
Transit Protection Computers, Test Equipment		<ol style="list-style-type: none"> 1. Load per mounting (kg) 2. Interfering frequency (Hz) (Hz = rpm/60)
Vehicle Engines, Cabs, ROPS Cage		See corresponding product data sheet:
Instrument Mounting Electronic Racks, Radio TX/RX, Mobile Computer Systems		Select correct load line in 1 and correct interference line in diagram 3.
Heavy Duty Isolators Off Highway Vehicles, Vibratory Screens, Large Engines, Public Service Vehicles		The load line intersects with required type of mounting.
Building and Construction Inertia Blocks, Heavy Plant, Ductwork, Suspended Ceilings		Connect this intersection point vertically down to the interference line in diagram 3.
Machine Tools Lathes, Punch Presses, Grinders, Woodworking Equipment		On the sloping curve, the isolation degree is indicated. For static deflection, see diagram 2.
Motion Control Rebound, Motion Limitation		
Vehicle Suspension Pivot Arms, Trunnion Mounts, Gearbox Mountings		
General Purpose Mount Exhaust Systems, Small Fans, Instrument Panels		





Trelleborg Industrial AVS is a world leader in the design and manufacturing of rubber to metal bonded components for anti-vibration application and suspension systems used in rail, marine, defence, industrial and civil engineering applications. Our strength is that we can offer a wide range of isolators in combination with specialised expertise that is needed to achieve a total solution. We use data-based surveillance software, conduct tests and provide full technical support.

Trelleborg Industrial AVS is an ISO9001 accredited company that operates a policy of continuous improvement and development. We reserve the right to change design and specification of our products without prior notification or alteration of literature.

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Solutions for

vibration & shock

– worldwide

All machinery vibrates and causes noise and structure-borne sound. At Trelleborg Industrial AVS we solve this type of problem all the time, and we know it pays off.

The working environment can be improved, which among other things means fewer industrial injuries to the people who work with the machinery; and the economic benefits are considerable, less wear, lower maintenance costs and increased lifetime of



the machinery. Whilst two vibration problems are never alike. We always analyze the problem carefully before we start to work on a solution. During the design and development phase we transform our ideas into reality and create effective solutions.

*It is always worth taking care of a vibration problem.
Both people and machines perform better
if vibrations are kept to a minimum.*

Product Description - Trelleborg Industrial AVS

ANB™	The shock buffer type ANB is used to effectively limit movement of equipment or machine components which need to be slowed down or stopped.	18
BA™ & Double U-Shear™	Novibra® type BA and Metalastik® type Double U-Shear are equally suitable for isolating vibrations from low speed machines and equipment while also protecting sensitive and lightweight units from external shocks and vibrations.	21
Bobbins™	A supplementary range of cylindrical mountings for a wide range of applications. They can be loaded either in compression or shear taking into consideration individual demands for actual applications.	23
Buffers™	Buffers are designed to protect structures and equipment from impact forces. They are usually fitted as non-metallic stops or incorporated in vehicle suspension systems to provide progressive stiffening under increasing load.	28
Cab Mountings	Specially profiled rubber section together with bump and rebound control washers provide optimum suspension characteristics for cabs on commercial vehicles, tractors and other off road vehicles, earthmoving equipment and construction plant.	30
Circular SAW™ Mountings	Used in a variety of industrial applications including vibratory rollers and small screens or for the suspension of smaller type I.C. engines.	32
Cushyfloat™	The Cushyfloat mounting is a general purpose unit designed to provide effective isolation of vibration and noise arising from both static and mobile equipment. Also marine engine suspension.	34
Cushyfoot™	Cushyfoot mountings are suitable for many different types of machinery, such as diesel engines, generator sets, fans, hydraulic units and lift machinery.	36
EH™	Type EH mountings are designed to achieve effective vibration isolation on engines, operator cabs and other ancillary units.	38
Equi-Frequency™ Mountings	General purpose low profile mounting for use where space is restricted. Suitable for stationary applications. May also be used to protect delicate or sensitive units from external shock or disturbances.	40
Fanflex™	A simple low cost mounting designed predominantly for the suspension of heating, ventilating and air conditioning equipment.	42
Flanged Instrumountings™	The Flanged Instrumountings protects sensitive equipment from external vibration and/or shock forces.	44
GK™	Novibra® mounting type GK is specifically designed for isolation of heavy machinery with low interfering frequencies. It is widely used under concrete foundations supporting heavy machinery.	46
HA™	The HA height adjustment facilitates precise coupling alignment for engine installations and boat building tolerances.	48
Low Frequency Mountings	The Low Frequency mounting is designed to give large deflection for small loads and are used to protect instruments etc, against vibration and impact, and also to isolate light vibrating apparatus from surroundings.	49
M™	Type M is ideal for applications involving isolation of low frequency vibrations in all planes. Also suitable for shock attenuation due to the designed ability to provide large deflection while providing passive vibration isolation on electronic instruments, measuring equipment and test cells.	51
MDS™	Designed to take high dynamic shock loads but to limit mount movements in all directions, with 2 part single bolt installation. No requirement for radius or chamfered hole.	53
Metaxentric™ Bushes	Similar to conventional Ultra Duty Bushes but with inner and outer sleeves offset radially. This feature provides a greater rubber thickness and hence increased flexibility in the normal direction of loading while maintaining control in other modes and still allowing torsional movement.	55

Product Description - Trelleborg Industrial AVS

Metacone™ & HK™	A range of mountings designed for high load capacity with relatively large static deflections. The high loading for a given size is achieved by utilizing the rubber to best advantage in shear and compression. Suitable for both engine and cab suspension in mobile applications.	56
Metacone™ & HK™ Washers	Overload and rebound washers (top and bottom) are necessary to limit maximum movement in the event of shock loading.	60
Novibra Plate™	The Anti-Vibration Plate is intended, primarily, for applications with low demands on vibration isolation.	62
RA™ & Failsafe™	For effective isolation of vibration and noise on machines with rotating movements.	64
RAB™	For effective isolation of vibration and noise on machinery with rotating movements. Especially suitable for 1-, 2- and 3-cylinder engines.	66
RAEM™	For effective isolation of vibration and noise on machines with rotating movements.	68
Rectangular SAW™ Mountings	Widely used for suspending engines on road vehicles and may also be used as springs for vibratory equipment.	70
3" Shearmount	Also known as 'Sandwich' mountings because they feature a rubber section sandwiched between plates of metal. Widely used for suspending engines on road vehicles and may also be employed as springs for vibratory equipment.	72
SAW™	Novibra® elements type SAW is heavy-duty mountings for high vertical static and shock loads in compression. Provides high isolation in the horizontal shear direction.	74
SE™	Novibra® type SE is suitable for the isolation of high frequency disturbances and also provides reduction of structure-borne noise.	77
SIM™	SIM is a mounting for marine and mobile applications. The strong metal parts and the soft vertical stiffness combined with high stiffness in axial direction makes it suitable for suspension of marine and industrial engines both with and without thrust bearing.	78
Spherilastik™ Bearings	Typical uses include traction and braking reaction rods for rail, road and off road vehicles, hydraulic damper fixings and other applications where a high duty bearing of compact size is required.	80
TF™ and TFE™	Novibra® type TF with level adjuster is a modern machine mounting suitable for a wide range of free standing workshop machines.	81
Two Bolt Instrumountings™	Two Bolt Instrumountings provide a convenient and effective means of isolating vibration generated by lightweight machinery.	84
U™	Type U provides for a stable machine installation and is particularly suitable for the vibration isolation of heavier machinery with relatively high interfering frequencies.	87
UH™	Novibra® mounting type UH is particularly suitable for the suspension of both mobile and static cabs as well as platforms on agricultural vehicles.	88
Vee Mountings™	A high load capacity mounting with large rubber volume providing a high degree of vibration and noise isolation. Ideally suited for suspending engines installed in public service and goods vehicles.	90
VP™ & UD™ Bushes	For vehicle suspension, pivot arms and all types of mechanical linkage, permits oscillating movement through the deflection of rubber in shear. Suitable to replace roller bearings where small motions are required (up to 20 degrees). Reduces shock loads and noise transmission in structures.	92
VT™	Novibra® type VT protects wall-mounted instrument cabinets from vibrations and shocks generated by nearby engines, workshop machinery.	94

Trelleborg Industrial AVS

- Provides a healthier environment

Trelleborg Industrial AVS's antivibration mountings primary task/function is to eliminate harmful vibrations and to effectively reduce structure-borne sound.

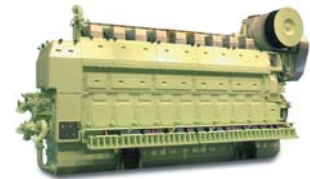


World-wide Solutions to Exceed Our Customers Expectations

Trelleborg Industrial AVS is a well-recognized supplier of antivibration mountings. With decades of experience of vibration problems all over the world, Trelleborg Industrial AVS today covers a wide spectrum of applications. Our principal markets are Industrial, Specialist Vehicles, Rail, Marine and Defence.



In the Industrial sector we have satisfied the requirements of manufacturers of fans, compressors, separators, generators, pumps, wind generators, Specialist vehicles, material handling equipment, buildings and bridges.



Our Mission

To be our customers' preferred choice for engineered solutions in Industrial, Specialist Vehicles, Rail and Marine markets.

Our polymer technologies enable the control of vibration and movement for the protection of people, equipment and the environment.



Complete solution of the vibration problem

Trelleborg Industrial AVS offers more than just a complete solution. We perform computer-managed calculations to achieve the optimum technical solution, We educate and train in vibration techniques to increase the understanding and knowledge of vibration problems.



We make FFT measurements on site to analyze the vibration problems.

Our distributors have a wide range of Trelleborg Industrial AVS mountings directly from stock to customer in order to minimize lead-time.



From R & D to finished product

Being a member of the Trelleborg Group enables Trelleborg Industrial AVS to be in a position of full control of the complete production process and all vital raw materials.

The Trelleborg Group has its own rubber mixing departments and laboratories with complete test equipment for measurements of raw materials and finished products.

Our laboratories continuously measure and control specifications of the raw material and finished products.

Trelleborg Industrial AVS has an R&D department, production facilities in the UK and Sweden, and follows the product all the way to the customer. Total control, in accordance with ISO 9001, of this process, results in the quality of the product required by the customer.

Environmental Policy – ISO 14000

Trelleborg Industrial AVS is working in the same way as its customers with the development of environmental friendly solutions and production processes, implementing an environment management system according to ISO 14000.

This means, for example, elimination of solvents in the vulcanizing process of composite material and solvent free adhesive to eliminate hazardous discharge.

At Trelleborg Industrial AVS we are convinced that a safe and healthy working and living environment provides good job satisfaction and higher productivity.



Trelleborg Industrial AVS

- A Safe Choice

Technical Solutions

Vibration problems are often complicated and Trelleborg Industrial AVS has a technical department with the ability to help customers analyze and evaluate in order to achieve the perfect solution to their vibration problem.

Our advanced computer based programs are designed in cooperation with technical universities.

Our strength in depth knowledge of vibration technology guarantees the optimum solution to our customers' vibration problems.

We commit ourselves to all kinds of issues.



Training And Test

Trelleborg Industrial AVS has possibilities to perform analysis with FFT technology. In such cases we perform measurements, analyze the application and recommend the best solution.

To increase the knowledge of vibration issues and Trelleborg Industrial AVS solutions, we conduct training and education courses for our customers and distributors.

Our Technical Centre with advanced testing facilities provides to Trelleborg Industrial AVS excellent opportunities for product development.



Trelleborg Industrial AVS

- Vibration Technology

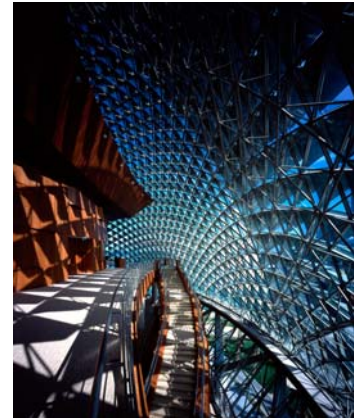
VIBRATION CAUSES STRUCTURE-BORNE NOISE

Vibration is generated by all kinds of machinery particularly those with rotating or reciprocating movements. Solidly mounted, these generated motions would be transmitted directly to the foundations giving rise to irritating noise to the immediate surroundings where the machine is installed.

Noise may also occur in areas some distance away, transmitted through the structure. This is normally referred to as “structure-borne noise” (structural noise).

In addition to noise, the creation of vibration can cause serious problems to sensitive machinery.

The human body, too, can be affected negatively and this manifests itself in reduced working capacity, tiredness, and headaches caused by both high and low frequencies. Extremely low frequencies with considerable movement cause motion sickness and sea-sickness.



The harmful effects of noise can be eliminated by:

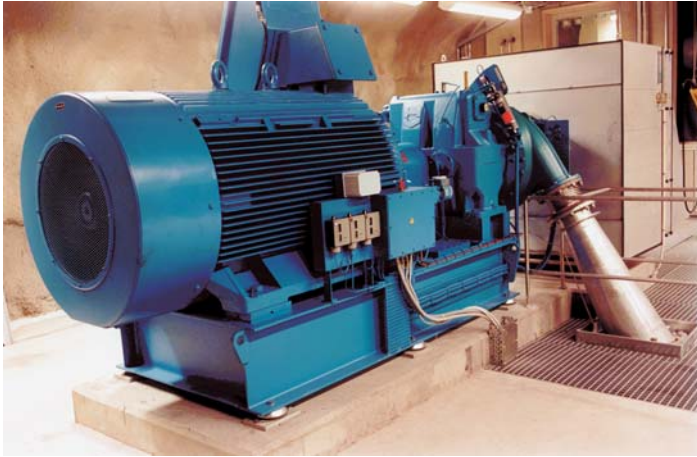
- Reducing imbalance in the machine and the machine’s natural vibrations to a minimum by applying greater accuracy in manufacture, suitable design of cutting tools, etc.
- Vibration-isolating the machine to prevent vibrations from being transmitted to surrounding areas.
- Vibration-isolating the machine to prevent the effect of outside interference.
- Sound-insulating the machine with suitable sound insulation and absorbing material to combat air-borne noise.



TRELLEBORG INDUSTRIAL AVS REDUCES THE TOTAL COST

The manufacturing costs related to extremely accurate balancing of machines are very high and may rise quickly with increasingly finer balancing.

Since vibration isolation of the entire machine may still have to be considered, Trelleborg Industrial AVS anti-vibration mountings can be cost effective by reducing the need for intensive balancing requirements.



* High pressure compressor mounted on Novibra© type RA.



THE PROPERTIES OF RUBBER MAKES IT PARTICULARLY SUITABLE AS A SPRING MATERIAL

Vibration isolation is based on installing machinery on springs or resilient material of known stiffness.

The types of spring material which are used most often are rubber and steel. Another alternative is air springs.

Rubber has high load bearing capacity with an ability to accommodate overload conditions without the catastrophic failures associated with steel and other materials. It can carry complex loadings more easily and economically than other alternatives.

The bonding of rubber to a rigid material creates a product, which can accommodate movement without any sliding or rotating surfaces that require lubrication.

This allows operation in many harsh environments without concern and with substantially reduced maintenance requirements.

Components can be designed to integrate with the space limitations of the application and provide control in all six modes of freedom.

Components can be designed to integrate with the space limitations of the application and provide control in all six modes of freedom.

Steel springs are normally used in the form of coil springs or leaf springs. The benefit of these is that they permit relatively high deflections, but their disadvantage is that they provide very little damping. Due to this, excessive movement occurs when passing through the resonance range. Often special devices are installed in order to limit deflections.

To allow their properties to be utilized in a satisfactory way, Trelleborg Industrial AVS rubber mountings are available in various hardness grades and polymer types.

Rubber has many unique properties, including acoustic damping characteristics, which assist the installation designer in keeping noise levels inside and outside passenger accommodations to a minimum.

RUBBER AS AN ENGINEERING MATERIAL

Compared with other engineering materials, rubber is very ductile. In some cases, the elongation may be higher than 1000%, and by far the highest proportion of this strain is elastic. Metals, on the other hand, have very small strains below the elastic limit. Compared with metals, the tensile strength of rubber is low. The maximum level that can be achieved with rubber is 25-30 MPa. However, because of the high strain, rubber has a very large work absorption capacity compared with the best grade of steel.

If a material is subjected to a load below the elastic limit, the deformation will, according to Hooke's law, be proportional to the load. This does not apply to rubber under tension or compression. This means that rubber does not have any constant tensile or compression modulus of elasticity. Metals will normally be softer towards the end of a tensile test, while the opposite is often the case with rubber. Rubber does not have a yield point, and the modulus is increased until there is abrupt failure.

THE MOST IMPORTANT PROPERTIES FOR RUBBER

High elastic ductility

High elastic ductility is, therefore, the most pronounced feature of rubber. Just how easy it is to deform rubber is shown by the fact that the modulus of elasticity of compression for rubber within the normal hardness range, 30-80° IRH, is between 2 and 12 MPa; while the modulus of elasticity of steel is 210 000 MPa, This means that rubber is about 100 000 times softer than steel.

Damping capacity

The stiffness of a spring is a measure of applied force (P) against a resulting Deflection (X). Measurements taken at a continuous feed rate (usually in the order of 1mm/sec velocity) provide static (or pseudo static) characteristic. The curves in fig. 5 show alternative methods of determining stiffness.



Sound-insulating

As sound-insulating material, rubber is one of the very best. The effect of sound insulation increases with the thickness of the rubber. Rubber is an excellent absorber of impact sound, which occurs in foundations, floors, buildings, etc.

Environmental Conditions

Trelleborg products are manufactured in a wide range of rubber compound types. A range of hardnesses is available in each compound type to allow the required stiffness to be achieved.

Each compound is carefully formulated to obtain the best performance for specific properties. The compound chosen depends upon the most important properties for the application's requirement. Strength and fatigue requirements, operating temperature, environmental conditions and potential contamination must be considered. Most Trelleborg rubber compounds are based on polyisoprenes, offering high strength and excellent performance characteristics. A range of synthetic rubber compounds is also available for special applications where resistance to continuous high temperatures (>75°C) or other harsh environmental conditions is required. Anti-oxidants and anti-odorants are included in many formulations to provide resistance against ozone and ultra violet rays.

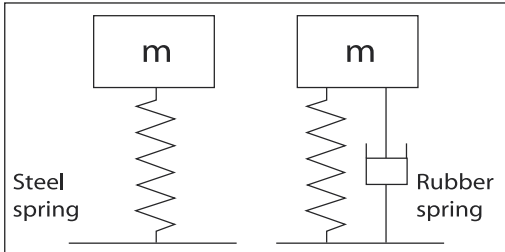


Fig. 1. Schematic difference between rubber spring and steel spring.

SPRING COEFFICIENTS

A rubber spring has different characteristic for static and dynamic conditions. A constant load causes a deflection, and the inclination/deflection gives the static spring coefficient.

When the spring from equilibrium is loaded with a dynamic force, the response is a higher spring coefficient.

SPRING COEFFICIENTS

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The curves in fig. 5 show alternative methods of determining stiffness.

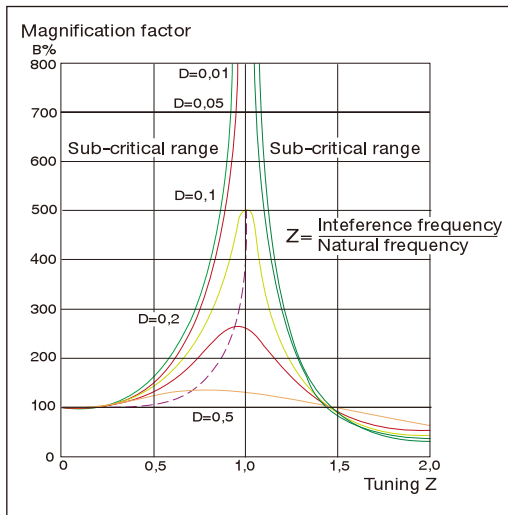


Fig. 2. Resonance curve for spring material with different internal damping.

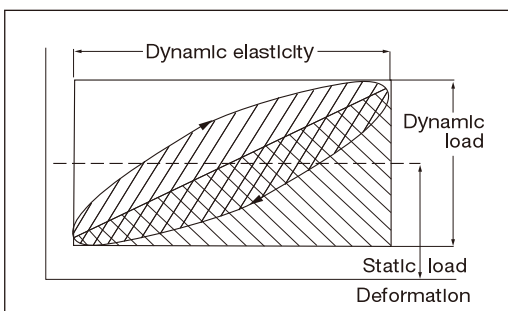
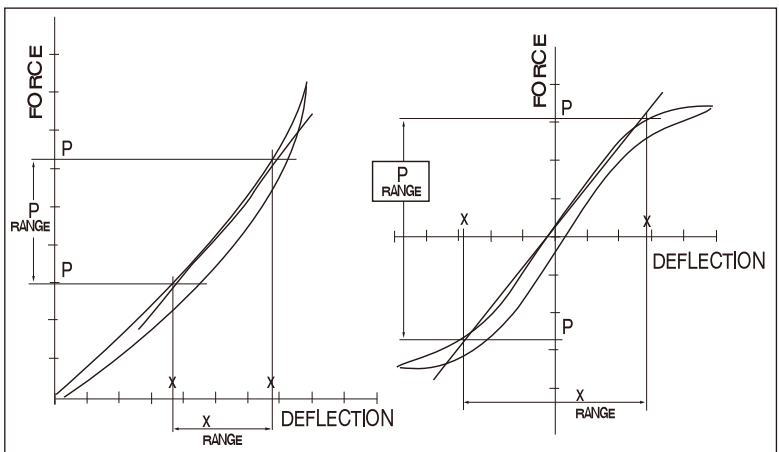


Fig. 3. Schematic representation of the internal damping properties of rubber. The elliptical area indicates the loss of energy.

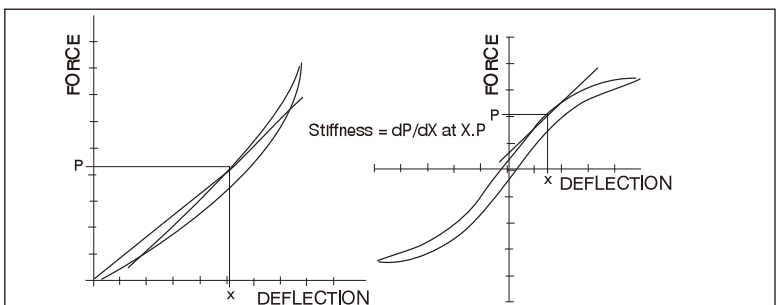


Fig. 5. dP/dX at XP average gradient over P (or X) range (usually derived by least squares method of curve fitting).

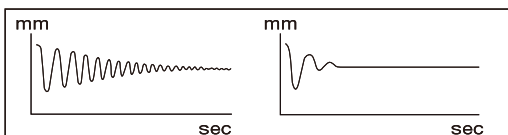


Fig. 4. Vibrations sequence with single impact for steel and rubber springs.

Commercial Name International Designation	Butyl Rubber IIR	Acrylonitrile Butadiene Rubber NBR	Natural Rubber NR
Hardness Range IRH	45 - 70	40 - 70	35 - 80
Temperature Range	-40 à +120°C	-40 + 130°C	-40 à +70°C
Properties			
Creep Performance	Moderate	Moderate	Good
Fatigue Performance	Good	Moderate	Very good
High Temperature Performance	Good	Good	Moderate
Low Temperature Performance	Good	Good	Good
Physical Strength	Good	Good	Excellent
Resistant to			
Acids	Very good	Conditional	Conditional
Oil and greases	Not suitable	Excellent	Not suitable
Ozone	Very good	Moderate	Moderate
Petrol	Not suitable	Excellent	Not suitable
Solvents, Aliphatic	Not suitable	Very good	Not suitable
Solvents, Aromatic	Not suitable	Conditional	Not suitable
Solvents, Halogen	Not suitable	Bad	Not suitable
Water	Good	Good	Good
Wear and Tear	Good	Very good	Very good

Table 1. Typical properties for rubber compounds used in antivibration mountings.

Dynamic Stiffness

The stiffness of a rubber spring changes when a dynamic force is applied. This is known as the dynamic (or complex) stiffness. The dynamic stiffness is usually higher than the pseudo-static stiffness, (the difference being referred to as the dynamic to static ratio) and is affected by several factors including changes in frequency, temperature and amplitude. See fig. 6.

The dynamic stiffness is considered to be unchanged between 5Hz and 80Hz under constant conditions. Above this frequency range, the dynamic stiffness of the spring will deviate from the ideal 'massless' spring stiffness. This is due to the mass effects of standing waves. "Wave effect" changes of dynamic stiffness are generated when the rubber section dimensions become comparable with multiples of the half wavelength of the propagated wave passing through the spring. Calculations of the deviation from ideal "massless" spring dynamic stiffness due to wave effect are complex and are normally obtained from test measurement. A typical stiffness curve for a large section rubber to metal bonded spring is shown below. In fig. 7.

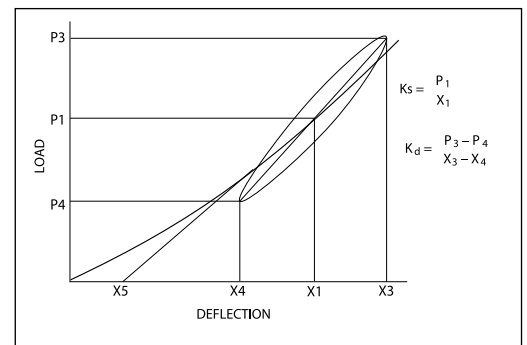


Fig. 6.

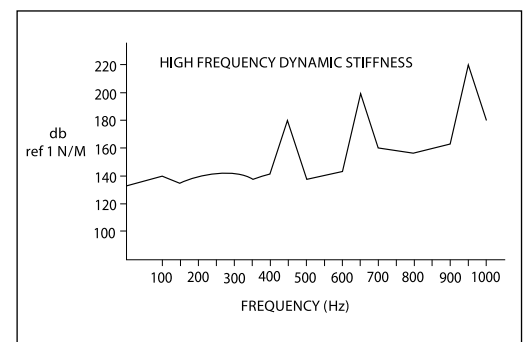


Fig. 7.

Creep Performance

When a rubber spring is subjected to a constant load, the resultant deflection continues to increase with time. An example of creep that occurs in a pair of inclined springs is shown on the graph in Fig. 8.

A typical creep characteristic for rubber used in antivibration mountings is 3-5% per time decade.

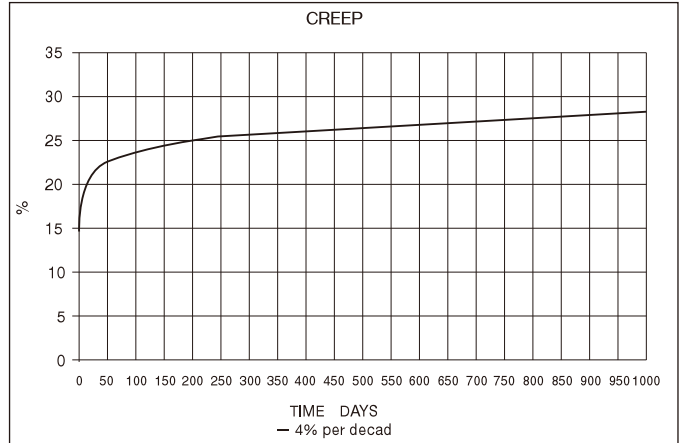


Fig. 8.

Joule effect

Changes in temperature cause small changes in the deflection of loaded rubber springs. This change in deflection, which is reversible with temperature, is known as the Joule effect. For pairs of springs shown a 10°C rise in temperature will cause an increase in clearance by approximately 4.5% of the nominal static deflection.

See Fig. 9 and 10.

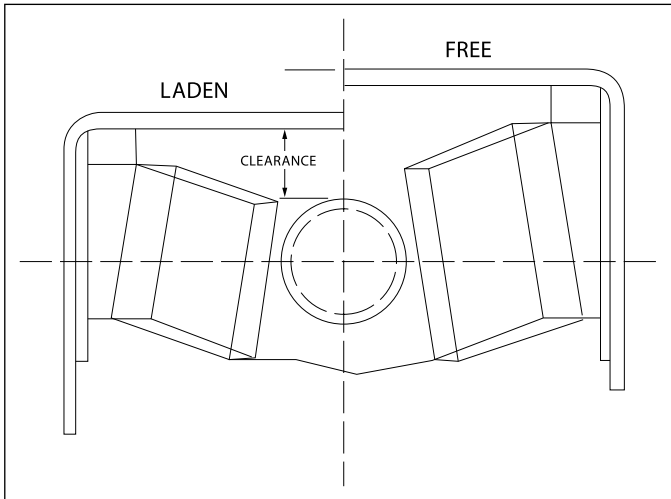


Fig. 9.

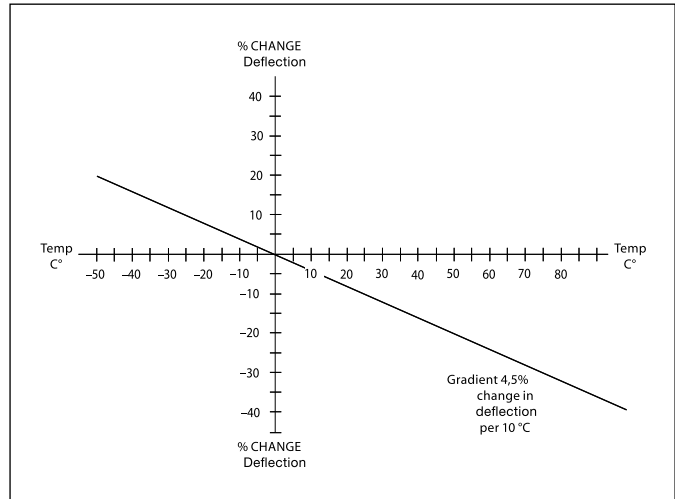


Fig. 10.

STIFFNESS OF A RUBBER SPRING

When calculating compression characteristics of rubber, it should be noted that the deflection is not directly proportional to the load, as the modulus of elasticity in compression increases with the degree of stress. The modulus of shear, however, remains constant for normal stresses.

The factor with the most effect on stiffness is the ratio between loaded and free surface area of rubber. This is the so-called shape factor (often designated S). With thin rubber sections, a very high modulus of elasticity can be achieved. In other respect, the stiffness of a rubber spring is determined by the dimensions and the hardness of the rubber.

Fig. 11 illustrates the relationship between rubber hardness and shear modulus, and fig. 12 the dependence of the bulk modulus on the shape factor. The latter curve applies at 10% deformation.

The curves show that rubber at a shape factor of 0.25 for shear is about 6-8 times softer than compression for the same rubber hardness. Since only 3-4 times the stress value in compression can be considered, it may be said that rubber is best used in shear to achieve large deflections and good isolation properties, particularly at low interference frequencies.

SELECTION OF ANTIVIBRATION MOUNTINGS

The principle relating to vibration isolation with springs is that they are placed between the machine and the base or plinth. To ensure effective isolation, the springs must be selected carefully, otherwise the result could be impaired performance. In favourable cases, the transmitted force can be reduced to only 2 or 3% of that of a rigidly mounted machine. In such cases, the vibrations are practically eliminated.

SOME VIBRATION DEFINITIONS

Amplitude	A	(m)	The magnitude of the displacement of a vibration deflection from the mean position. The total vibration is thus twice the amplitude.
Interference frequency	f	(Hz)	Is essentially the same as the frequency of the rotational speed of the machine or a harmonic.
Frequency	f ₀	(Hz)	The number of vibrations in a freely-oscillating system per unit of time.
Mass	m	(Kg)	The mass of the oscillating system.
Spring force	F	(N)	The force emanating from a spring on the machine or the reverse.
Deflection	d	(m)	The deformation of the spring from the neutral position.
Static spring stiffness	K _{stat}	(N/m)	The force required in Newtons to compress the mounting 1 m.
Dynamic spring stiffness	K _{dyn}	(N/m)	Spring stiffness when an alternating force is applied.
Tuning ratio	Z	(-)	The ratio between interference frequency f and natural frequency f ₀ .
Interference force	F _s	(N)	The force transmitted to the base of an isolated machine.
Impulse force	F _i	(N)	The force transmitted to the base of a rigidly mounted machine.
Magnification factor	B	(-)	The part of the impulse force which is transmitted as a vibration force. Indicates the relation between the interference force F _s and impulse force F _i .
Level of isolation	I	(-)	The part of the impulse force which is eliminated by the vibration isolation, (1-B) or, if B is expressed as a percentage, (100-B).
Damping coefficient	c	(Ns/m)	The linear viscous damping coefficient.
Critical damping	c _{kr}	(Ns/m)	The linear viscous damping coefficient at critical damping. A system is said to be critically damped if it returns to its initial static position without any over-oscillation after a displacement.
Damping factor	D	(-)	The ratio between C and C _{kr} .
Reduction	R	(dB)	Isolation expressed in decibels.
Deflection	δ _{stat}	(mm)	The static deflection for a spring.

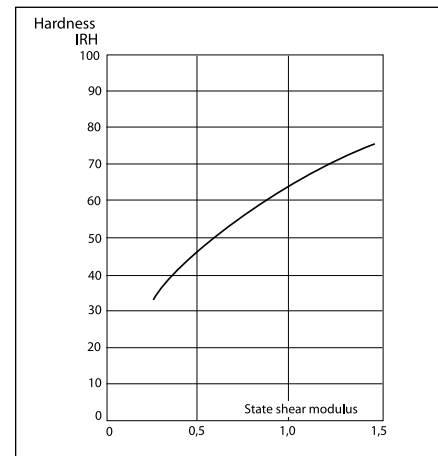


Fig. 11. Relationship between rubber hardness and shear modulus.

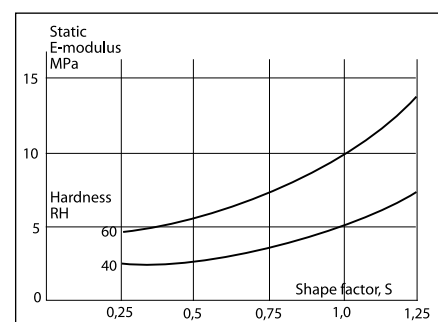


Fig. 12. The dependence of the compression modulus upon the shape factor.

Calculation of deflection

When calculating deflection the following formula shall be used.

$$\delta_{stat} = \frac{F}{K_{stat}}$$

Calculation of isolation degree

The following formulas are used for calculating the isolation degree for a given spring.

The natural frequency: $f_o = \frac{1}{2\pi} \sqrt{\frac{K_{dyn}}{m}}$

Tuning: $Z = f/f_o$

Magnification factor: $B = \frac{F_s}{F_i} = \sqrt{\frac{1+4D^2Z^2}{(1-Z^2)^2+4D^2Z^2}}$

The factor D depends on the internal damping of the spring material. In rubber D has the value 0.04-0.1 depending on hardness of the rubber. The term $4D^2Z^2$ can generally be neglected completely except in the resonance range, that is, when $Z=1$. If $Z=1$, that is, the machine speed (rpm) = the natural vibrations of the system, it is said that there is resonance, and the vibrations will be infinitely large if there is no damping.

Here, then, a rubber spring has a distinct advantage over a steel spring, which has minor internal damping and in which the amplitude, in theory, grows to a very high value in the resonance point. Refer to fig. 2 on page 12.

Isolation degree $I=(1-B)$ or as percentage, $I=(1-B) \times 100$

Reduction in dB $R=20 \log(1/B)$

The relative magnitude of the transmission of force depends entirely on the tuning ratio Z. If Z is high, the force transmission percentage will be small.

As can be seen in Fig. 13, B at $Z=\sqrt{2}$ has dropped to 100% and when Z is further increased, B drops rapidly. Vibration isolation is therefore of significance first when the operating frequency considerably exceeds the natural frequency. For practical applications, Z should be between 3 and 5, which means that 88 and 96 % of interference forces are eliminated.

Generally, the operating speed of a machine (interference frequency) is given. If the system's natural vibration coefficient can be modified, and influence Z, it is possible to change the force transmitted. This is exactly what happens

when vibration isolation is achieved. The low elasticity and shear moduli of rubber are used to achieve a low natural frequency.

To summarize, transmission of vibration forces can be effected in three ways:

1. Rigidly mounted machines transmit vibration forces in unchanged form to the base, which is therefore forced to be a part of the movement of the machine. The magnification factor can be regarded as being 100%.
2. In the case of an unsuitable spring system, the magnification factors will increase considerably and may amount to several hundred percent.
3. The force transmission percentage is reduced substantially by correct calculation and suitable mountings being installed between the machine and base. Typical reductions can be from 100 down to 10%, but in favourable circumstances can be as low as 2%.

All machines have more than one resonance point as, through many interacting movements, they can vibrate in different modes. The resonance points can be determined, but the methods of calculation are often difficult. Experience has shown that all resonance velocities that may arise do not need to be clarified. It is usually sufficient to calculate the more significant ones which can be determined easily. The desired level of isolation and the interference frequency determine where the resonance frequency shall be.

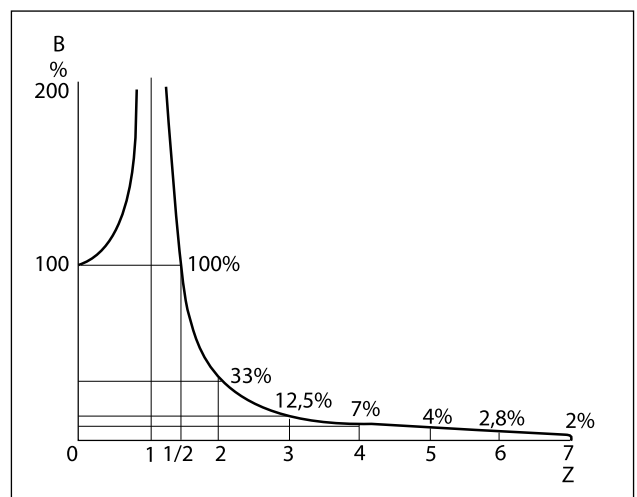


Fig. 13 Resonance curve.

SHOCK ISOLATION

Shock is usually described as a transient phenomenon as opposed to a vibration, which is a continuous process.

A shock pulse can normally be described by parameters such as maximum amplitude (acceleration, for example), duration (in milliseconds, for example), and the shape of the pulse. The pulse may be a half sine wave, rectangular, saw tooth or other shape of wave.

The basic principle for achieving good shock isolation is to mount the machine on mountings that are soft enough to give a low natural frequency, and which can offer relatively large mounting deflections.

If the duration of a shock pulse is τ seconds, and the natural frequency of the set up is f_0 Hz, then the product must be $\tau f_0 < \text{approx. } 0.25$ if the isolation is to provide protection against the shock.

The value 0.25 is not an absolute value but depends on the shape of the shock pulse.

STORAGE

There may be changes in appearance and physical properties of rubber products during storage, particularly if adverse conditions apply. BS3574 provides an ideal guide to the most suitable storage conditions, including:

- Moderate temperature (ideally 20°-30°).
- Low humidity.
- Protection from intense light, radiation and high ozone concentrations.
- It is recommended that the storage period does not exceed five years.

Unit conversion

Multiply	by	to obtain
feet	0.30480	meters
inches	0.02540	meters
pounds	0.453	kilograms
pound/force	4.45	Newtons
feet/second	0.3048	meters/second
inches/second	0.0254	meters/second
feet/second ²	0.3048	meters/second ²
inches/second ²	0.0254	meters/second ²

GENERAL SET UP

1. The various parts of the machine are combined on a common base.
2. The entire machine is isolated by means of suitable Trelleborg Industrial AVS anti-vibration mountings.
3. Flexible connections to the machine are required in order to achieve effective isolation. The application of Trelleborg expansion joints can be recommended.
4. If required, there should be grounding for removing static electricity.

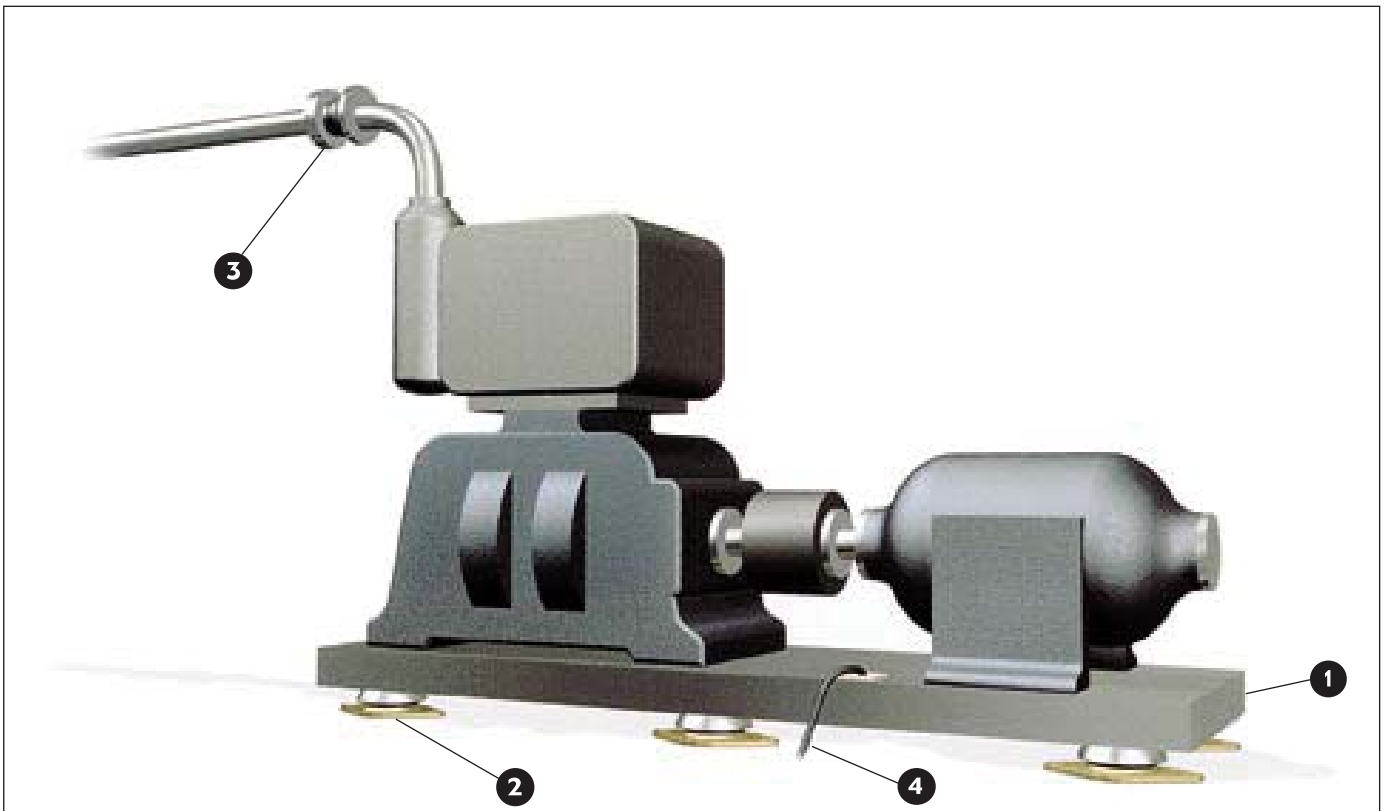


Fig. 14. General set up.



Features

Buffer type ANB consists of a cylindrical rubber body bonded to a square baseplate of steel. Each corner of the baseplate has a fixing hole.

Special high-hysteresis rubber compound is used to ensure as much energy absorption as possible. The volume of the rubber is used at optimum efficiency.

For new machine developments simpler designs and lighter calculated forces can be considered enabling a lower cost.

Novibra® type ANB™

The shock buffer type ANB is used to effectively limit movement of equipment or machine components.

Typical field applications would be:

- ▼ Wagons
- ▼ Cabinets
- ▼ Falling goods
- ▼ Lifting cranes
- ▼ Off-road material handling equipment
- ▼ Container handling equipment
- ▼ Forestry vehicles
- ▼ Traversing cranes
- ▼ Working beams

Through the damping of the rubber a high degree of energy absorption is achieved. The rubber is stiffer under dynamic conditions compared to static or pseudo static loading; hence more energy is absorbed for a given deformation. Diagram 4 shows the effect of the energy factor.

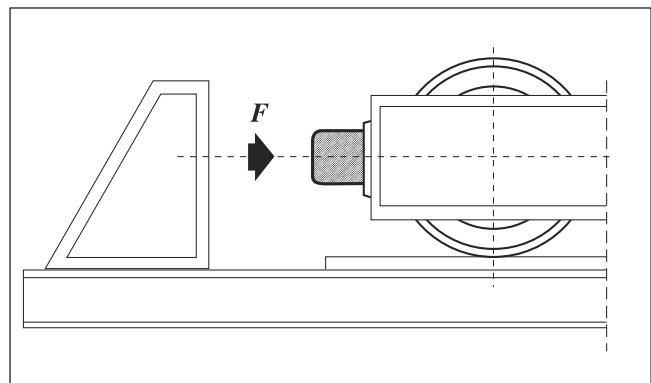


Fig. 1. Traverse crane with shock buffer ANB.

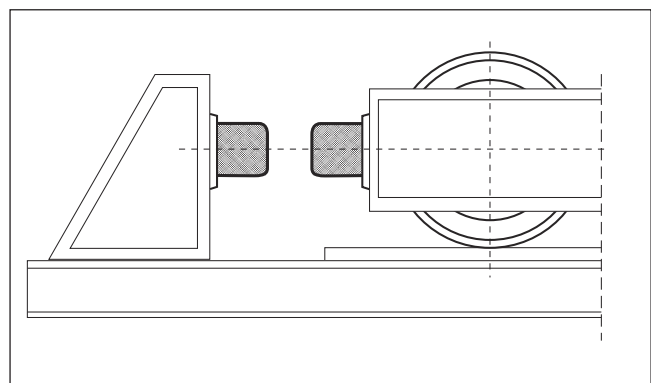


Fig. 2. Traverse crane with 2 ANB buffers connected in series..

Type	Drawing no.	Part no.	Dimensions in mm						Weight (Kg)	F-Max (N)
			K	A	D	d	H	t		
ANB50	15-4034	10-00151	70	50	50	7	43	3	0.2	8000
ANB75	15-4035	10-00152	100	75	75	9	63	3	0.5	20000
ANB100	15-4037	10-00153	130	100	100	11	84	4	1.2	41000
ANB150	15-4032	10-00010	185	150	150	13.5	126	6	3.9	90000
ANB200	15-4033	10-00011	240	200	200	13.5	168	8	9.1	180000

For calculation purposes the following equations can be used:

$$E = \frac{m \cdot v^2}{2} \quad (1)$$

$$E = F \cdot s \quad (2)$$

$$F = m \cdot a \quad (3)$$

$$s = \frac{a \cdot t^2}{2} \quad (4)$$

$$v = \sqrt{a \cdot t} \quad (5)$$

$$v = \sqrt{2 \cdot a \cdot s} \quad (6)$$

$$v = \sqrt{2 \cdot g \cdot h} \quad (7) \text{ applicable in free fall}$$

E = energy in Nm

m = mass in kg

v = velocity in m/s

F = force in N

s = distance in m

a = acceleration in m/s²

t = time in s

g = acceleration due to gravity 9.81 m/s²

h = height in m

d = spring travel in m

Equation (4)- (7) valid for initial velocity = 0

ANB 50
ANB 75

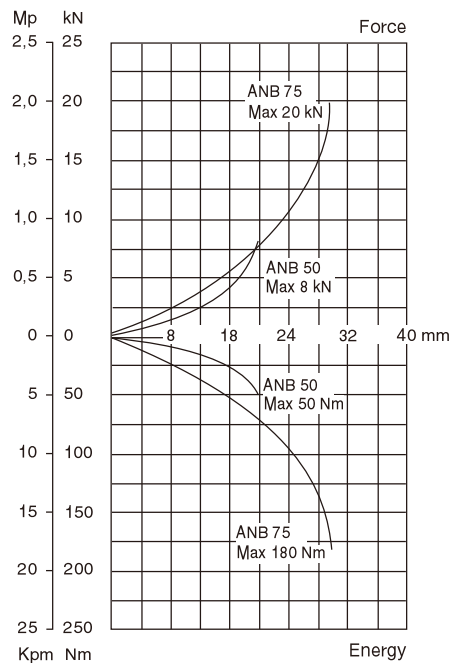


Diagram 1

ANB 100
ANB 150

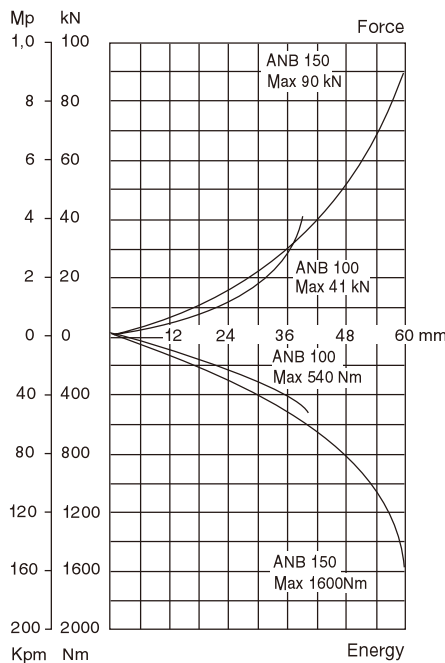


Diagram 2

ANB 200

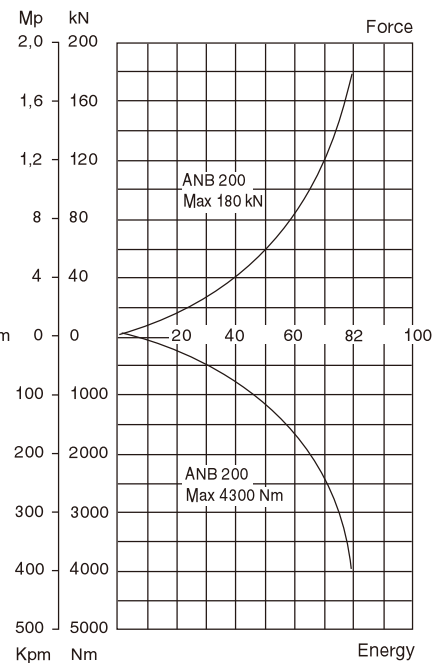
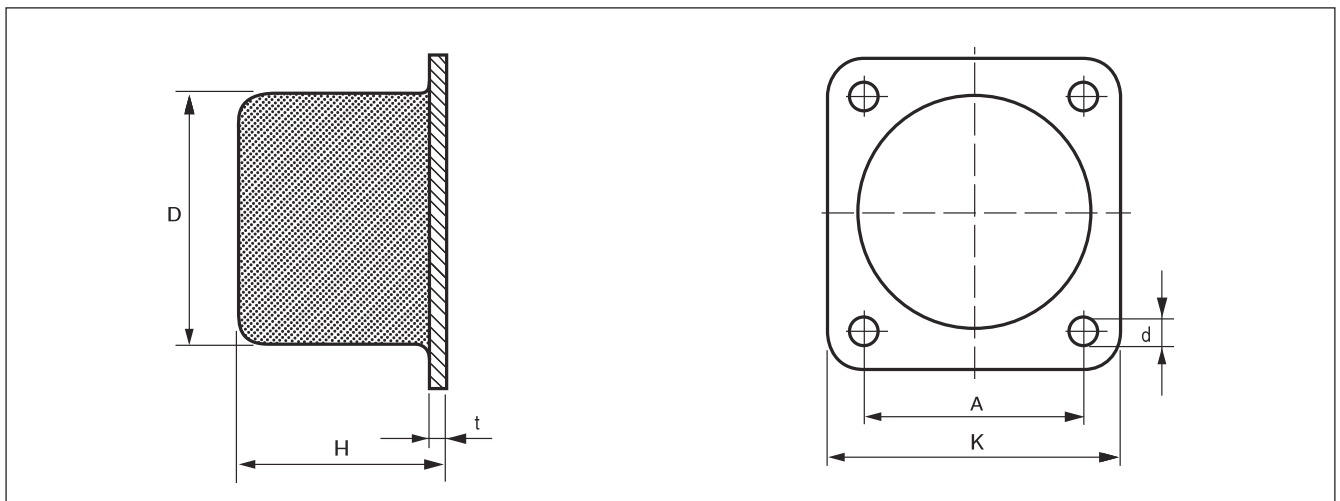


Diagram 3



CALCULATION EXAMPLES

The figures in parenthesis refer to the equations.

EXAMPLE 1: FREE FALL CALCULATION

1850 kg weight is to be dropped 1.83 metres onto 4 ANB buffers. What size ANB should be used? What force will be transmitted to the floor?

$$\text{Energy } E = F \cdot s \text{ (2)} = 1850 \cdot 9.81 \cdot 1.83 = 33212 \text{ Nm}$$

$$\text{Velocity at impact (shock velocity) } v = \sqrt{2 \cdot g \cdot h \text{ (7)}} = \sqrt{2 \cdot 9.81 \cdot 1.83} = 6 \text{ m/s.}$$

REFER TO ENERGY FACTOR GRAPH

If 50% deformation is allowed, the energy factor at 6 m/s is 0.4. Then dynamic energy 33212 Nm corresponds to $33212 \cdot 0.4 = 13285 \text{ Nm}$ static energy and for 4 buffers the static energy per buffer is 3320 Nm.

REFER TO FORCE-ENERGY DIAGRAM

Select ANB 200 which can each absorb up to 4300 Nm at 80 mm compression (which is 50% of static height) or will compress 76 mm at 3320 Nm.

$$\begin{aligned} \text{Force at impact surface} \\ &= \text{force at 76 mm deflection} / 0.4 \\ &= 150 / 0.4 = 375 \text{ kN per buffer} \\ &= 1500 \text{ kN for 4 buffers} \end{aligned}$$

Hence if 1850 kg is dropped 1.83 metres onto 4 x ANB 200 buffers they will each compress 76 mm and the total force on the floor will be 1500 kN.

EXAMPLE 2A: CRANE BUFFER CALCULATION

A crane weighs 2000 kg and travels at 1.6 m/s. What size ANB buffers should be used to stop it and what will the final force be?

The dynamic or kinetic energy

$$E = \frac{m \cdot v^2}{2} = \frac{2000 \cdot 1.6^2}{2} = 2560 \text{ Nm (1)}$$

REFER TO ENERGY FACTOR GRAPH

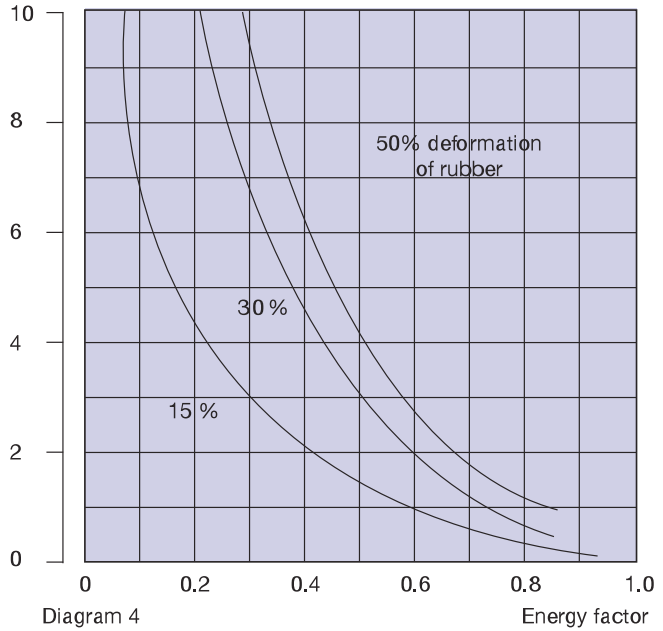
Assuming a 50% deformation, the energy factor = 0.75 at 1.6 m/s. Hence the equivalent static energy is $2560 \cdot 0.75 = 1920 \text{ Nm}$. Then for 2 buffers the static energy is 960 Nm per buffer.

REFER TO FORCE-ENERGY DIAGRAM

ANB 150 buffers can be chosen with a deflection at 960 Nm of 49 mm, which is only 41% of a free height of 120 mm, whereas 50% had been assumed. With the energy factor reduced to 0.72 (for 41% deflection at 1.6 m/s) the static energy is:

$$2560/2 \times 0.72 = 922 \text{ Nm}$$

Shock velocity m/s



REFER TO FORCE-ENERGY DIAGRAM FOR ANB 150

At 922 Nm static energy, the deflection is 48.5 mm (close to 49 mm). Then the static force at 48.5 mm deflection is about 51 kN. Therefore the dynamic load (Force at impact) = $51 / 0.72 = 71 \text{ kN}$. Hence 2 x ANB 150 buffers will deflect 48.5 mm and transmit a force of 71 kN or 7240 kg each, i.e. the structure must withstand 14.6 tons.

EXAMPLE 2B: CRANE BUFFER CALCULATION

How can the dynamic force calculated in example 2a be reduced, and by how much?

The force will be reduced and the deflection will be increased if ANB 150 buffers are connected in series (i.e. 4 buffers instead of 2) as illustrated by fig. 2.

Then, assuming 30% deformation the energy factor at 1.6 m/s = 0.68.

Hence the equivalent static energy is $2560 \cdot 0.68 = 1740 \text{ Nm}$ and for 4 buffers the static energy is 435 Nm per buffer.

The force-Energy diagram shows that at 435 Nm, buffer ANB 150 deforms 35 mm. This corresponds to 29.2% of a free height of 120 mm which is close to assumed value 30%.

Then the static force at 35 mm deflection is 26 kN and the dynamic load at impact will be:

$$26 / 0.68 = 38 \text{ kN}$$

Hence 4 x ANB 150 buffers connected 2 + 2 will give a total deflection of 70 mm with a final force per double arrangement of 38 kN or 3870 kg, i.e. the structure must withstand 7.7 tons.

BA™ & Double U Shear™

Features

Novibra® type BA and Metalastik® type Double U-Shear mountings utilise bonded rubber in shear to permit relatively high deflections. Provides excellent isolation of low frequencies. (Type BA 20/2 is a half section suitable for very light loads). On rotating equipment applications the soft axis should be at right angles to the shaft. On mobile applications the stiff axis should be aligned in the direction of travel.



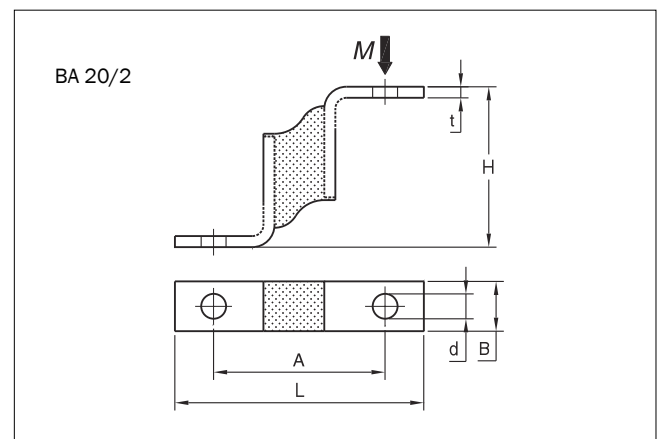
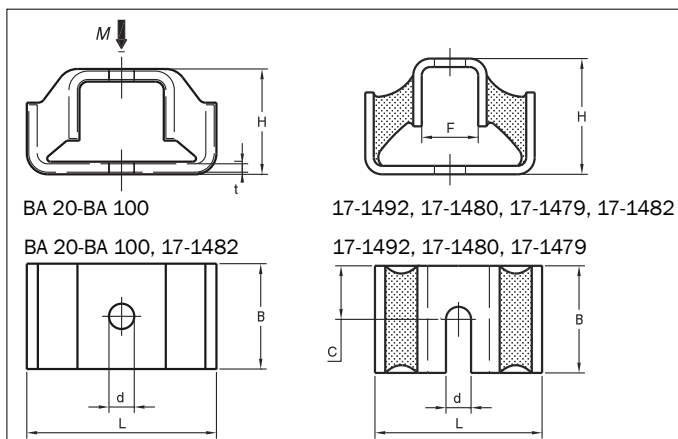
Stiffness values in the load-deflection selection diagrams refer to shear mode. Compression stiffnesses are n times larger, see adjoining table:

	n
17-1492	3.5
17-1480	6
17-1479	8
17-1482	3.5
BA 20	2.3
BA 50	3
BA 100	3.4

Novibra® type BA™ Metalastik® type Double U Shear™

Novibra® type BA and Metalastik® type Double U-Shear are equally suitable for isolating vibrations from low speed machines and equipment. Protects sensitive and lightweight units from external shocks and vibrations. Type BA and Double U-Shear are easy to install and ideal for applications e.g.

- ▼ Transit cases
- ▼ Light fans and compressors
- ▼ Gauging equipment
- ▼ Portable gensets and pumps
- ▼ Computers and electronic units
- ▼ Measuring and test instruments



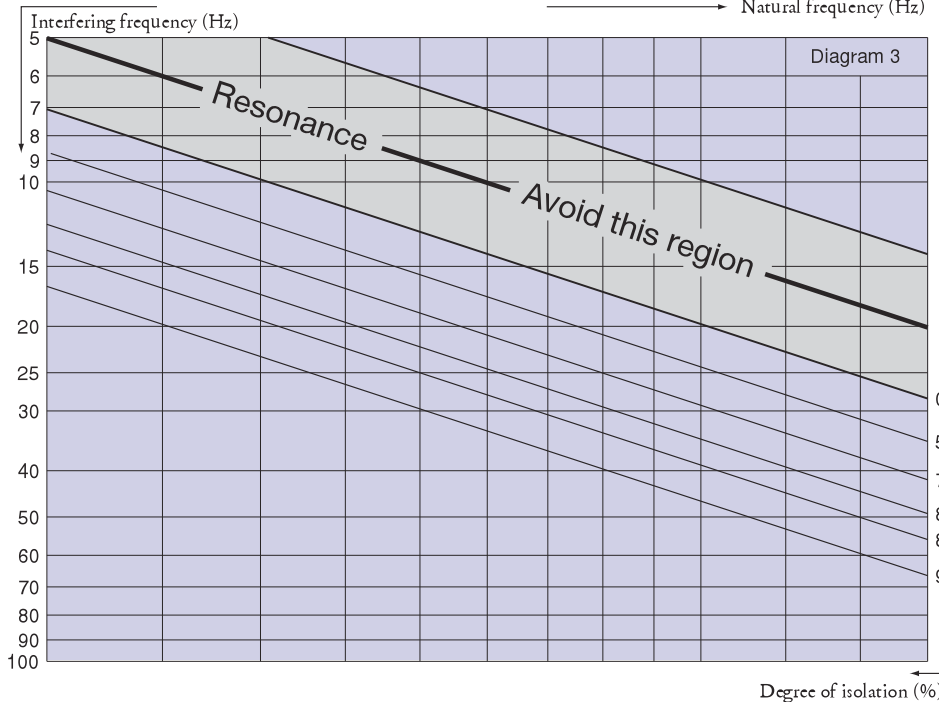
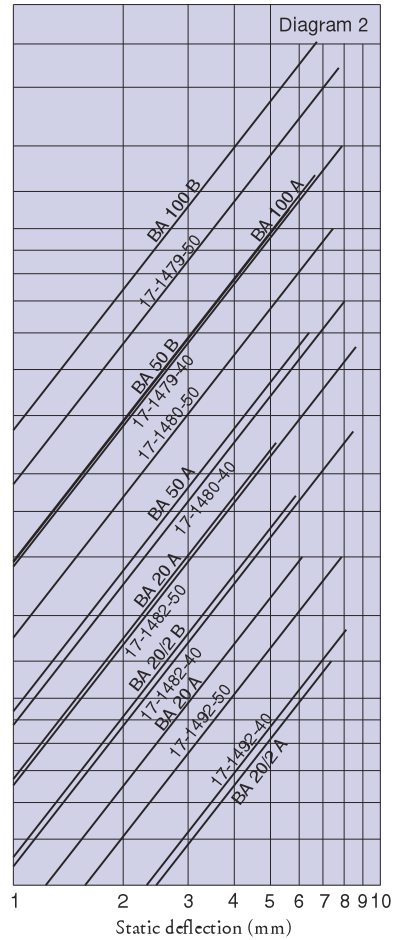
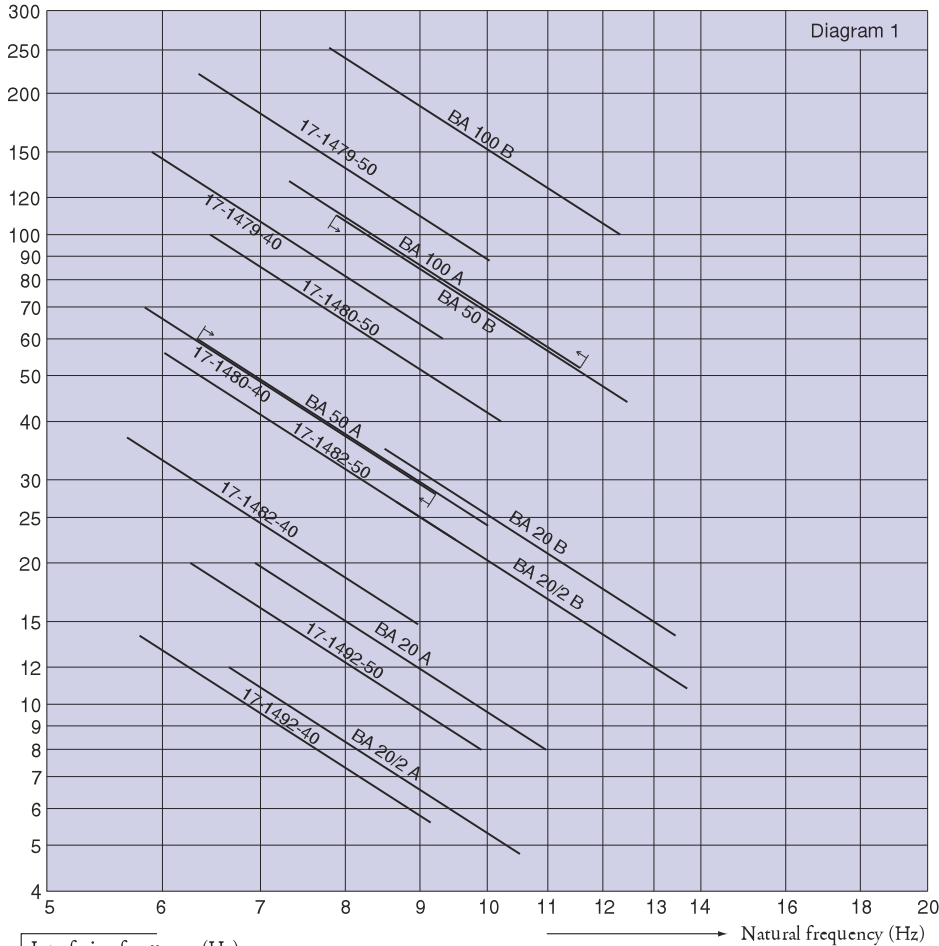
Type	Drawing no.	Part no. 40° IRH	Part no. 60° IRH	Dimensions in mm						Weight (Kg)	M-Max (Kg)				
				B	L	H	A	F	C		d	t	40° IRH	60° IRH	
BA 20/2	17-4345	10-00005	10-00006	20	90	58	62				8	4	0.09	12	27
BA 20	17-4035	10-00145	10-00146	20	90	50					10	4	0.16	20	35
BA 50	17-4036	10-00147	10-00148	50	90	50					12	4	0.42	60	110
BA 100	17-4037	10-00149	10-00150	100	90	50					15	4	0.83	130	250

Type	Drawing no.	Part no. 40° IRH	Part no. 50° IRH	Dimensions in mm						Weight (Kg)	M-Max (Kg)				
				B	L	H	A	F	C		d	t	40° IRH	60° IRH	
Double U-Shear	17-1492	10-00518	10-00519	19	60	43		19	10.3	6.7			0.09	14	20
	17-1480	10-00511	10-00512	51	80	78		32	25	13			0.6	70	100
	17-1479	10-00509	10-00510	64	86	108		38	32	16.7			1.1	150	220
	17-1482	10-00515	10-00516	51	60	41		20		11			0.2	37	56

BA™ & Double U Shear™

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



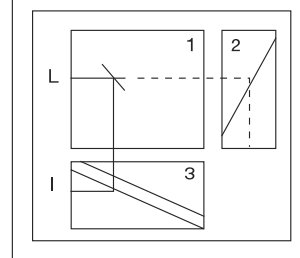
To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz)
(Hz = rpm / 60)

Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.

Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.

For static deflection, see diagram 2.

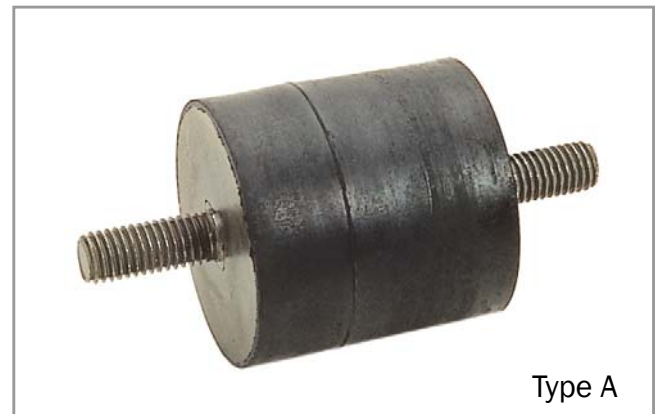


Features

Trelleborg Industrial AVS - Bobbins

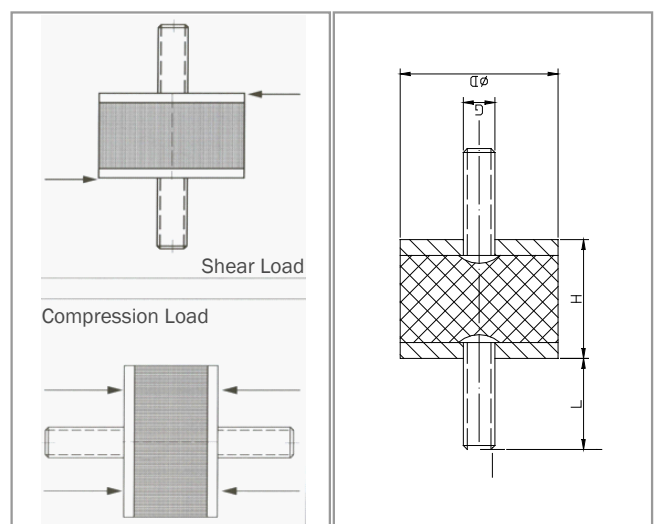
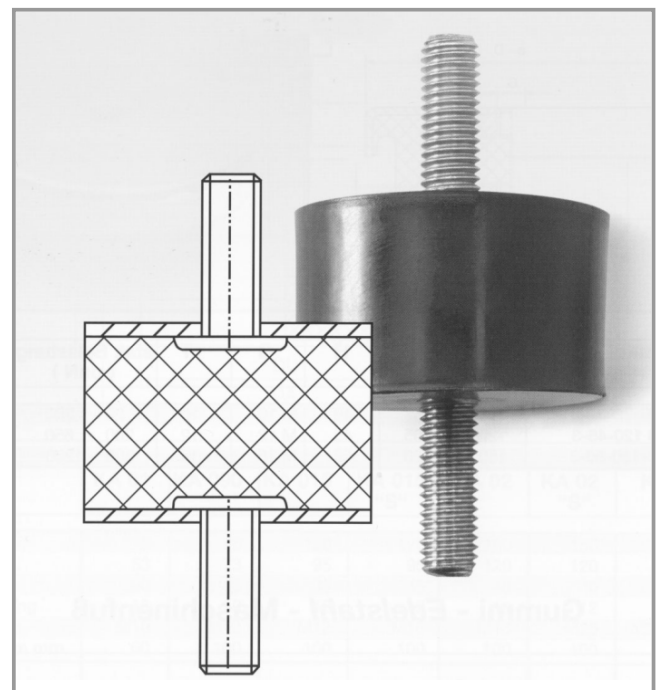
A supplementary range of cylindrical mountings for a wide range of applications. They can be loaded either in compression or shear taking into consideration individual demands for actual applications.

Figures stated are for natural rubber hardness 60° IRH.



Natural Rubber : 55°/60° shore

Part no.	Dimensions Diameter /Height	Bolt Internal Thread	Bolt Length mm	Compression Load		Shear Load	
				F(Max) N	S(Max) mm	F(Max) N	S(Max) mm
20-01435	A10/10	M4	10	40	0,9	20	2,0
20-01066	A10/15	M4	10	40	1,2	15	3,1
20-01067	A15/10	M4	10	120	0,9	35	2,8
20-01068	A15/15	M4	10	100	1,5	40	3,2
20-00418	A20/10	M6	15/18	170	0,5	70	1,4
20-01226	A20/15	M6	18	160	1,2	70	2,6
20-00541	A20/20	M6	15/18	160	1,7	70	4,5
20-01228	A20/25	M6	15/18	150	2,1	60	6,2
20-00557	A25/10	M6	18	300	0,8	120	1,5
20-00558	A25/15	M6	18	290	1,5	110	2,5
20-00559	A25/20	M6	18	280	2,6	110	3,8
20-01437	A25/25	M6	18	260	2,7	105	5,4
20-01629	A25/30	M6	18	250	3,4	90	6,7
20-01536	A30/15	M8	20	500	0,9	170	2,6
20-01438	A30/20	M8	20	440	1,7	170	3,9
20-01440	A30/25	M8	20	400	2,1	160	5,3
20-01441	A30/30	M8	20	380	2,9	150	6,6
20-00438	A30/40	M8	20	300	4	100	10
20-01423	A40/20	M8	23	900	1,5	300	3,8
20-01443	A40/30	M8	23	700	2,4	300	6,6
20-00563	A40/40	M8	23	650	3,5	260	9
20-01444	A50/20	M10	28	2000	2,1	500	3,6
20-00564	A50/25	M10	28	1400	2,5	500	4,6
20-01445	A50/30	M10	28	1400	3,2	500	6,4
20-01714	A50/35	M10	25	1300	3,5	500	8
20-01446	A50/40	M10	28	1100	3,8	450	8,5
20-00882	A50/45	M10	28	1050	4,1	450	10,1
20-00549	A50/50	M10	28	1050	4,8	420	11,7
20-01447	A70/35	M10	25	2400	4,5	900	9
20-01253	A70/45	M10	28	2300	4,2	900	9,9
20-00547	A75/40	M12	37	2900	3,6	1000	4,9
20-01027	A75/50	M12	37	2800	5,2	1000	11,2
20-00548	A75/55	M12	37	2500	5,2	1000	12,5
20-01259	A100/40	M16	41	6600	3,9	2000	8,2
20-00568	A100/55	M16	41	5100	6,1	2000	12,4



The technical values are to be used for info only.
If questions, please contact TIAVS.



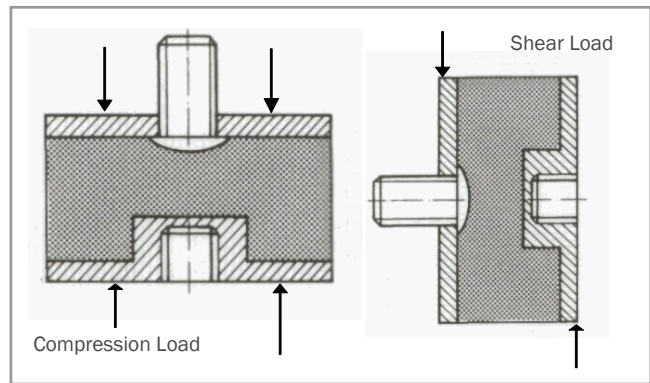
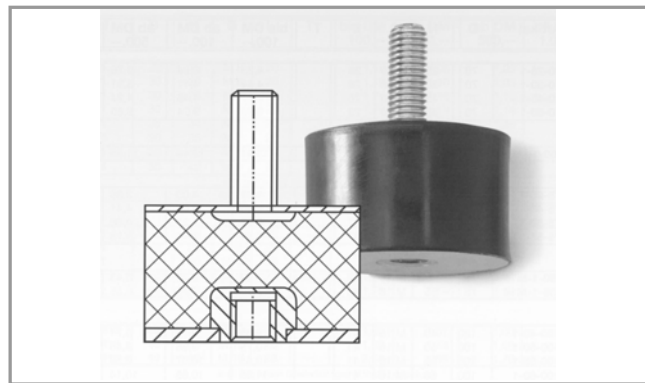
Features

Trelleborg Industrial AVS - Bobbins

A supplementary range of cylindrical mountings for a wide range of applications. They can be loaded either in compression or shear taking into consideration individual demands for actual applications.

Figures stated are for natural rubber hardness 60° IRH.

The technical values are to be used for info only.
If questions, please contact TIAVS.



Part no.	Dimensions Diameter/Height	Bolt Internal Thread	Bolt Length mm	Compression Load		Shear Load	
				F(Max) N	S(Max) mm	F(Max) N	S(Max) mm
20-01449	B10/10	M4	10	56	0,9	10	2,3
20-00794	B10/15	M4	10	52	1,5	23	3,8
20-01698	B15/15	M4	10	115	1,4	50	3,8
20-01264	B20/15	M6	10	160	0,9	105	3,8
20-01265	B20/20	M6	18	160	1,2	90	5
20-01266	B20/25	M6	18	150	2,5	90	6,3
20-01267	B25/15	M6	18	290	1,3	160	3,8
20-01268	B25/20	M6	18	280	2,1	145	5
20-00573	B25/25	M6	18	260	2,9	135	6,3
20-01016	B25/30	M6	18	250	3,2	135	7,5
20-01269	B30/15	M8	20	676	1,4	208	3,4
20-00898	B30/20	M6	20	380	1,6	210	5
20-00464	B30/25	M6	20	370	2,3	200	6,3
20-00575	B30/30	M8	20	355	2,8	190	7,5
20-01539	B30/40	M8	20	300	3,2	100	8
20-00466	B40/30	M8	20	600	2,4	340	7,5
20-00821	B40/40	M8	23	600	3,8	330	10
20-01273	B50/20	M10	28	1300	1	455	4
20-00577	B50/30	M10	28	1200	2,6	500	7
20-00578	B50/40	M10	28	1100	3,6	315	10
20-01276	B50/50	M10	28	1050	5,1	505	12,5
20-00822	B60/40	M10	28	1750	4,6	700	6,3
20-01283	B75/50	M12	37	2600	4,3	1185	12,5
20-00824	B75/55	M12	35/37	2400	4,7	1170	13,8
20-00518	B100/40	M16	41	6500	3,2	2310	10
20-01285	B100/55	M16	41	5100	5	2180	13,8
20-01286	B100/60	M16	41	5000	5,6	2125	15

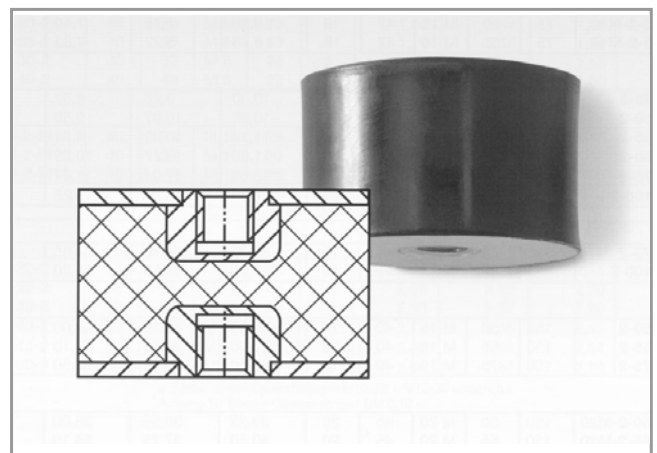
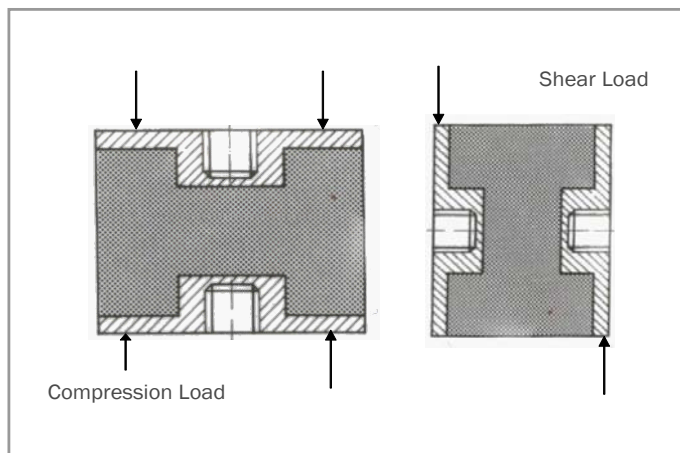
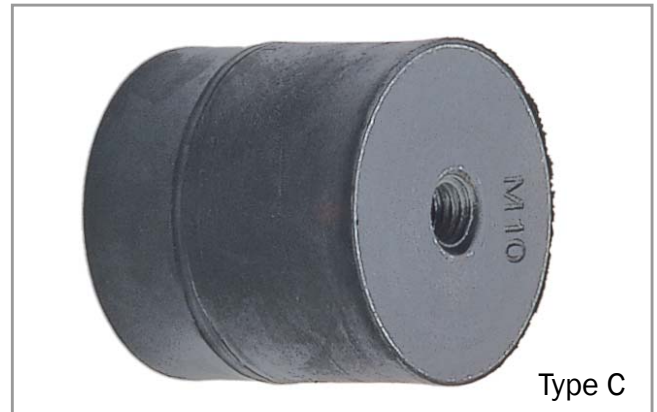
Features

Trelleborg Industrial AVS - Bobbins

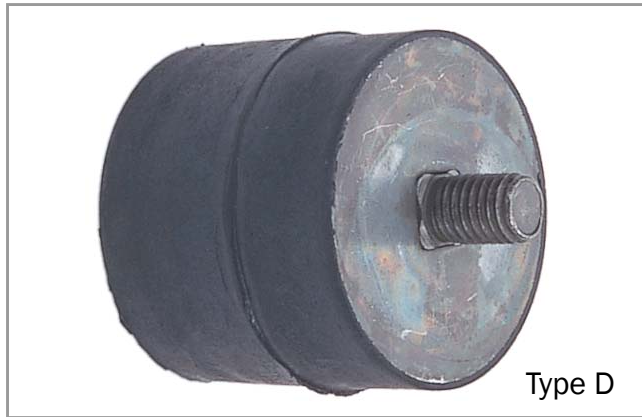
A supplementary range of cylindrical mountings for a wide range of applications. They can be loaded either in compression or shear taking into consideration individual demands for actual applications.

Figures stated are for natural rubber hardness 60° IRH.

The technical values are to be used for info only.
If questions, please contact TIAVS.



Part no.	Dimensions Diameter/Height	Bolt Internal Thread	Compression Load		Shear Load	
			F(Max) N	S(Max) mm	F(Max) N	S(Max) mm
20-00095	C10/10	M4	96	1,6	12	1,2
20-00583	C15/15	M4	120	1,5	40	2,0
20-01298	C20/20	M6	170	1,6	50	2,5
20-00584	C20/25	M4	150	2,2	40	2,7
20-00363	C20/30	M6				
20-01291	C25/20	M6	280	1,7	90	3
20-01292	C25/25	M6	260	2,2	80	3,5
20-00475	C30/25	M8	370	2,2	120	3,6
20-01455	C30/30	M8	355	2,6	110	4,1
20-01075	C30/35	M8	436	3,1	208	9,4
20-00476	C30/40	M8	429	3,6	208	10,9
20-00551	C40/30	M8	700	2,7	250	5,2
20-00587	C40/40	M8	650	3,9	250	7,4
20-01456	C50/30	M10	1200	2,4	400	5,2
20-00116	C50/35	M10	1150	2,9	400	6,4
20-01457	C50/40	M10	1100	3,3	400	7,4
20-01025	C50/45	M10	1050	4,1	400	8,6
20-01313	C50/50	M10	1050	4,9	400	9,7
20-01318	C75/40	M12	2900	3,2	900	7
20-01541	C75/45	M12				
20-01320	C75/50	M12	2600	4,1	900	9
20-00125	C75/55	M12	2400	4,6	900	10,1
20-01324	C100/40	M16	6500	2,9	1500	5,6
20-01325	C100/55	M16	5100	4,9	1500	9,1



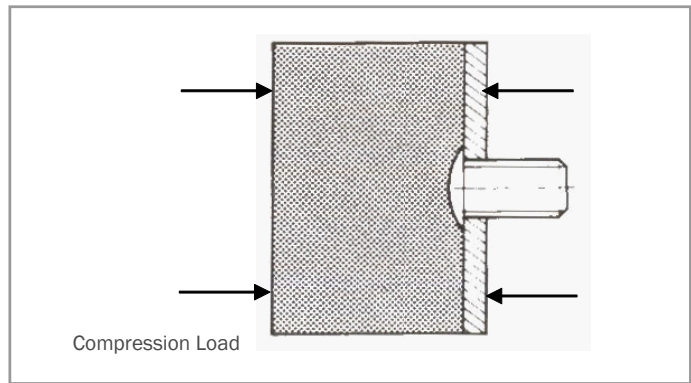
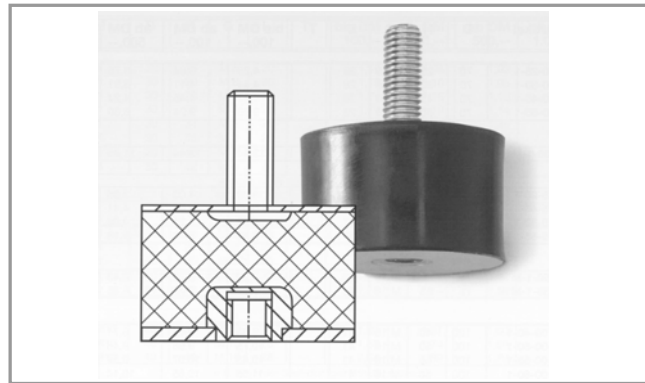
Features

Trelleborg Industrial AVS - Bobbins

A supplementary range of cylindrical mountings for a wide range of applications. They can be loaded either in compression or shear taking into consideration individual demands for actual applications.

Figures stated are for natural rubber hardness 60° IRH.

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If questions, please contact TIAVS.



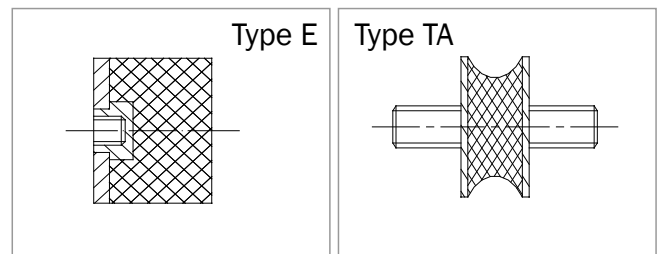
Part no.	Dimensions Diameter/Height	Bolt Internal Thread	Bolt Length mm	Compression Load	
				F(Max) N	S(Max) mm
20-01542	D10/10	M4	10	59	1
20-01459	D15/15	M4	13	115	2
20-01561	D20/10	M6	8/15/18	170	1,1
20-01338	D20/15	M6	18	160	1,4
20-01339	D20/20	M6	15/18	160	1,9
20-01340	D20/25	M6	18	150	2,8
20-01342	D25/10	M6	18	300	0,8
20-01015	D25/15	M6	18	290	1,5
20-01346	D25/20	M6	20	280	2,3
20-00490	D30/15	M8	20	350	3,1
20-00597	D30/17	M8	20		
20-01461	D30/20	M6	20/25	350	4,4
20-00604	D30/25	M6	20	350	5,8
20-00492	D30/30	M8	23	350	7,2
20-01562	D40/25	M8	20/23	1044	2
20-01462	D40/30	M8/M10	28	660	3,3
20-01365	D40/40	M8	28	600	4,6
20-00602	D50/20	M10	28	1500	2
20-00601	D50/30	M10	28	1200	3,3
20-01369	D50/40	M10	28	1100	4,3
20-01370	D50/45	M10	27	1050	5,1
20-00649	D75/25	M12	37	5446	2,5
20-01379	D75/40	M12	37	2900	4
20-01382	D75/50	M12	41		
20-01387	D100/40	M16	41	6600	3,6
20-01388	D100/50	M16		5400	5

Features

Trelleborg Industrial AVS - Bobbins

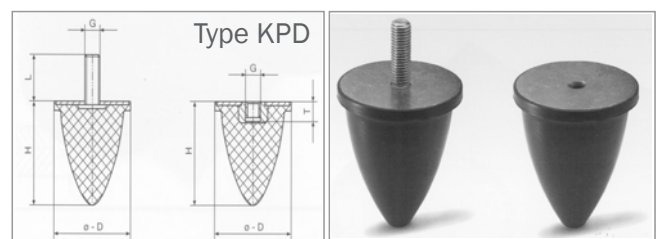
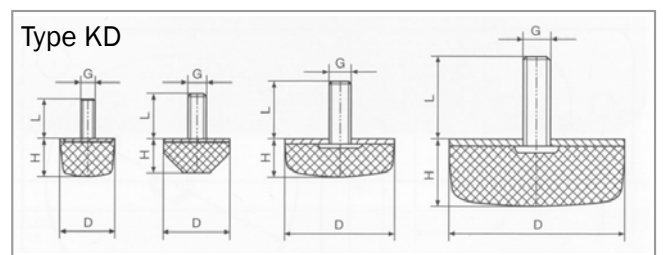
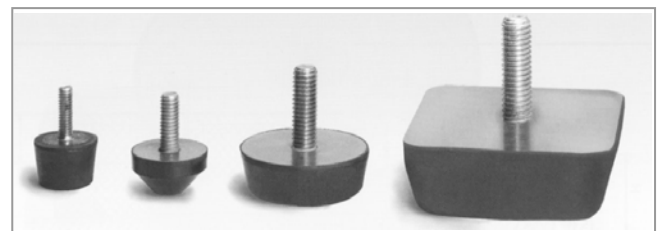
A supplementary range of cylindrical mountings for a wide range of applications. They can be loaded either in compression or shear taking into consideration individual demands for actual applications.

Figures stated are for natural rubber hardness 60° IRH.



Type	Part no.	Dimensions Diameter /Height	Bolt Internal Thread	Bolt Length mm
Type E	20-01564	E15/15	M4	
	20-00594	E30/17 A40°	M8	
	20-00668	E40/30	M8	
	20-01464	E40/40	M8	
	20-00501	E50/20	M10	
	20-00607	E50/36 A40°	M10	
	20-01406	E50/40	M10	
	20-01407	E50/45	M10	
Type TA	20-01610	TA25/20	M6	12~18
	20-01647	TA40/30	M8	20
Type KD	10-00087	KD25/12	M6	
	20-00013	KD25/13	M6	16
	20-01611	KD25/17	M6	18
	20-00595	KD50/17	M10	28
	20-01469	KD50/50	M8	20
Type KPD	20-00686	KPD30/30	M8	20
	20-00929	KPD30/36	M8	20

Other dimensions on special demand with minimum quantity and/or order value.



The technical values are to be used for info only.
If questions, please contact TIAVS.

Buffers™



Features

Circular and rectangular types are easily fitted. Reduction of transmitted shock loads enables equipment to be designed more economically.

The rising stiffness properties enable vehicle suspension characteristics to be optimised.

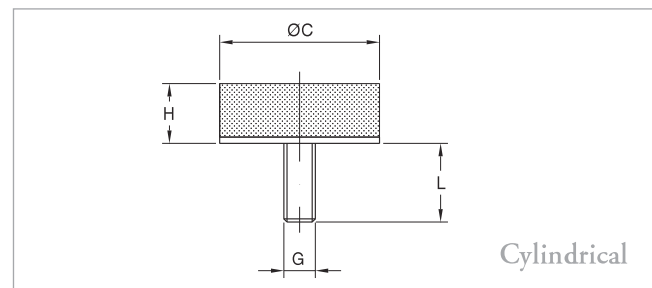
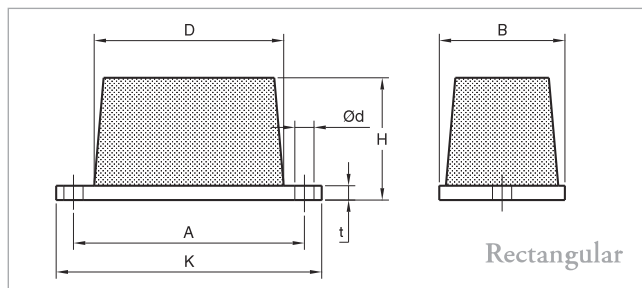
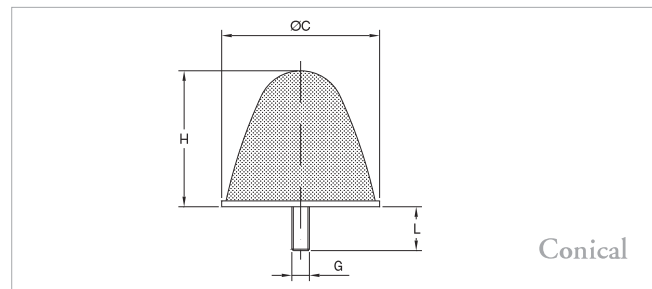
ANB - R is made in oil and chemical resistant Nitrile Rubber.

Metalastik® type Buffers™

Buffers are designed to protect structures and equipment from impact forces. They are usually fitted as non-metallic stops or incorporated in vehicle suspension systems to provide progressive stiffening under increasing load.

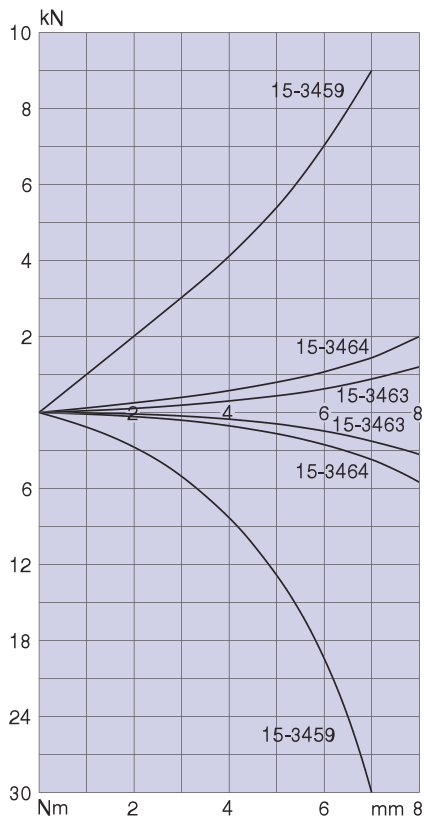
Typical applications:

- ▼ Cranes
- ▼ Dump trucks
- ▼ Off-road vehicles
- ▼ Handling equipment
- ▼ Vehicle suspensions

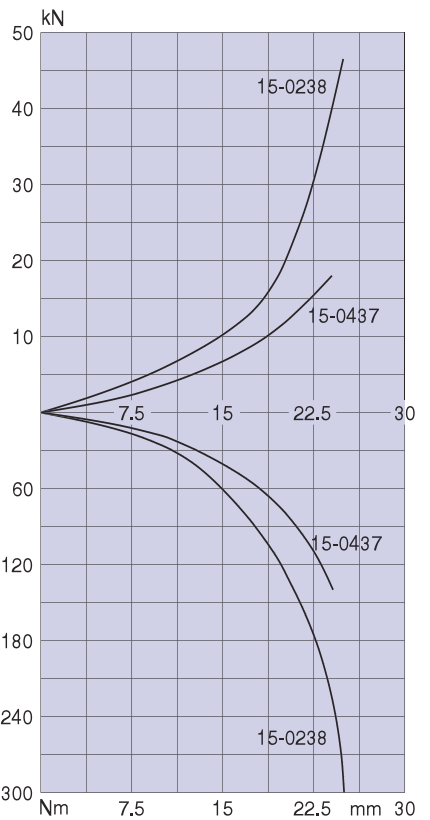
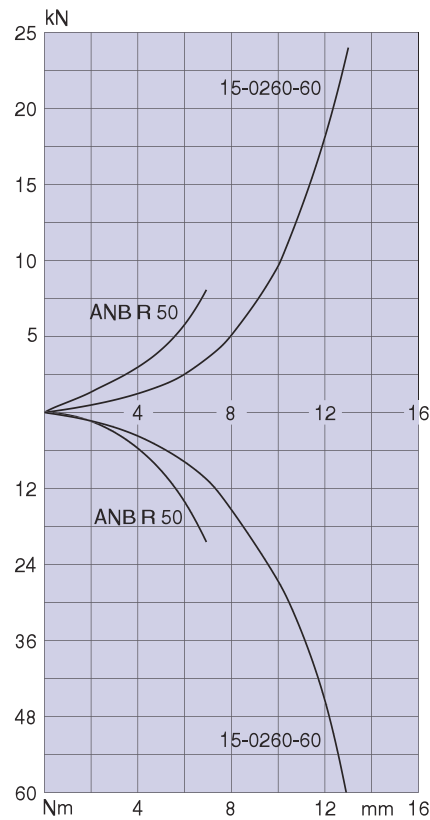


Type	Drawing no.	Part no.	Dimensions in mm							Weight (Kg)
			C	H	G	L	K	A	B	
Cylindrical buffers	15-3463	10-00341	21	19	M6	15				0,2
	15-3464	10-00342	32	21	M8	20				0,05
	15-3459	10-00337	51	19	M10	25				0,1
Cylindrical buffers	15-3462	10-00340	28,5	37	M6	15				0,03
	19-0604	20-00686	32	28,5	M8	20				0,04
	15-3461	10-00339	38	38	M8	20				0,06
	15-3435	10-00334	48	51	M10	25				0,12
	15-3460	10-00338	70	46	M12	30				0,27
	15-3445	10-00336	108	95	M12	30				0,79
	15-3443	10-00335	108	121	M12	30				0,99
Rectangular buffers	15-0437	10-00322	121	105	48	56	86	8,6	6,3	0,48
	15-0238	10-00315	121	105	57	56	86	8,6	6,3	0,55
	15-0260	10-00317	156	127	64	37	89	13,5	6,3	0,57
ANB R50*	19-0564	20-00417	84	68,5	32	22	51	6,7	3	0,06

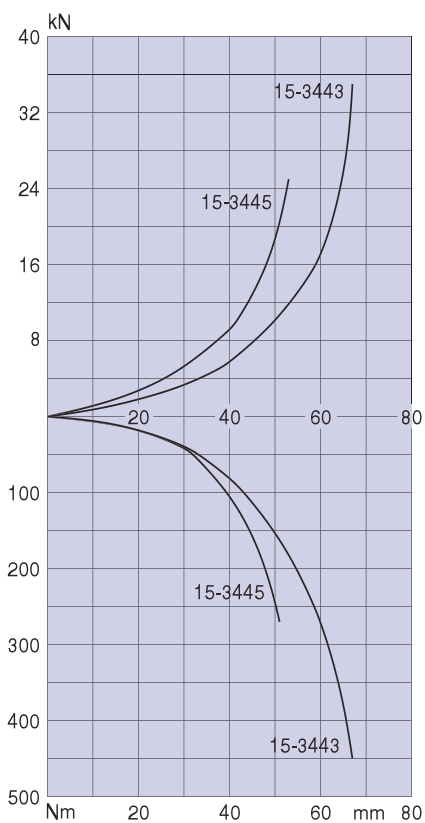
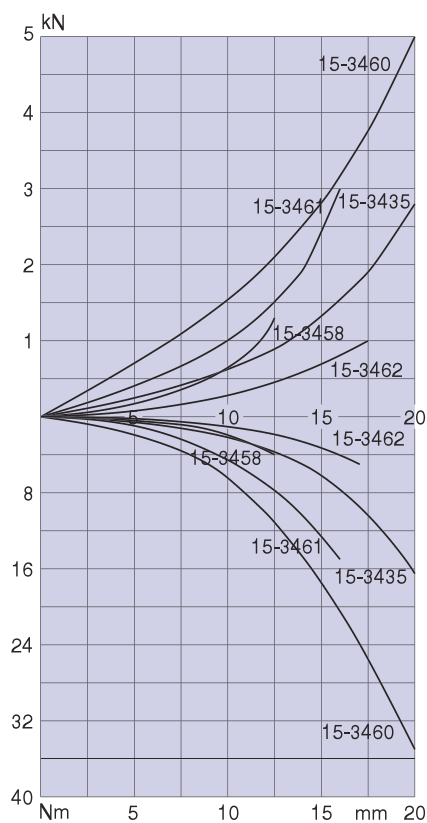
Cylindrical



Rectangular



Conical

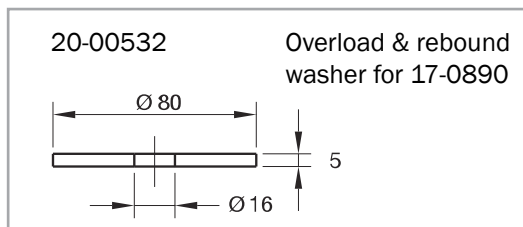
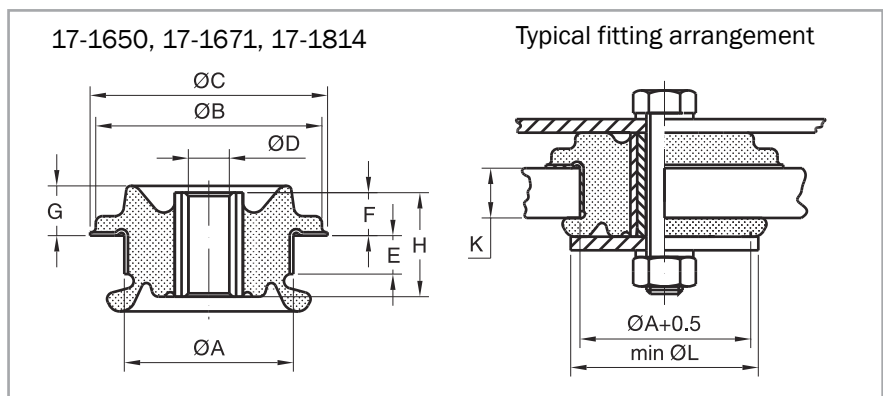
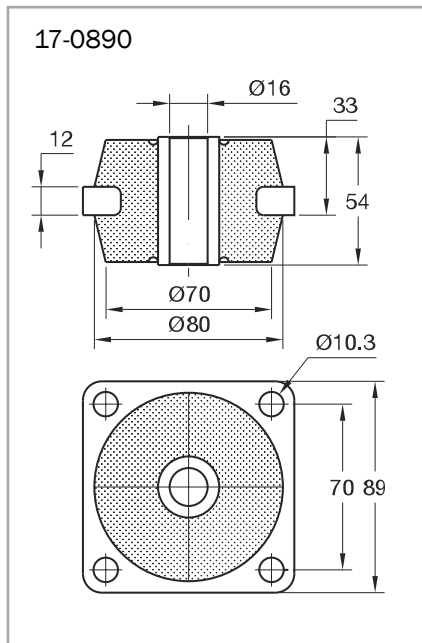
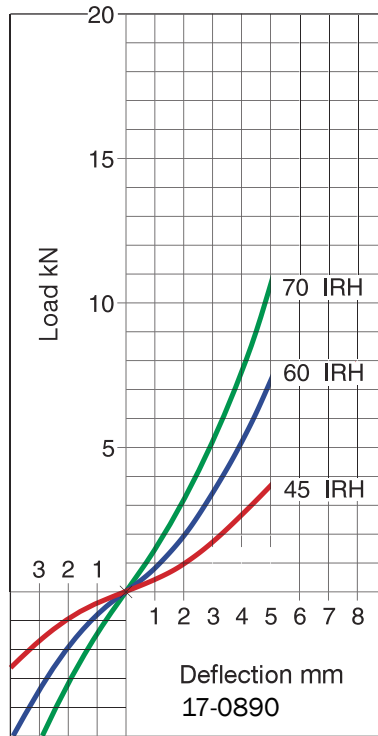


Cab mountings



Metalastik® type Cab Mountings

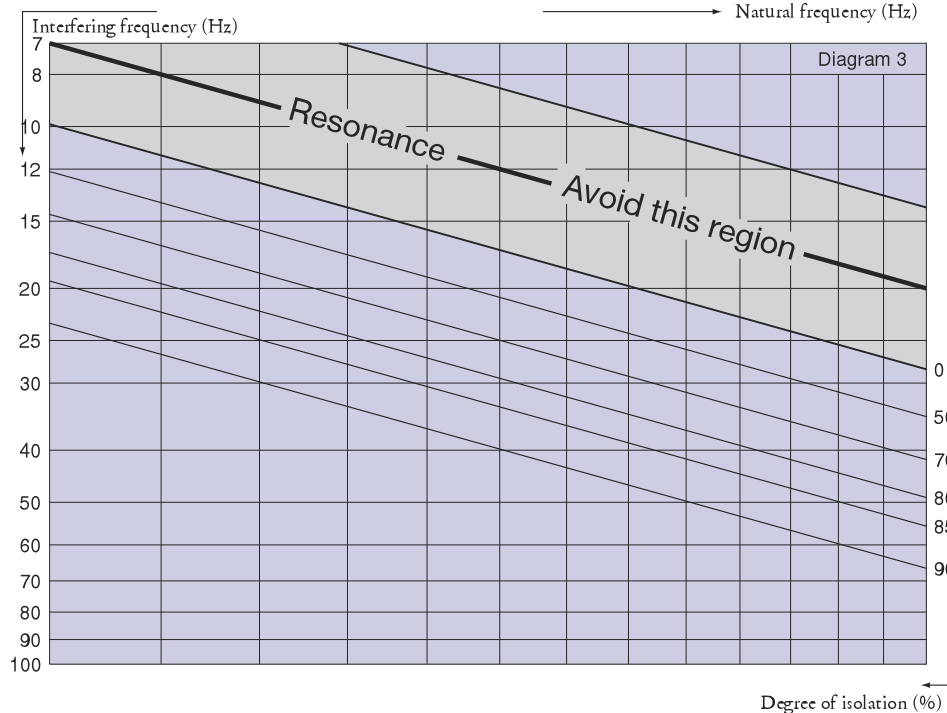
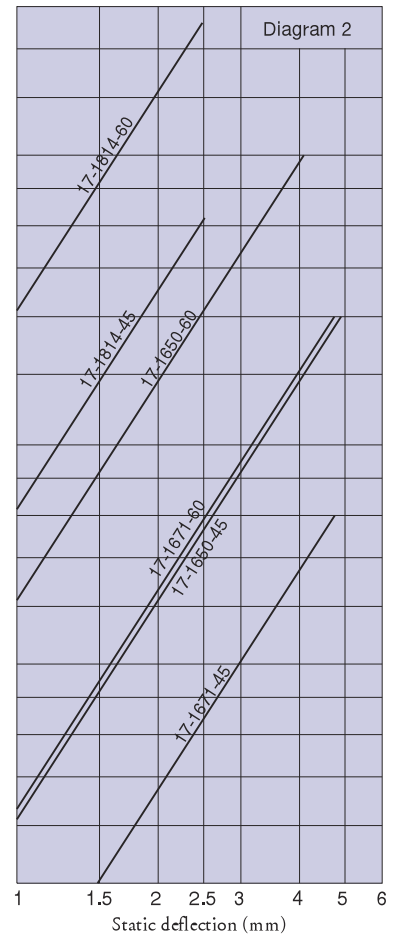
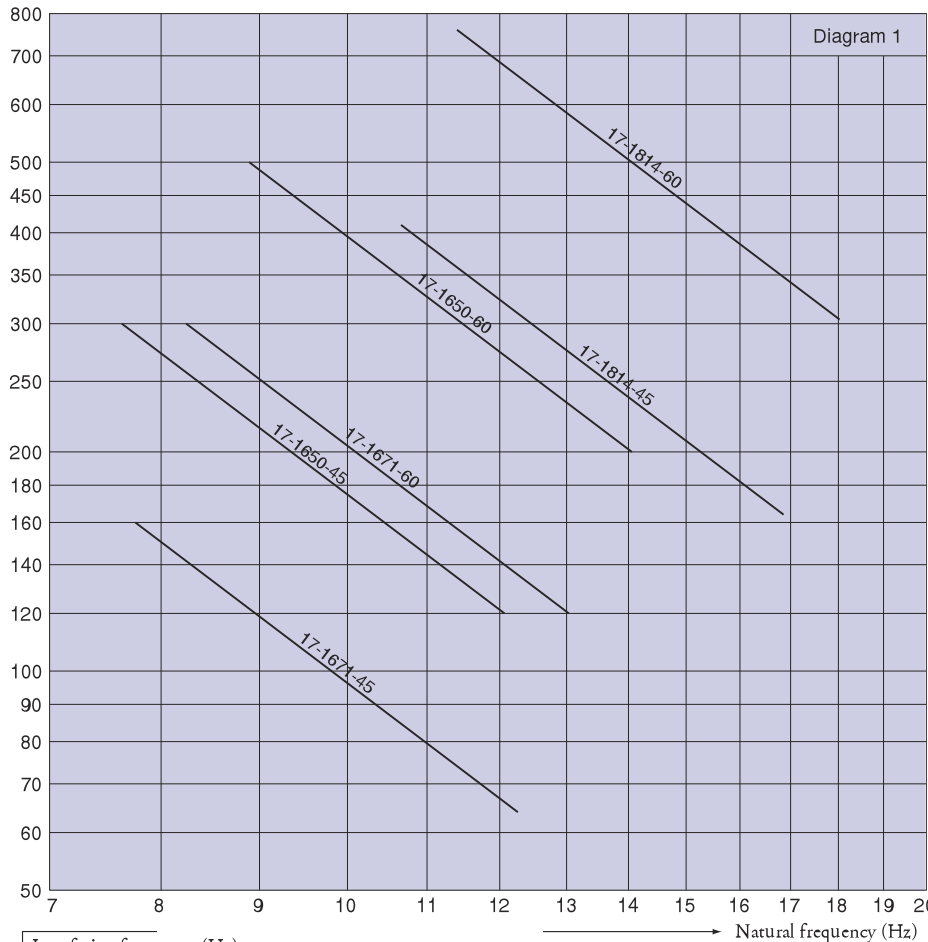
Specially profiled rubber section together with bump and rebound washers provide optimum suspension characteristics for cabs on commercial vehicles, tractors and other off-road vehicles.



Drawing no.	Part no.	Dimensions in mm										Max load (Kg)	Radial Stiffness (N/mm)	Weight (Kg)
		A	B	C	D	H	F	E	G	K	L			
17-1671-1	10-00563	75	100	105	16,5	46	19	17	22	20	105	160	500	0,45
17-1650-1	10-00554	75	100	105	16,5	46	19	17	22	20	105	300	650	0,46
17-1650-1	10-00555	75	100	105	16,5	46	19	17	22	20	105	500	1300	0,46
17-1814	10-00598	89	115	120	25	47	13	23	21	25	120	410	700	0,63
17-1814	10-00603	89	115	120	25	47	13	23	21	25	120	760	1400	0,63
17-0890	10-00440	see drawings										see table	0,83	
17-0890	10-00441												0,83	
17-0890	10-00442												0,83	
Washer	20-00532													

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



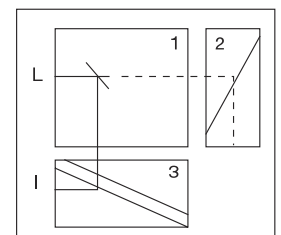
To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz)
(Hz = rpm / 60)

Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.

Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.

For static deflection, see diagram 2.



Circular SAW™ Mountings



Features

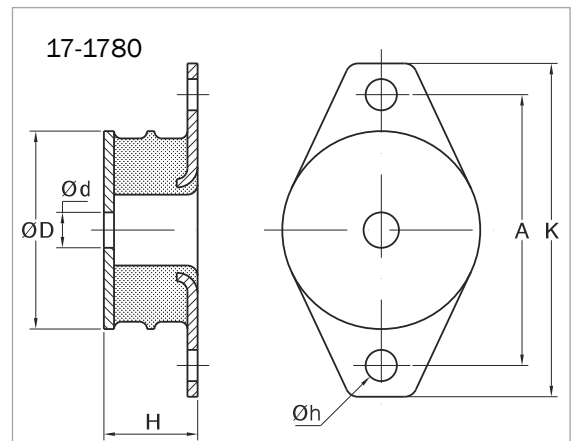
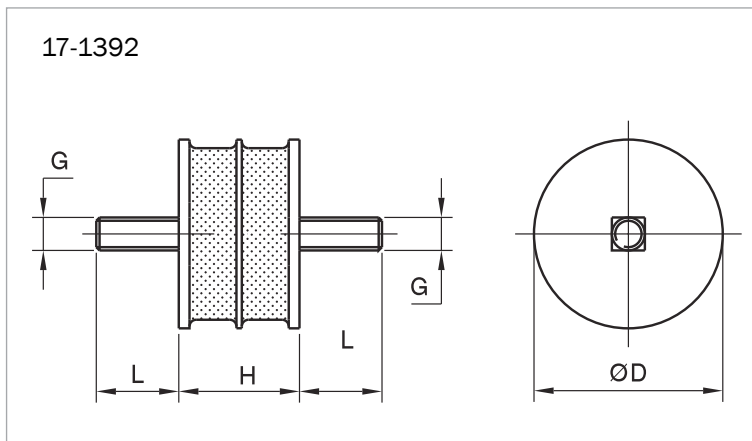
The metal interleaf incorporated in the design provides a higher compression to shear stiffness ratio, thereby increasing the load capacity in the compression or combined compression and shear modes.

The 17-1780 engine mounting features a void in the rubber section to allow the use of a central snubber device.

Metalastik® type Circular SAW™ Mountings

Used in a variety of industrial applications including vibratory rollers and small screens and for the suspension of smaller engines.

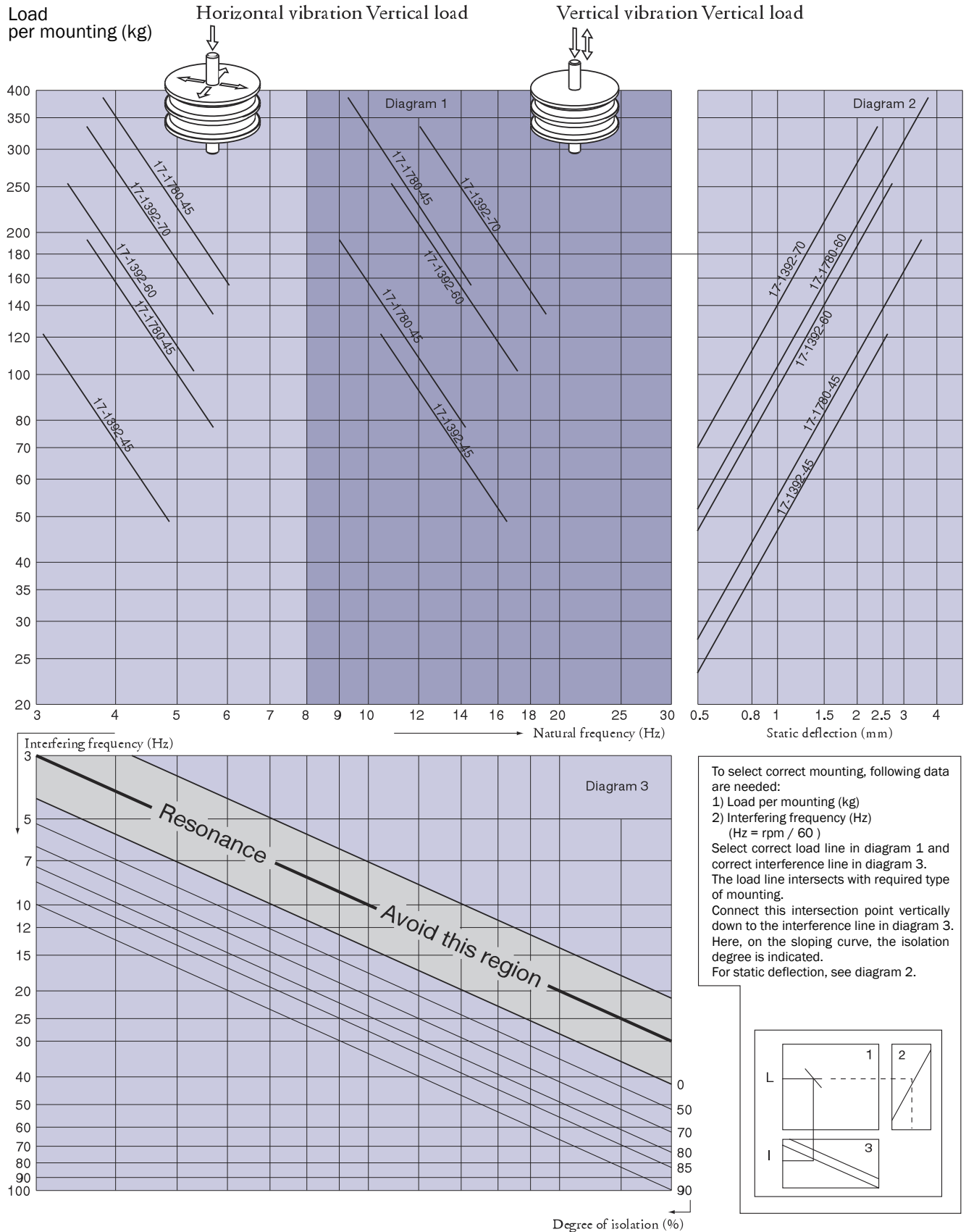
17-1780 can be fitted with a rebound washer for mobile applications.



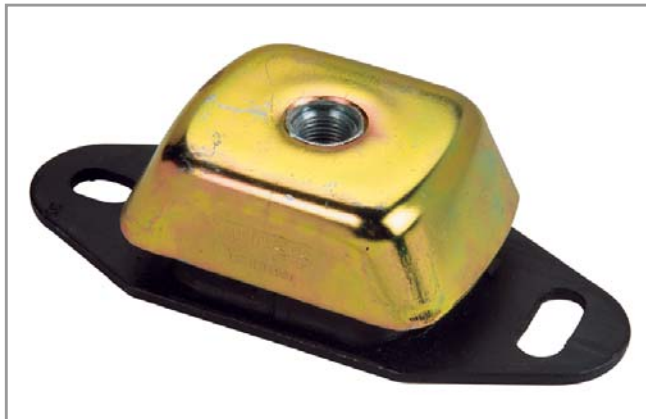
Drawing no.	Part no.	Dimensions in mm								Max load in compression (Kg)	Max load in shear (Kg)	Weight (Kg)
		D	H	L	G	A	K	d	h			
17-1392	10-00492	57	37	25	M10					120	90	0,28
17-1392	10-00493	57	37	25	M10					250	90	0,28
17-1392	10-00494	57	37	25	M10					330	90	0,28
17-1780	20-02536	95	45			130	160	17	15	190	135	0,81
17-1780	20-02848	95	45			130	160	17	15	380	160	0,81

Circular SAW™ Mountings

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.



Cushyfloat™



Metalastik® type Cushyfloat™

The Cushyfloat™ mounting is an ideal general purpose unit designed to provide effective isolation of vibration and noise arising from many types of static and mobile equipment including:

- ▼ Pumps
- ▼ Compressors
- ▼ Generator sets
- ▼ Marine, industrial and vehicle engines

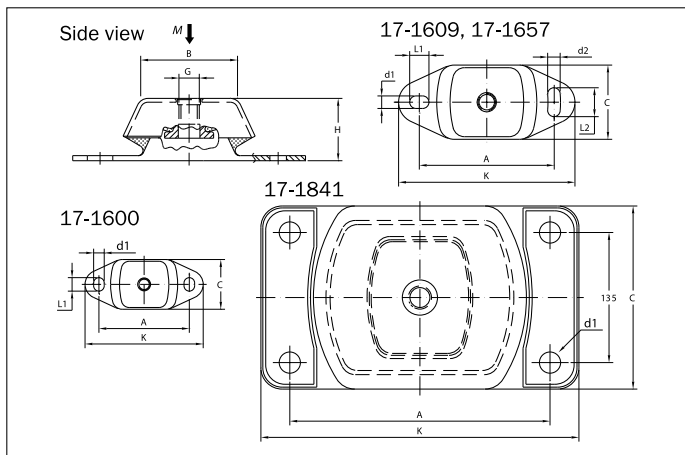
Features

Originally designed for use with marine engines, this compact low profile mounting is easy to install. It combines 3 way control of the suspended equipment with relatively large static deflections where the rubber is loaded in shear and compression.

The design incorporates bump and rebound control features which limit excessive movements under shock loading. Top metal cover gives protection against oil contamination.

Protective finish resists corrosion attack. Propeller thrust on marine applications is accommodated. There are four sizes in the standard range which with varying degrees of rubber hardness cater for point loads from 32 kg to 3000 kg. Natural frequencies as low as 8 Hz are possible.

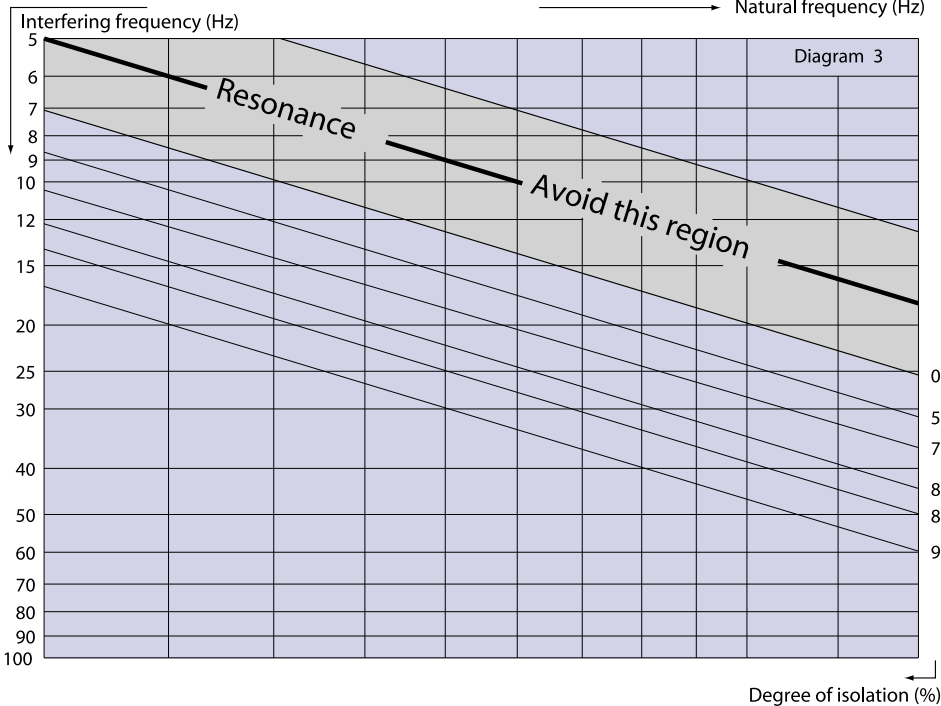
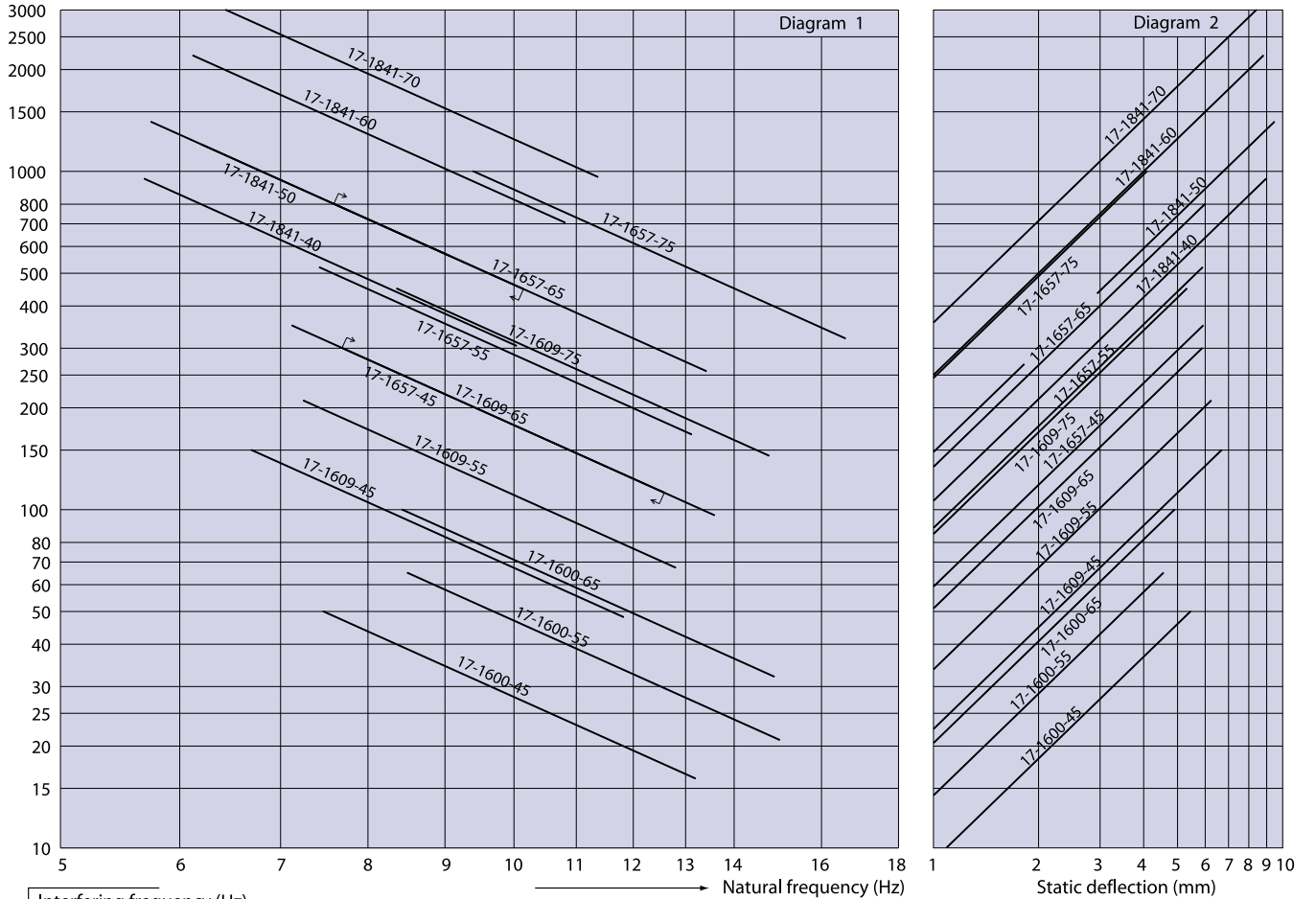
* When used in marine engine applications with thrust forces involved, the maximum load capacity is substantially reduced, see table below!



Drawing no.	Part no.	Dimensions in mm										M-max (Kg)	*M-max (Kg)	Max longitudinal force F(N)	Weight (Kg)
		B	C	A	K	H	d1	L1	d2	L2	G				
17-1600-1	10-00535	60	60	100	120	38	11	14	--	--	M12	50	35	370	0,3
17-1600-1	10-00536	60	60	100	120	38	11	14	--	--	M12	65	55	560	0,3
17-1600-1	10-00537	60	60	100	120	38	11	14	--	--	M12	100	80	830	0,3
17-1609-1	10-00545	75	75	140	183	50	13	20	13	30	M16	150	95	1000	0,9
17-1609-1	10-00546	75	75	140	183	50	13	20	13	30	M16	210	140	1500	0,9
17-1609-1	10-00547	75	75	140	183	50	13	20	13	30	M16	300	210	2300	0,9
17-1609-1	10-00548	75	75	140	183	50	13	20	13	30	M16	450	315	3300	0,9
17-1657-1	10-00557	80	112	182	230	70	18	26	18	34	M20	350	250	2800	2,4
17-1657-1	10-00558	80	112	182	230	70	18	26	18	34	M20	520	370	4200	2,4
17-1657-1	10-00559	80	112	182	230	70	18	26	18	34	M20	800	560	6400	2,4
17-1657-1	10-00560	80	112	182	230	70	18	26	18	34	M20	1000	700	11800	2,4
17-1841-2	10-00605	221	190	270	330	110	Ø22	--	--	--	M24	950	630	5300	9,6
17-1841-2	10-00606	221	190	270	330	110	Ø22	--	--	--	M24	1400	945	7100	9,6
17-1841-2	10-00607	221	190	270	330	110	Ø22	--	--	--	M24	2200	1575	12500	9,6
17-1841-2	10-00608	221	190	270	330	110	Ø22	--	--	--	M24	3000	2100	18000	9,6

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



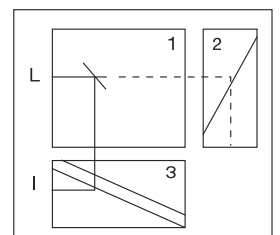
To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz)
(Hz = rpm / 60)

Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.

Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.

For static deflection, see diagram 2.



Cushyfoot™



Features

Cushyfoot™ mountings have two rubber elements, used in shear and compression, to provide excellent stiffness characteristics for the isolation of a wide range of vibration frequencies.

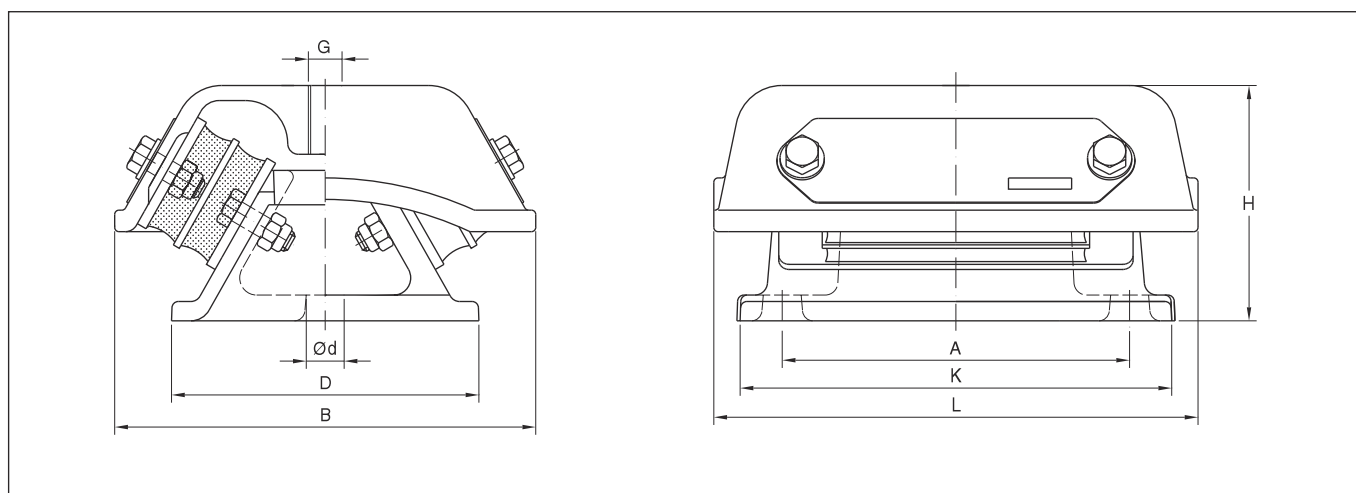
There are three sizes, 17-0290 for loads up to 230 kg per mounting, 17-0213 for loads up to 1250 kg and 17-0346, which will carry up to 1280 kg per mounting, but will provide up to 16 mm static deflection.

The Cushyfoot™ mounting has the following features:

- ▼ A wide load range from 50 to 1280 kg.
- ▼ Dissimilar horizontal stiffnesses give optimum vibration isolation and motion control.
- ▼ Strong castings for safety and reliability.
- ▼ Stamped identification plates for product identification.

Metalastik® type Cushyfoot™

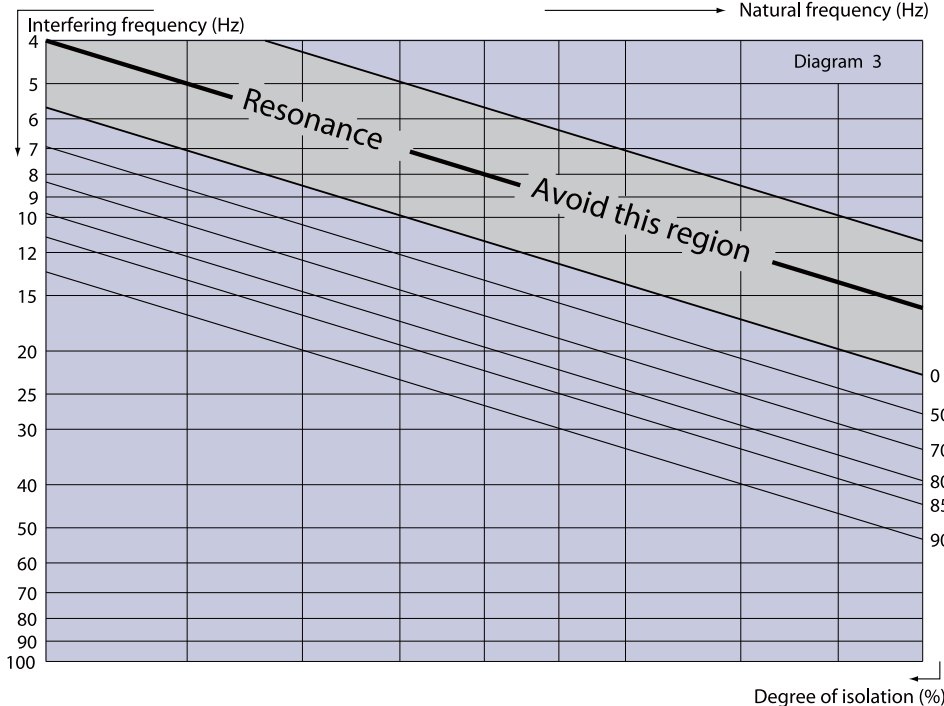
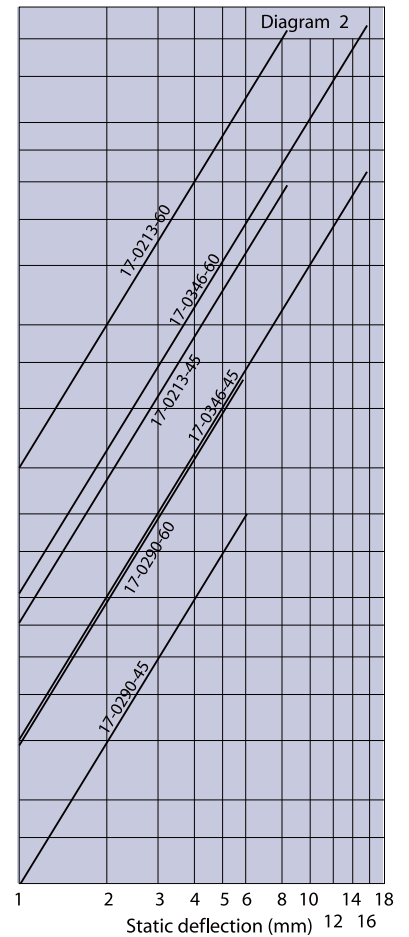
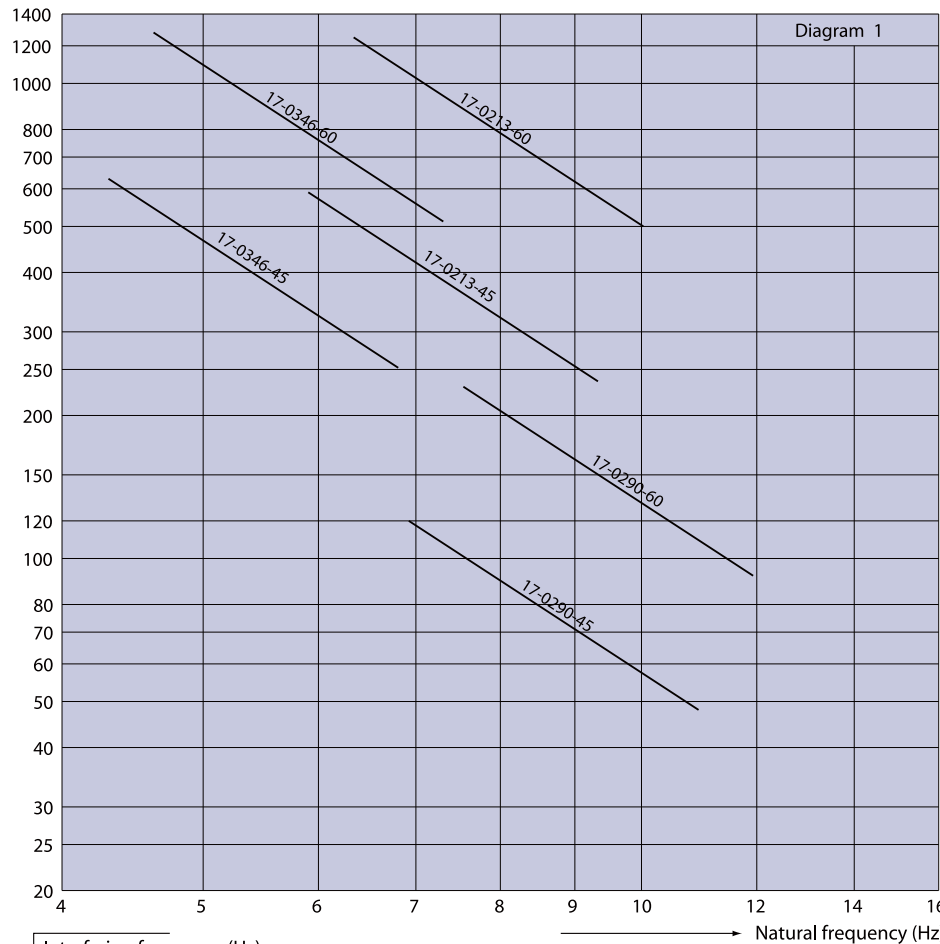
Cushyfoot™ mountings are suitable for many different types of machinery, e.g. diesel engines, generator sets, compressors, fans, hydraulic units and lift machinery.



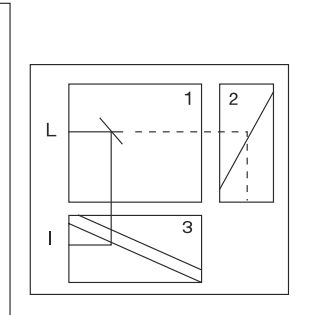
Drawing no.	Part no.				Dimensions in mm								Weight (Kg)	M Max (Kg)			
	45°IRH	55°IRH	60°IRH	70°IRH	L	B	A	K	H	D	d	G		45°IRH	55°IRH	60°IRH	70°IRH
17-0290	20-00689	-	10-04251	-	122	132	90	114	72	82	13	M16	2,3	120	-	230	-
17-0213	10-04106	-	10-04104	10-04103	230	204	165	205	110	148	18	M16	10	590	-	1250	1650
17-0346	10-04234	-	10-04120	-	230	204	165	205	123	148	18	M16	9,5	630	990	1280	-

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz)
 ($\text{Hz} = \text{rpm} / 60$)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.





Features

Type EH is designed primarily for mobile applications where high dynamic and shock forces are encountered.

Dynamic vertical movements in both the directions are restricted and excellent horizontal stability is provided.

Stress on brackets are optimized while at the same time obtaining vibration isolation and shock absorption.

The function of EH includes features as:

- ▼ Fail-safe installation
- ▼ Simple design – easy to install
- ▼ Wide load range, 80 to 450 kg
- ▼ Dynamic efficiency in all directions
- ▼ Attenuation of structure-borne noise
- ▼ Accommodation of misalignment and distortion

Novibra® type EH™

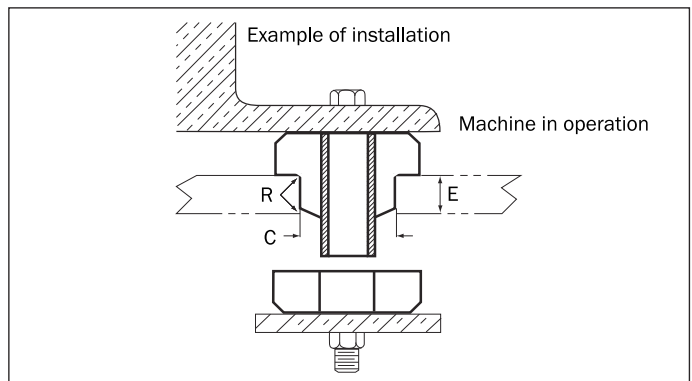
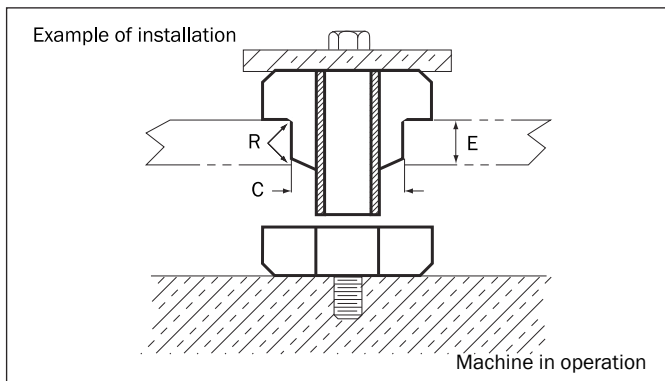
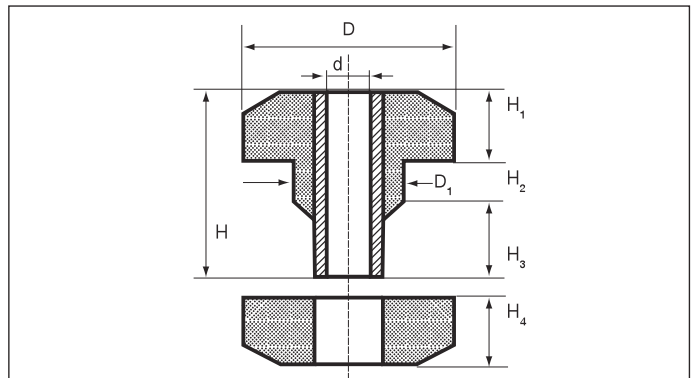
Type EH mountings are designed to achieve effective vibration isolation on engines, operator cabins and other ancillary units.

Typical applications can be found in the following areas:

- ▼ Military vehicles
- ▼ Agricultural vehicles
- ▼ Off-road equipment
- ▼ Construction equipment
- ▼ Transport machinery
- ▼ Industrial mobile machinery

Max tightening torque:

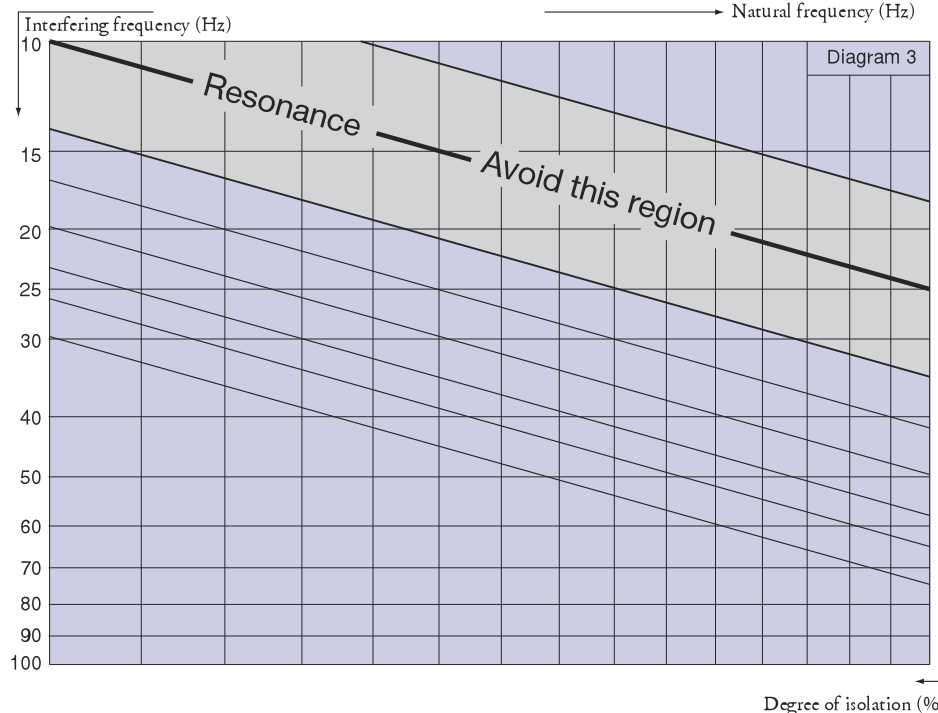
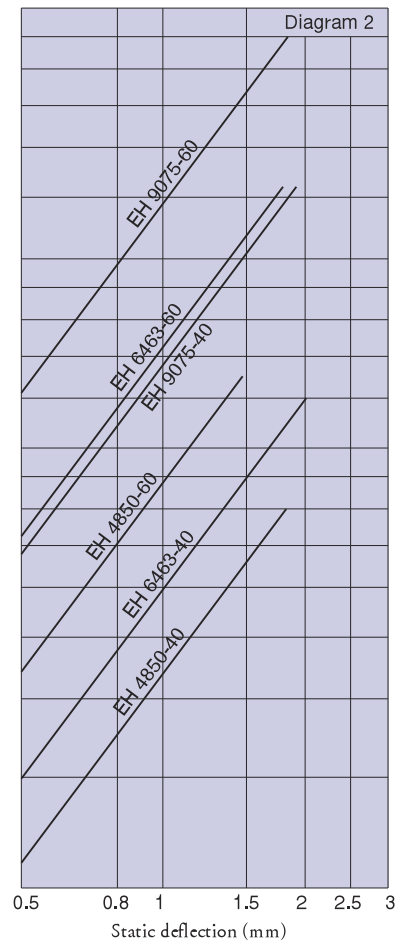
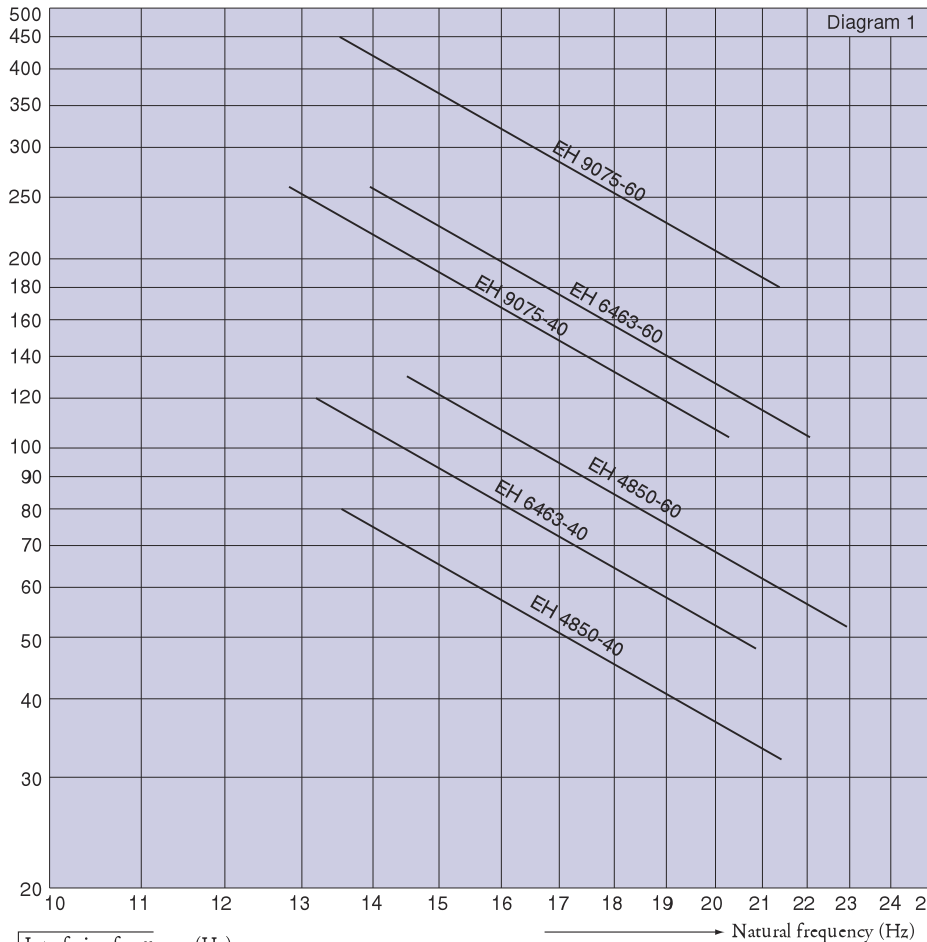
- ▼ EH 4850: 40 Nm
- ▼ EH 6463: 80 Nm
- ▼ EH 9075: 200 Nm



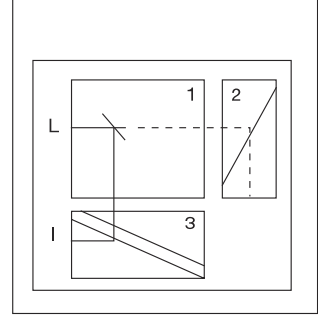
Type	Drawing no.	Dimensions in mm										Top & Bottom Washer		
		C	E	R										
EH4850	19-0213-1	31,0	15,0	1,5									20-00416	
EH6463	19-0214-1	39,0	22,0	2,3									20-00532	
EH9075	19-0727-1	56,5	28,0	3,0									20-00533	
Drawing no.		Part no.		Dimensions in mm								Max load (Kg)		
		40°IRH	60°IRH	d	D	D1	H	H1	H2	H3	H4	40°IRH	60°IRH	
EH4850	19-0213-1	20-00621	20-00620	13,0	50	32	50	20	10	20	20	80	130	
EH6463	19-0214-1	20-00619	20-00618	17,0	64	40	62	23	14	25	23	120	260	
EH9075	19-0727-1	–	20-00616	23,0	89	58	73	25	19	29	25	260	450	

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz)
 (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.



Equi-frequency™ Mountings



Features

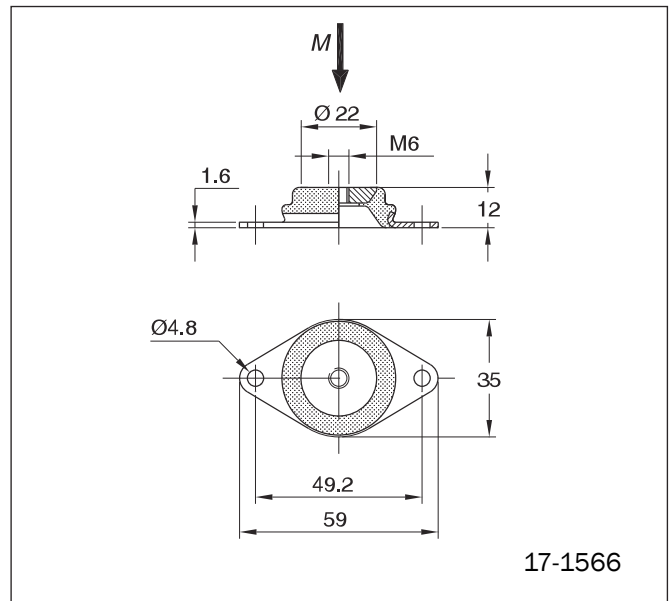
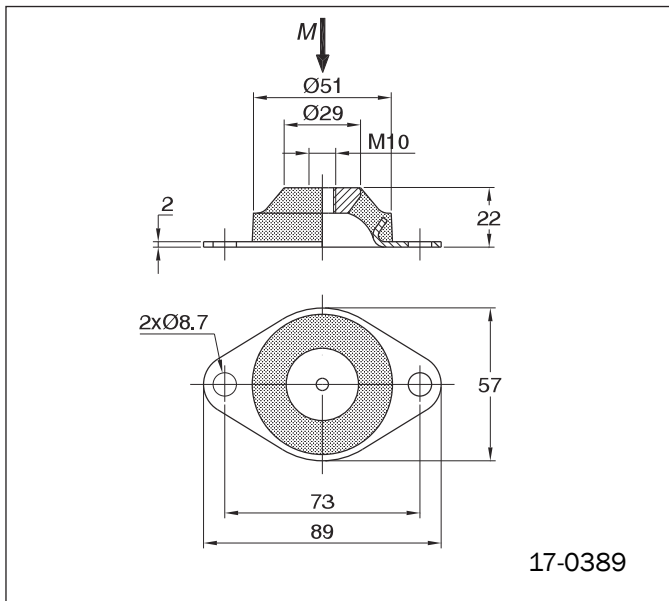
Each design has substantially the same stiffness in vertical and horizontal directions. Load range 11 kg to 54 kg. Can be used as small anti-shock mounting when static loadings are derated.

Metalastik® type Equi-Frequency™ Mountings

General purpose low profile mounting for use where space is restricted. Suitable for stationary applications. May also be used to protect delicate or sensitive equipment from external shock or disturbances.

Typical applications include:

- ▼ Small fan sets
- ▼ Instrument panels
- ▼ Small vacuum pumps
- ▼ Small reciprocating engines

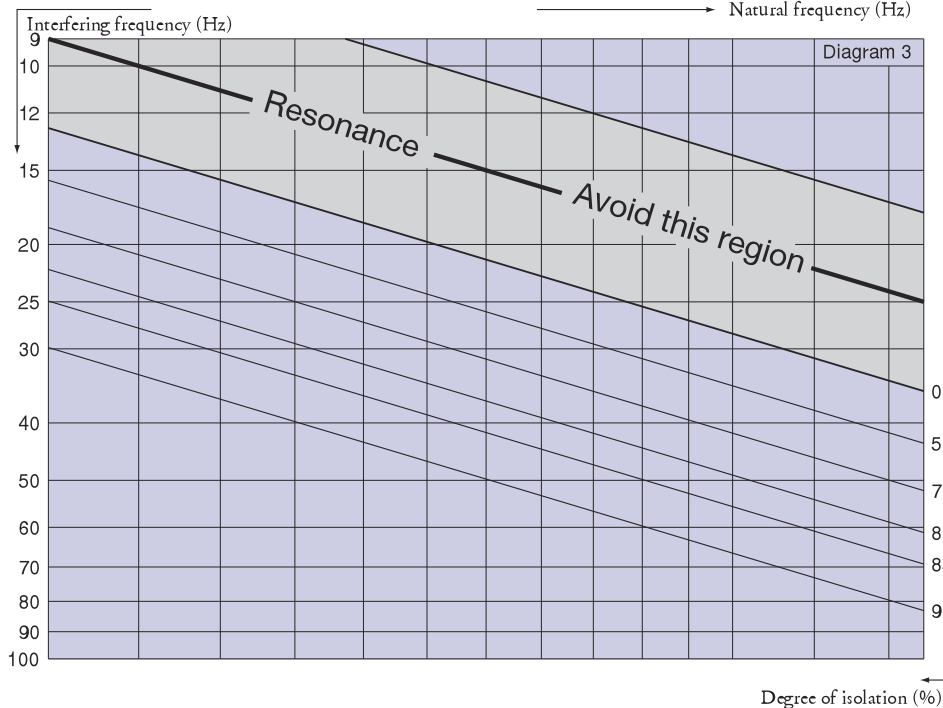
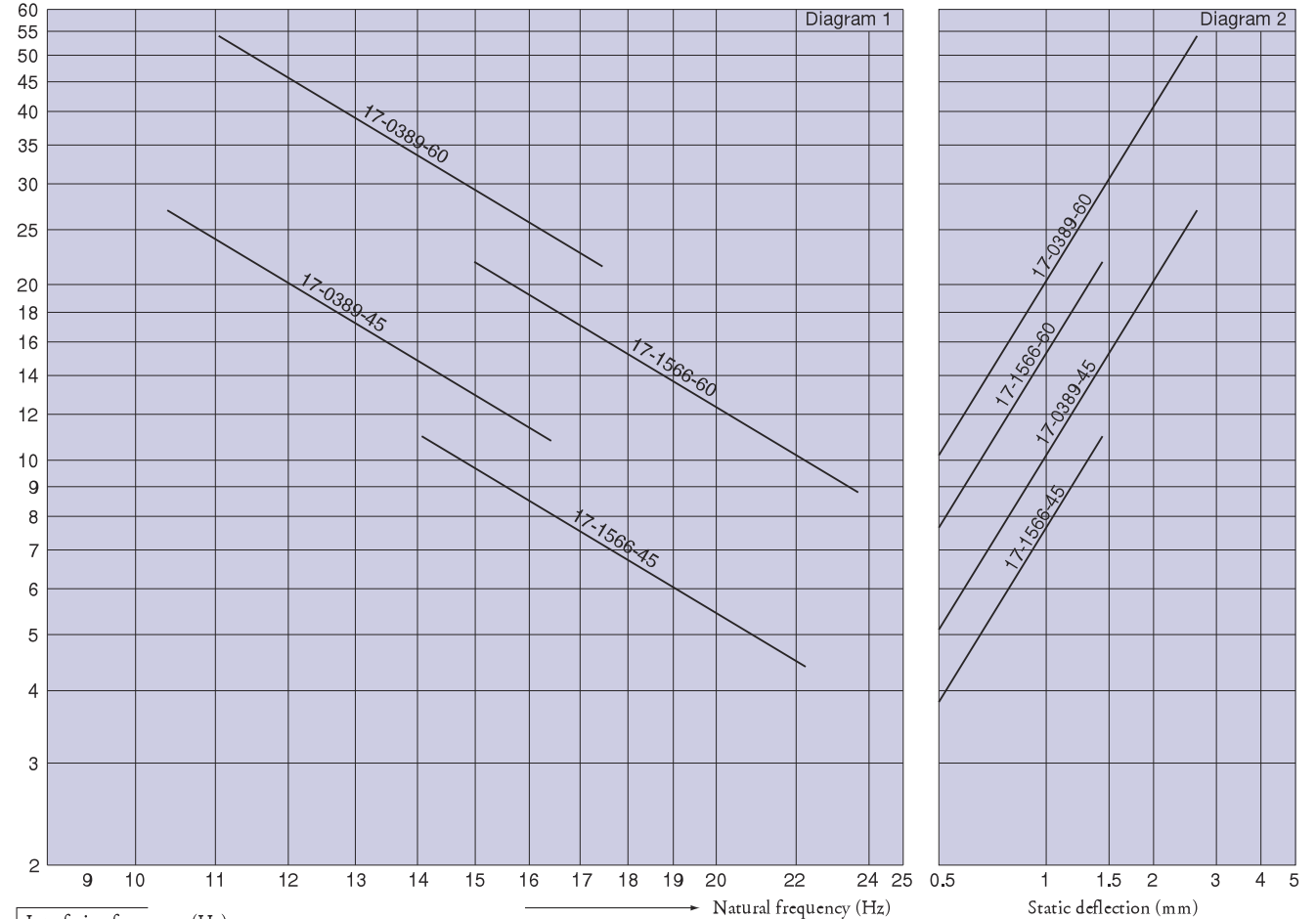


Drawing no.	Part no.	M-Max (Kg)	Weight (Kg)
17-1566	10-00529	11	0,024
17-1566	10-00530	22	0,024
17-0389-5	10-00406	27	0,10
17-0389-5	10-00407	54	0,10

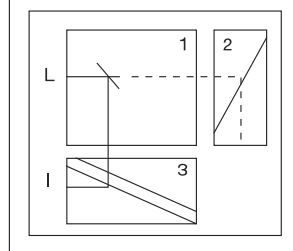
Equi-frequency™ Mountings

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz)
 (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.





Features

Simple design with metal parts encapsulated in high grade natural rubber compound giving good environmental resistance.

Provides relatively large static deflections and hence a high degree of vibration attenuation - 90% isolation for disturbing frequencies of 15 Hz (900 c.p.m).

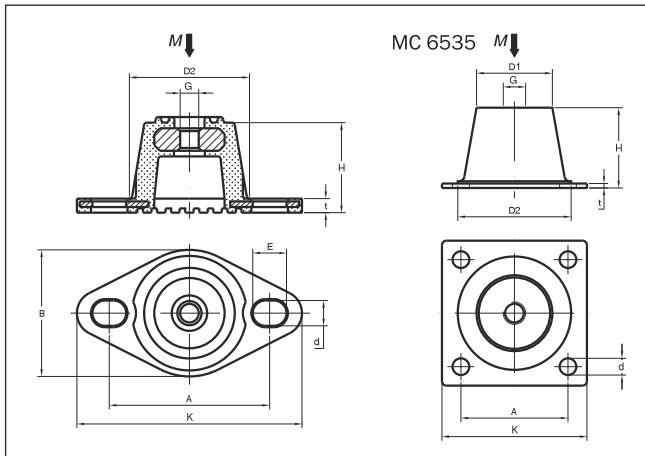
Range gives capacity for point loads of 35 kg to 350 kg.

Metalastik® type Fanflex™

A simple mounting designed predominantly for the suspension of heating, ventilating and air conditioning equipment.

May be used for:

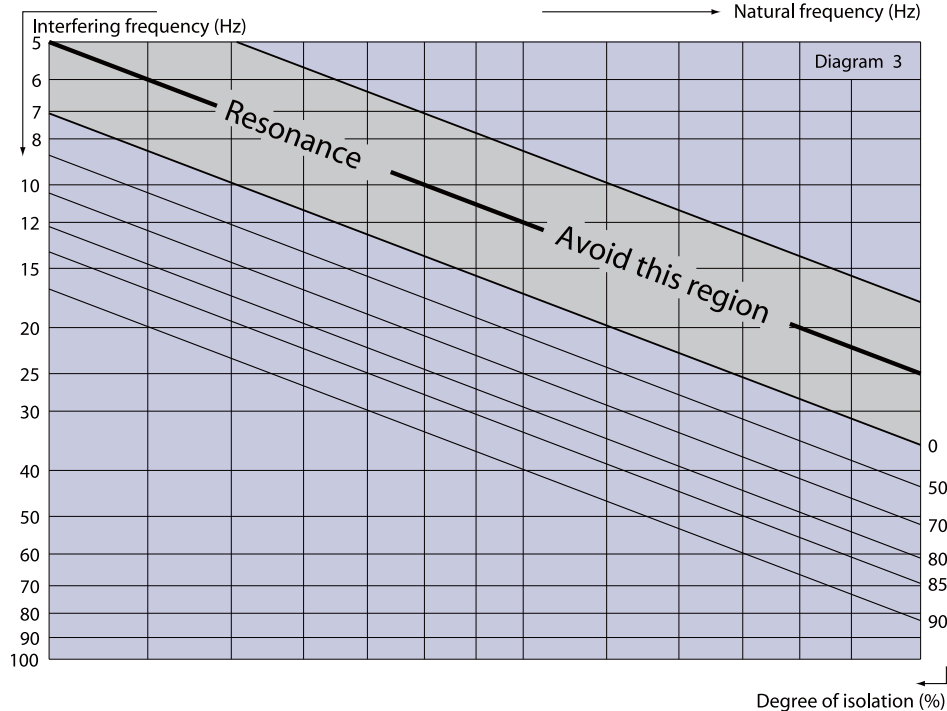
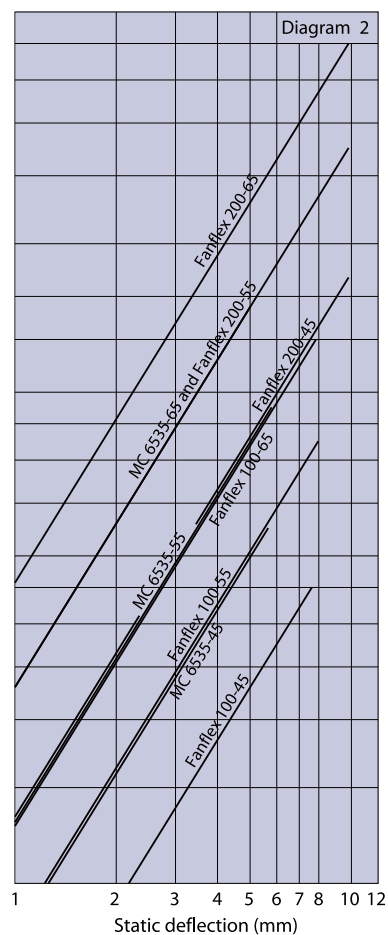
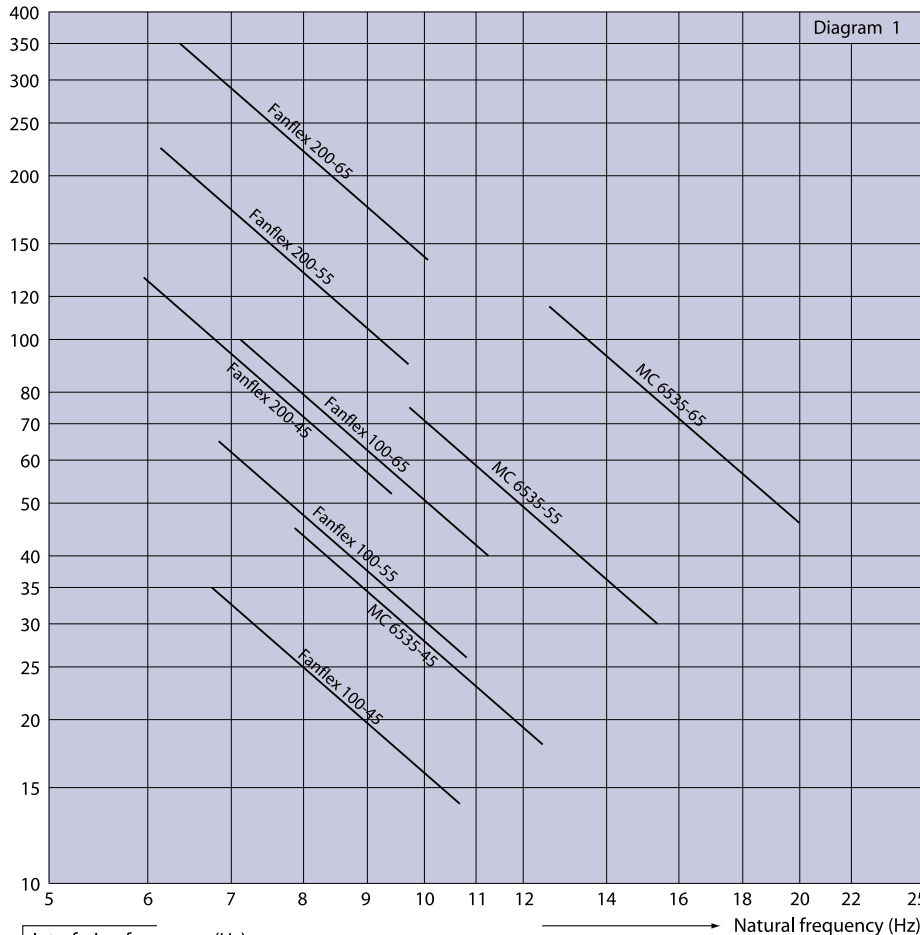
Pumps, fans, compressors and control cabinets.



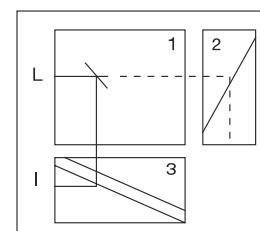
Type	Drawing no.	Part no.	Dimensions in mm										Weight (Kg)	M-Max (Kg)	Colour Code
			A	K	H	B	D1	D2	E	G	d	t			
Fanflex 100-45	19-0200	20-00518	57	80	32	45		41	12	M8	9	5	0,09	35	yellow
Fanflex 100-55	19-0200	20-00519	57	80	32	45		41	12	M8	9	5	0,09	65	blue
Fanflex 100-65	19-0200	20-00520	57	80	32	45		41	12	M8	9	5	0,09	100	red
Fanflex 200-45	19-0201	20-00521	71	95	45	60		56	14	M10	9	5	0,22	130	yellow
Fanflex 200-55	19-0201	20-00522	71	95	45	60		56	14	M10	9	5	0,22	225	blue
Fanflex 200-65	19-0201	20-00523	71	95	45	60		56	14	M10	9	5	0,22	350	red
MC 6535-45	19-0565	20-00662	48	65	36		34	51	8	M10	7,5	2	0,12	45	white
MC 6535-55	19-0565	20-00663	48	65	36		34	51	8	M10	7,5	2	0,12	75	red
MC 6535-65	19-0565	20-00664	48	65	36		34	51	8	M10	7,5	2	0,12	115	black

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

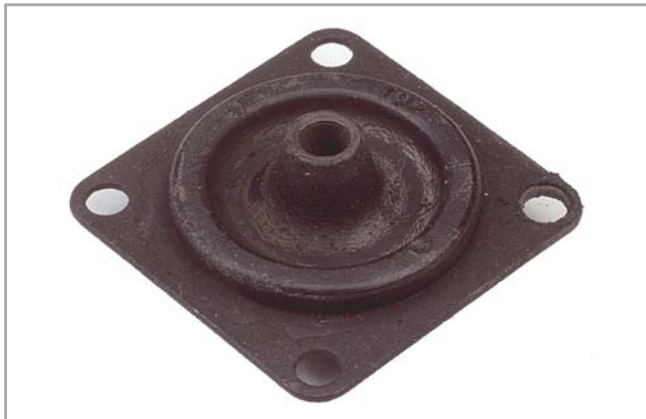
Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz) (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.



Flanged Instru-mountings™

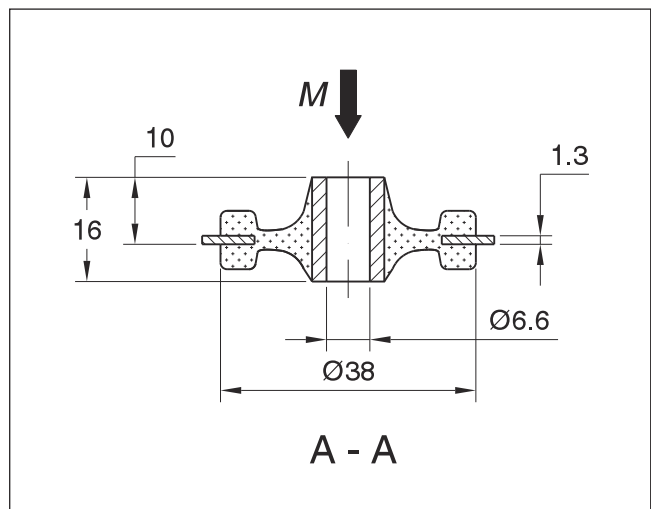
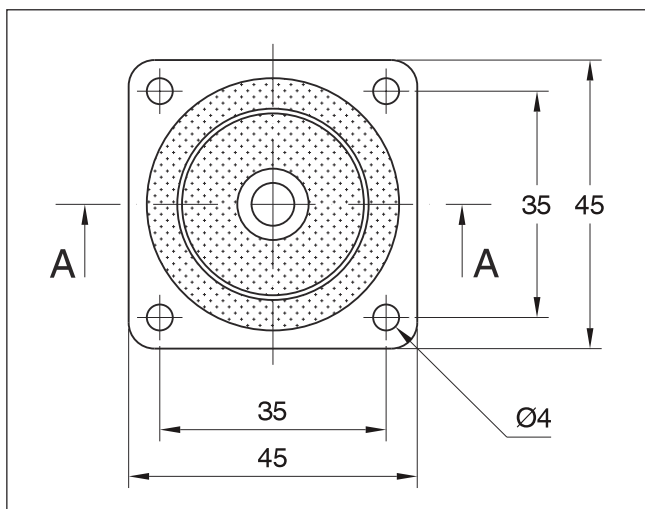


Features

- ▼ Load range from 2.7 to 5.4 kg.
- ▼ Static deflection up to 2.5 mm.
- ▼ Easy to fit as part of a cabinet enclosure.
- ▼ Fail-safe when fitted with overload and rebound washers of the same diameter as the rubber section.

Metalastik® type Flanged Instru-mountings™

These mountings are suitable for both mobile and static applications, for the protection of sensitive equipment from external vibration or for vibration isolation of small fan sets, transformers and similar equipment. Flanged Instrumountings can be fail-safe if fitted with a washer to the top and bottom of the rubber section.

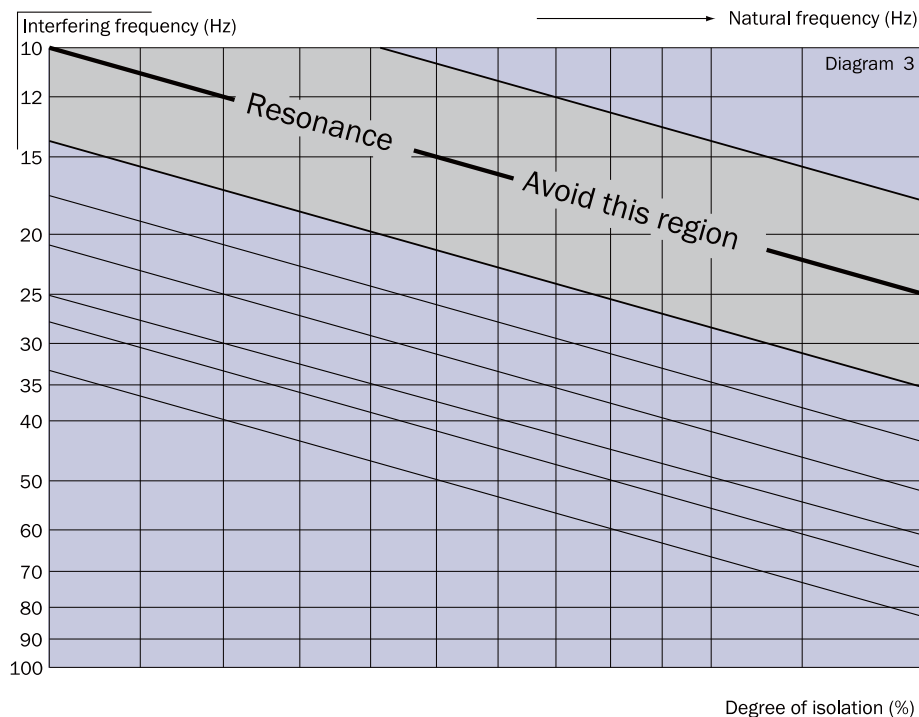
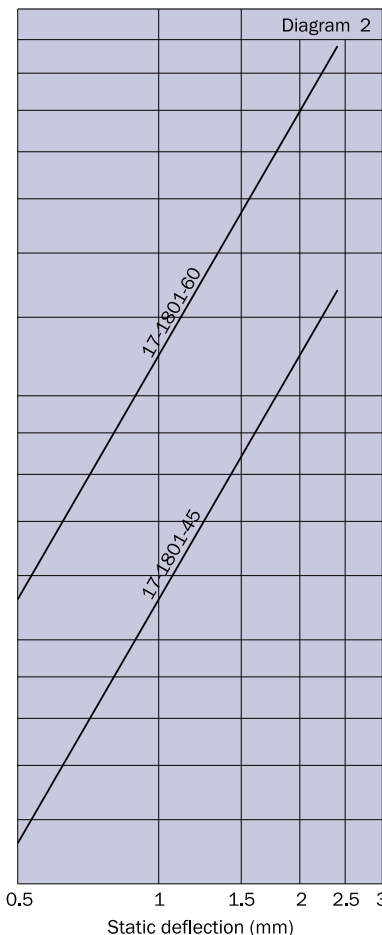
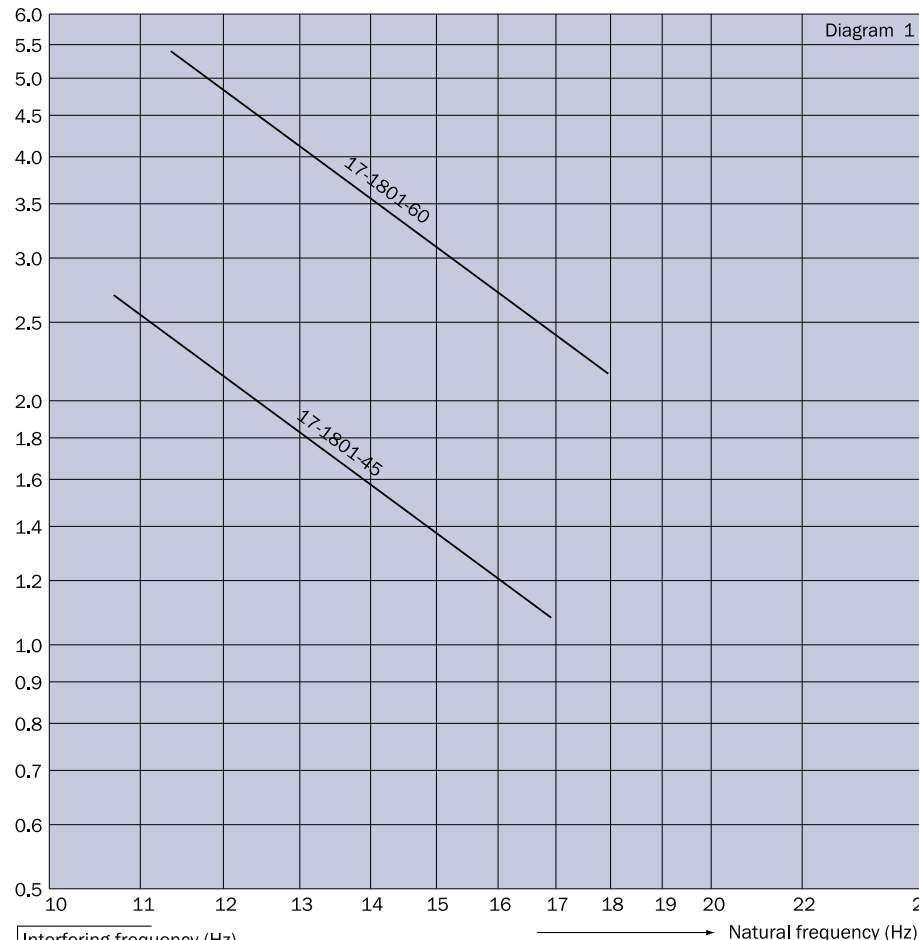


Drawing no.	Part no.	M-Max (Kg)	Weight (Kg)
17-1801	10-00583	2,7	0,03
17-1801	10-00584	5,4	0,03

Flanged Instru-mountings™

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



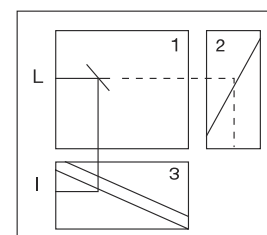
To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz) (Hz = rpm / 60)

Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.

Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.

For static deflection, see diagram 2.





Features

Type GK is a heavy duty mounting with excellent flexible characteristics in both vertical and lateral planes. Deflection up to 30 mm is possible making type GK suitable for installations with low disturbing frequencies.

Installation is simple, eliminating traditional methods of attachment to machinery or support structure.

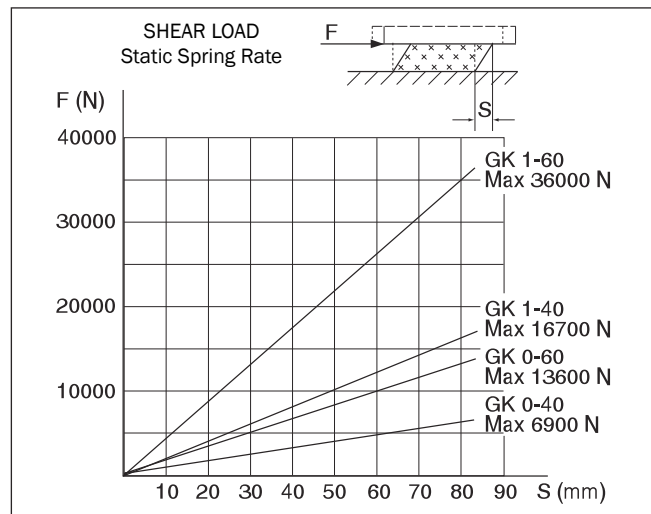
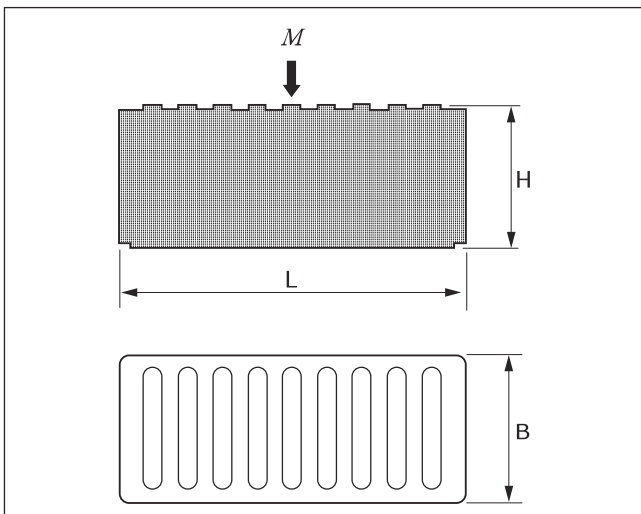
Novibra® type GK™

Mounting type GK is specifically designed for isolation of heavy machinery with low interfering frequencies. It is widely used under concrete foundations supporting heavy machinery.

The long narrow section enables type GK to be suitable for fitting under a common structural frame supporting different equipments.

Typical fields of application are:

- ▼ Mixers
- ▼ Gearboxes
- ▼ Converters
- ▼ Industrial fans
- ▼ Paper mills
- ▼ Sound enclosures
- ▼ Floating structures



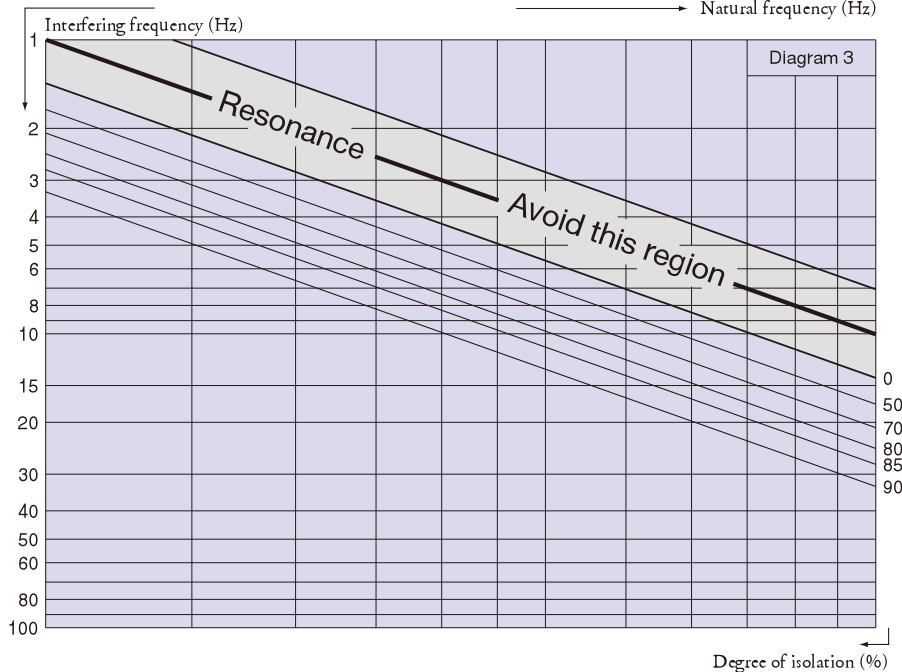
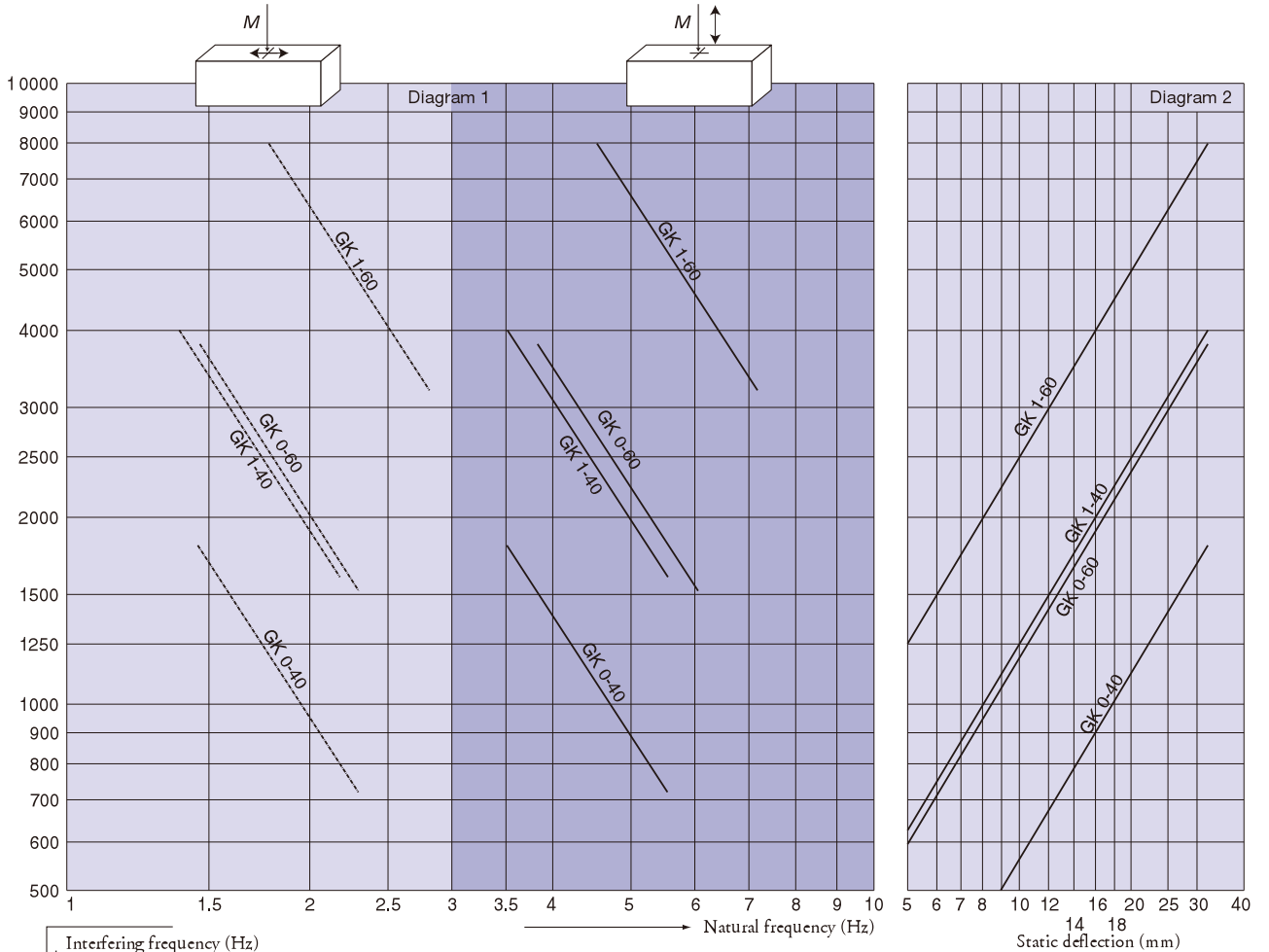
Type	Drawing no.	Part no.	Dimensions in mm			M-Max (Kg)	Weight (Kg)
			L	B	H		
GK0-40	15-4041	10-00085	195	175	150	5,2	1800
GK0-60	15-4041	10-00101	195	175	150	5,7	3800
GK1-40	15-4042	10-00008	400	175	150	10,7	4000
GK1-60	15-4042	10-00009	400	175	150	11,8	8000

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

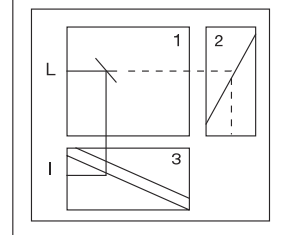
Load per mounting (kg)

Horizontal vibration Vertical load

Vertical vibration Vertical load



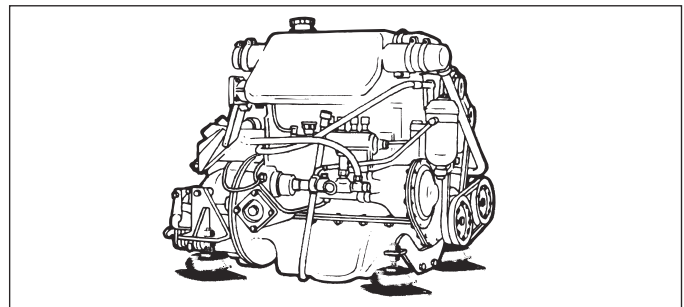
To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz)
 (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3.
 The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3.
 Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.





Features

Type HA is a height adjuster made in corrosion protected grade 8 steel. The steel is zinc plated and chromated according to DIN 50691/ISO 2081. The height adjuster is supplied complete with washer and nut for fastening to the mounting and two nuts and a lock washer for the engine foot fastening. The HA height adjustment facilitates precise coupling alignment for engine installations and boat building tolerances.

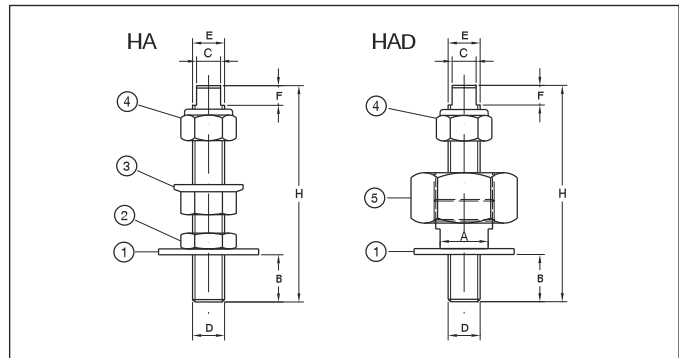


Trelleborg Industrial AVS - Height Adjusters

Type HA is available in various sizes to suit the small and medium range of Trelleborg Industrial AVS mountings, as listed in the table below. It allows mountings to be retrofitted to existing installations where original spares are unobtainable.

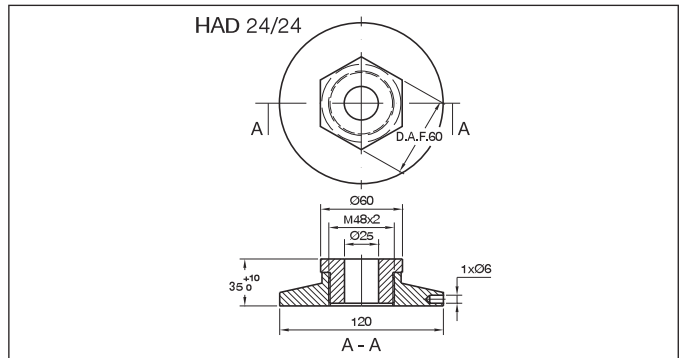
Note:

- ▼ For optimum solutions where close coupling tolerances are required, allow the mountings to settle for 48 hours before final alignment of the engine installation.
- ▼ For securing the bolt into the mounting, it is recommended to apply thread lock adhesive.
- ▼ The height adjuster HA can be used together with Novibra type M-mount. See description of M-mount.



Height Adjusters can be used together with:

HA 12/12	RAB, RA 100 M 12, RA 200 M 12, RAEM 60,
HA 12/16	RAEM 125 M 12, RAEM 350 M 12, 17-1463,
HAD12/16	Cushyfloat 17-1600, SIM 100
HA 16/16	RA 350 M 16, RA 500, RA 800,
HAD16/16	RAEM M 16, RAEM 800,
HA 16/20	Cushyfloat 17-1609, SIM 200,
HAD16/20	Cushyfoot 17-0213, 17-0290, 17-0346
HA 20/20	Cushyfloat 17-1657, SIM 300
HAD20/20	
HAD24/24	Cushyfloat 17-1841



Type	Part no.	Dimensions in mm						1 Washer	2 Hexagon low nut	3 Hexagon flange nut	4 Lock nut plastic insert	5 Fine thread adjusting unit	
		H	D	E	A	B	C						F
HA 12/12	40-04704	95	M12	M12		20	D.A.F.8	8	37*12*3	M12	M12	M12	
HA 12/16	40-06068	105	M12	M16		20	D.A.F.12	10	44*15*3	M16	M16	M16	
HA 16/16	40-04705	110	M16	M16		24	D.A.F.12	10	50*15*3	M16	M16	M16	
HA 16/20	20-00511	130	M16	M20		24	D.A.F.12	10	56*20*4	M20	M20	M20	
HA 20/20	40-02515	135	M20	M20		30	D.A.F.12	10	60*21*4	M20	M20	M20	
HAD 12/16	20-00513	105	M12	M16	D.A.F.24	20	D.A.F.12	10	44*15*3			M16	M30*1,5
HAD 16/16	20-00514	110	M16	M16	D.A.F.24	24	D.A.F.12	10	50*15*3			M16	M30*1,5
HAD 16/20	20-00515	130	M16	M20	D.A.F.27	24	D.A.F.12	10	56*20*4			M20	M36*2
HAD 20/20	20-00516	135	M20	M20	D.A.F.27	30	D.A.F.12	10	60*21*4			M20	M36*2
HAD 24/24	20-00517	see drawing											

Low Frequency Mountings

Features

These anti-vibration mountings are designed to give large deflection for small loads and are used to protect suspended equipment against vibration and impact.

Low Frequency Mountings are available in three sizes and two grades of rubber hardness.

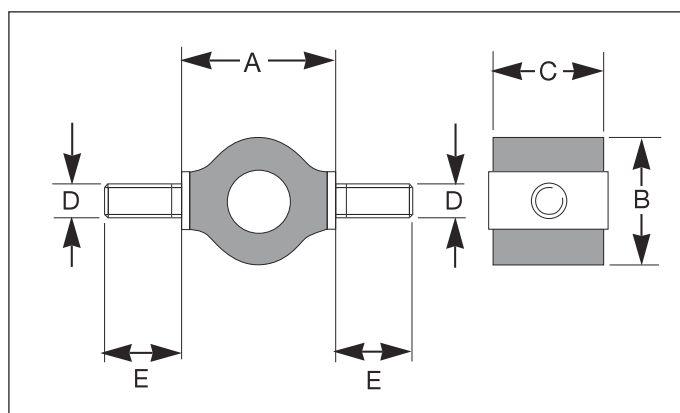
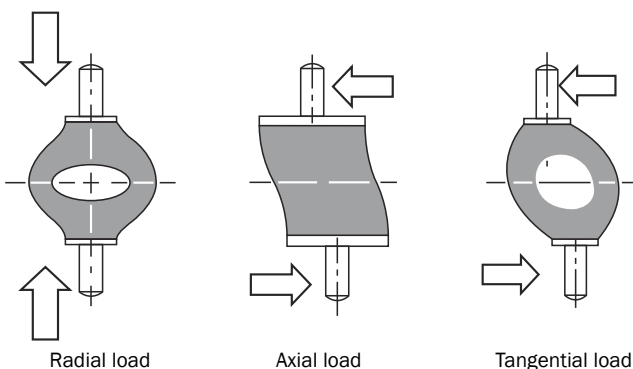


Novibra® type Low Frequency Mountings

Novibra® type Low Frequency are designed for shear as well as compressive loads. Continual tensile load should be avoided.

Ideal for applications as:

- ▼ Light instruments
- ▼ Light fans and compressors
- ▼ Computer and electronic units
- ▼ Shock mounting for light applications

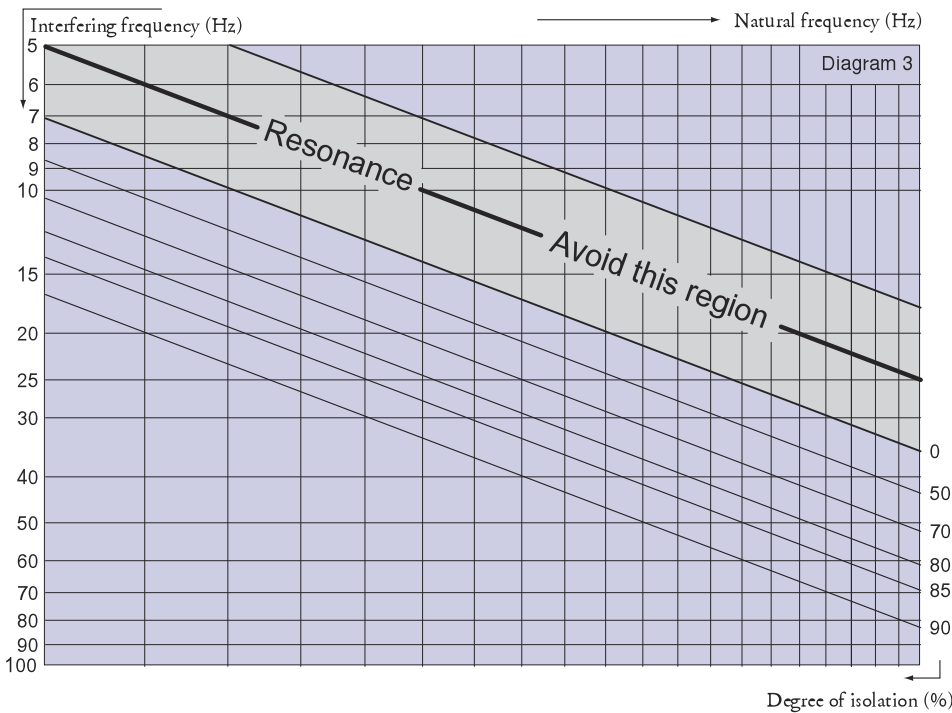
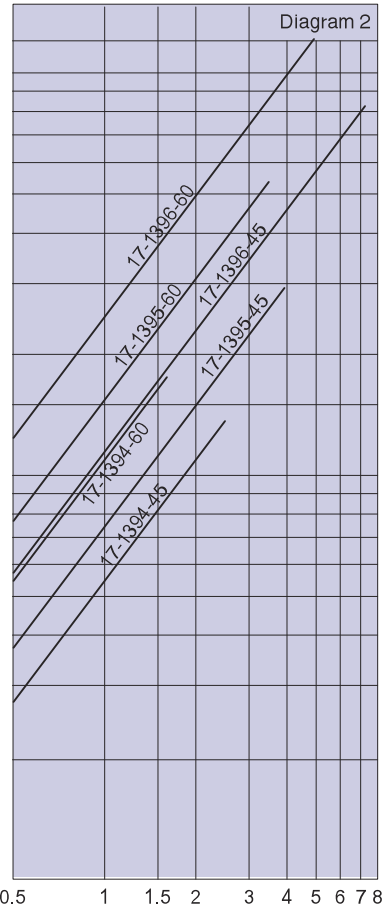
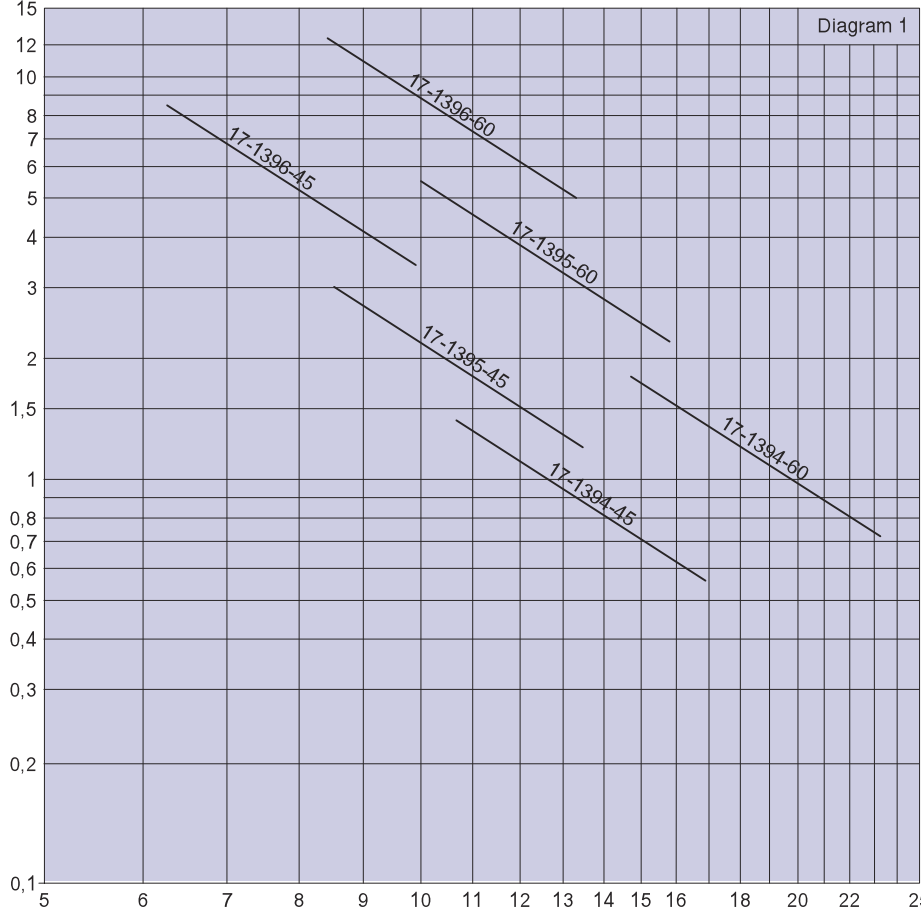


Drawing no.	Part no.		Dimensions in mm					45° IRH Max Load			60° IRH Max Load		
	45° IRH	60° IRH	A	B	C	D	E	Radial(N)	Axial(N)	Tangential(N)	Radial(N)	Axial(N)	Tangential(N)
17-1394	20-00017	20-00018	17	14	13	M4	10	14	4	2,5	18	5	3,5
17-1395	20-00020	20-00021	30	25	19	M5	14	30	10	8	55	15	15
17-1396	20-00022	20-00023	38	35	25	M6	15	85	30	25	125	45	35

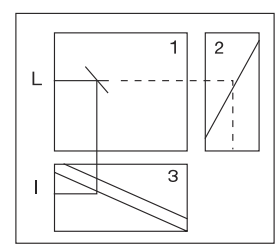
Low Frequency Mountings

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz)
 (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.



Features

Novibra® type MTM is specifically designed to give large deflection at low loads. Although the mount design allows high deflection, the mountings are compact in weight and easy to install.

Its unique construction and the latest production methods make Novibra® type MTM a high performance antivibration mounting having a number of advantages:

- ▼ Tight tolerances on dynamic stiffness rate for accurate vibration calculations.
- ▼ Wide load rating options, 3.5–2500 kg.
- ▼ Corrosion protected to cope with arduous environments on land or marine applications (Fe/Zn8C2 as per ISO 2081).
- ▼ Clear and durable product marking so that mountings can be identified even after several years in operation.

When using MTM mount together with the height adjuster HA, it is necessary to use a washer. The diameter of the washer must be 20% larger than the diameter of the upper plate (D).

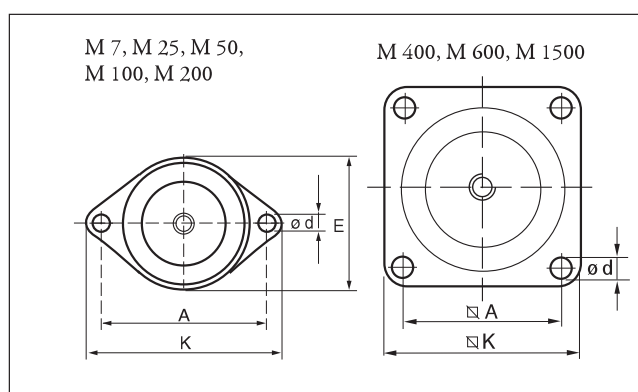
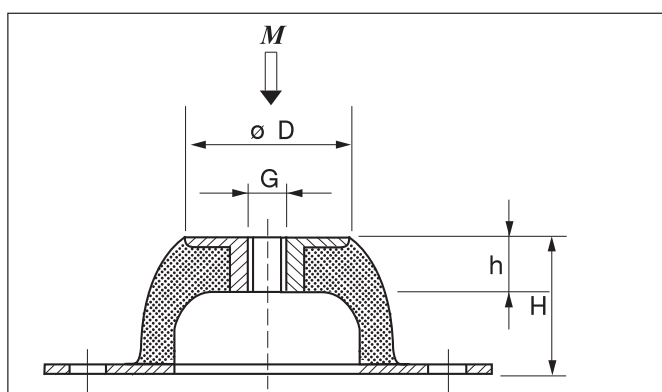
Specific fields of application are:

- ▼ Fans
- ▼ Pumps
- ▼ AC-units
- ▼ Ventilators
- ▼ Refrigerators
- ▼ Compressors
- ▼ Electric motors
- ▼ Weighing scales
- ▼ Test cell equipment
- ▼ Vibratory screens
- ▼ Noise control units
- ▼ Packaging application
- ▼ Food processing equipment
- ▼ Powder handling machinery



Novibra® type MTM

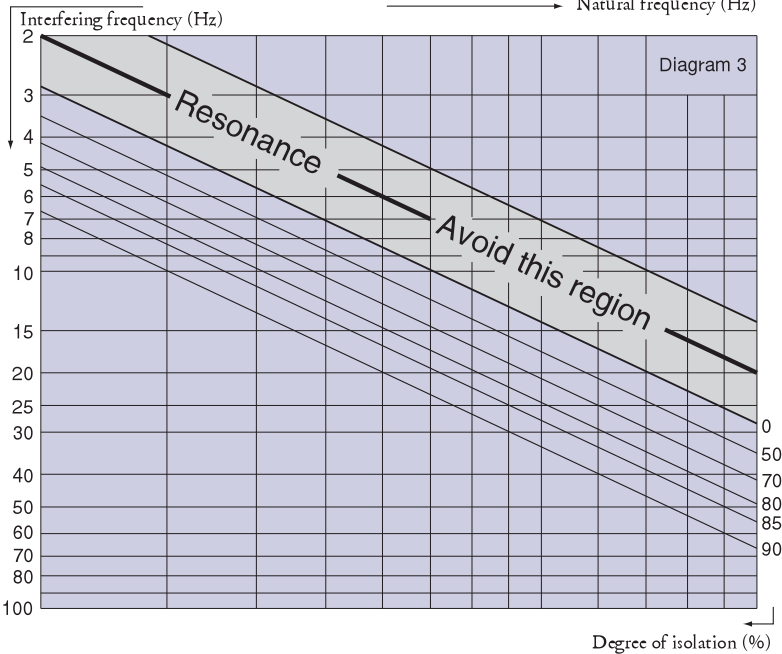
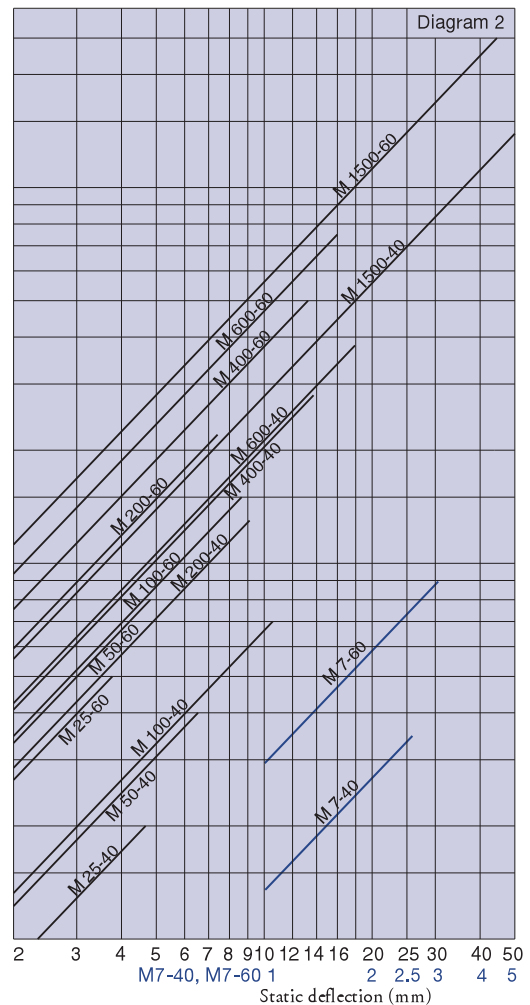
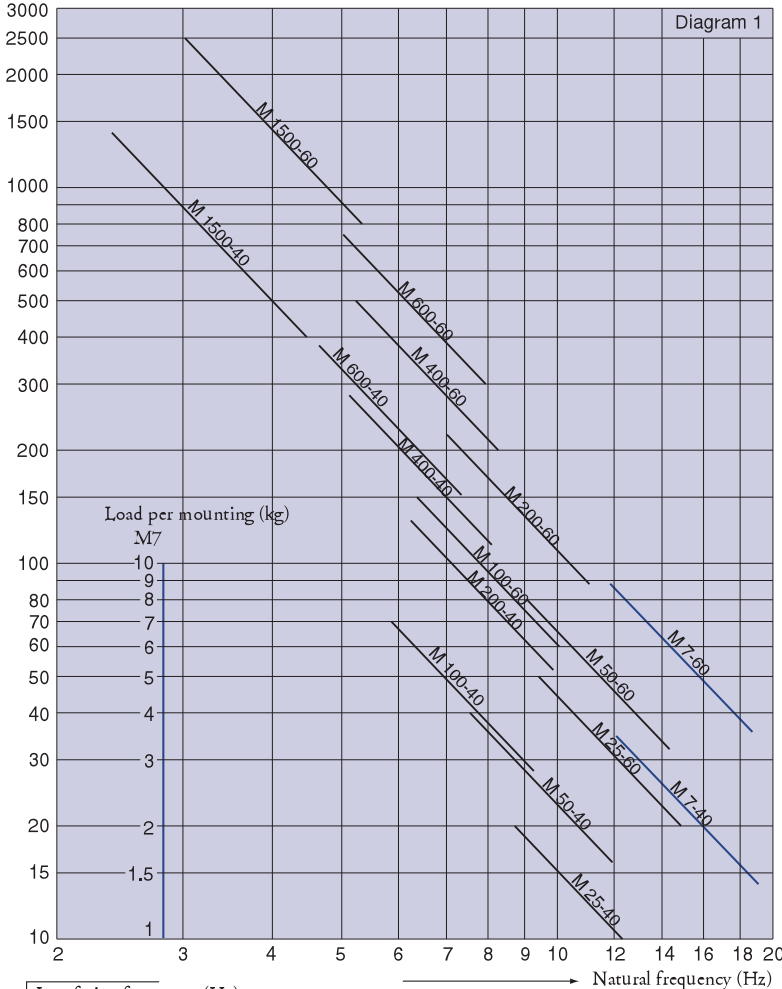
Type MTM is ideal for applications involving isolation of low frequency vibrations in all planes. Also suitable for shock attenuation due to the designed ability to offer large deflection. Provides passive vibration isolation on electronic instruments, measuring equipment and test cells.



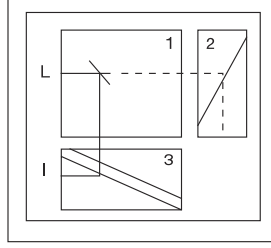
Type	Part no.		Dimensions in mm								M-Max(Kg)		Weight (Kg)
	40° IRH	60° IRH	D	E	A	K	H	h	d	G	40° IRH	60° IRH	
M7	10-00139	10-00140	18	43	50	64	20	7	7,0	M6	3,5	9	0,02
M25	10-00094	10-00095	33	56	66	85	25	11	8,0	M8	20	50	0,07
M50	10-00096	10-00097	45	76	92	114	35	14	10,0	M10	40	80	0,16
M100	10-00100	10-00099	53	96	110	136	40	15	11,5	M10	70	150	0,26
M200	10-00102	10-00103	58	101	124	151	45	13	11,5	M10	130	220	0,42
M400	10-00104	10-00105	78		120	150	63	18	14,5	M12	280	500	1,06
M600	10-00080	10-00081	100		160	200	85	25	14,5	M16	380	750	2,35
M1500	10-00082	10-00083	186		250	310	160	43	18,0	M24	1400	2500	9,43

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg) M25 - M1500



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz) (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.



Features

The MDS™ mounting is easy to install based on a 2 part single bolt installation. There is no requirement for radius or chamfered installation hole and a steel flange prevents rubber wear at the bracket interface. The bonded steel snubbing cup limits vertical movements and prevents excessive strain in rubber. The cup is encapsulated in rubber to prevent corrosion.

A rubber rim holds the lower mount half in the hole during assembly.

- ▼ Vertical dynamic snubbing +/- 6 mm.
- ▼ Horizontal dynamic snubbing +/- 3 mm.
- ▼ Static vertical load range 70-200 kg.
- ▼ Deflection at max static load 2.5 mm.
- ▼ Axial to radial stiffness ratio 1.5:1.

TYPICAL STATIC AXIAL (VERTICAL) STIFFNESS MDS 80/3820

(Assembled in pairs, with upper and lower washers 19-20 mm thick plate, 38 mm dia. hole)

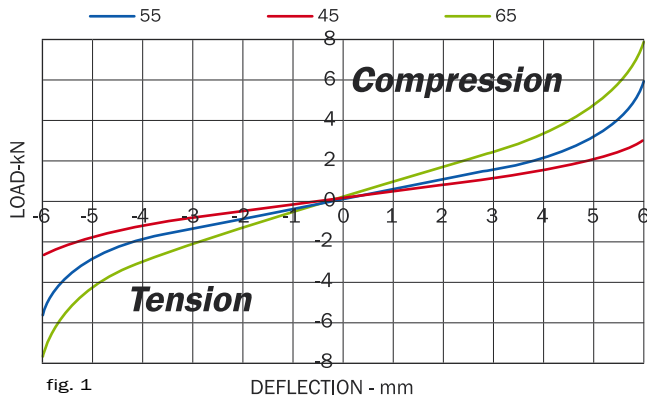


fig. 1

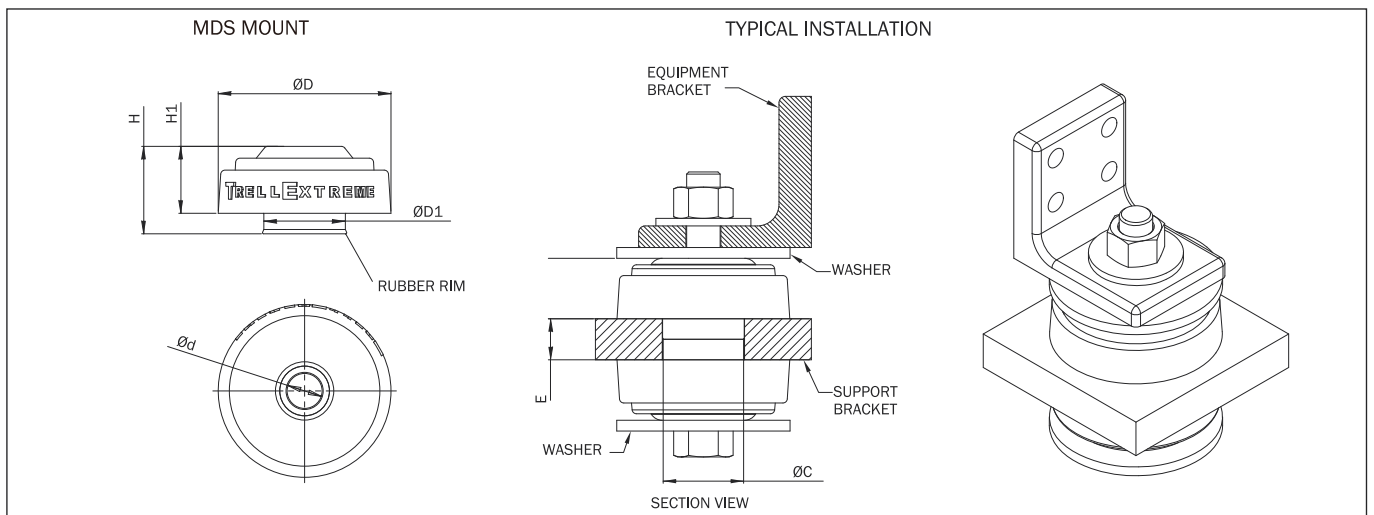


Trellextreme® type MDS™

The MDS™ mounts is designed to take high dynamic shock loads but to limit mount movements in all directions, MDS™=Multi Directional Snubbing.

In the static working load range, the MDS™ mounts have linear stiffness characteristics allowing easy prediction of mount deflection and isolation performance. (see fig. 1)

- ▼ Typical applications:
Engines and small cabs on off-highway vehicles.

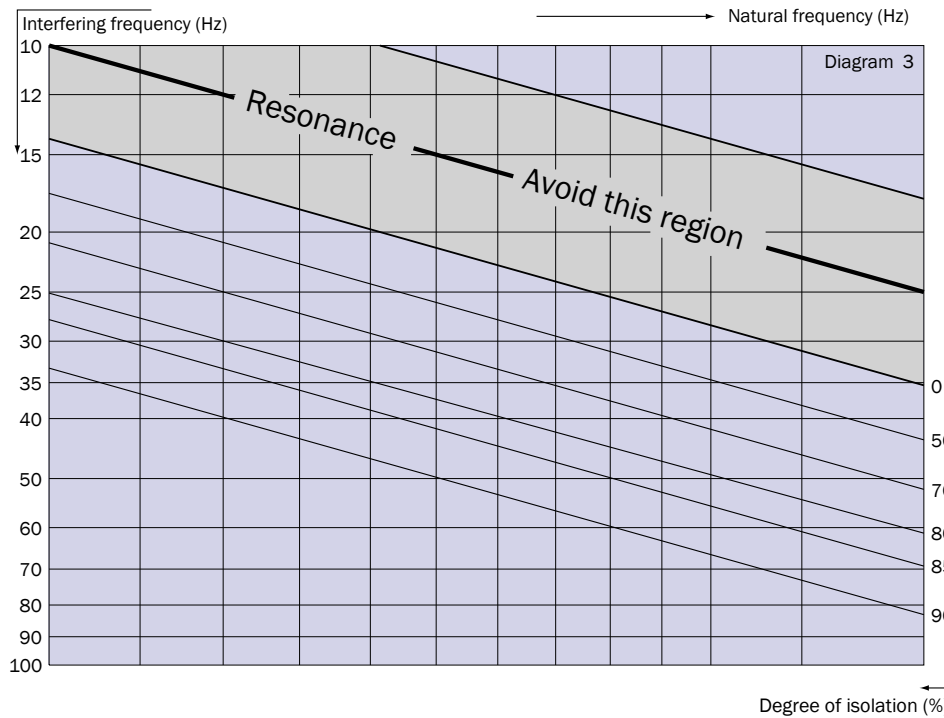
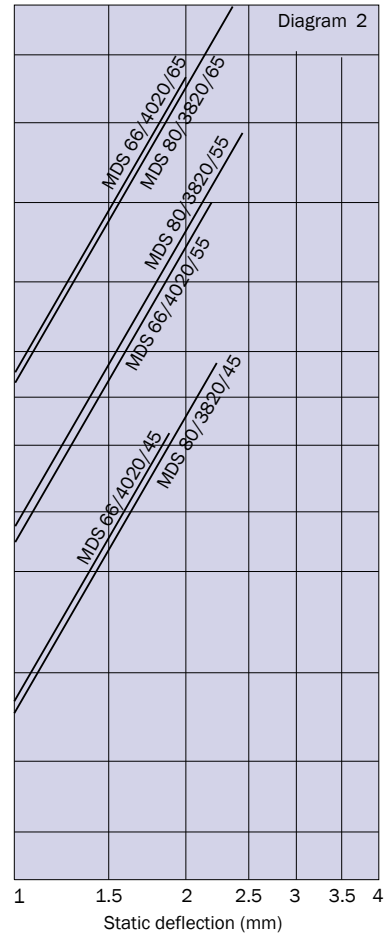
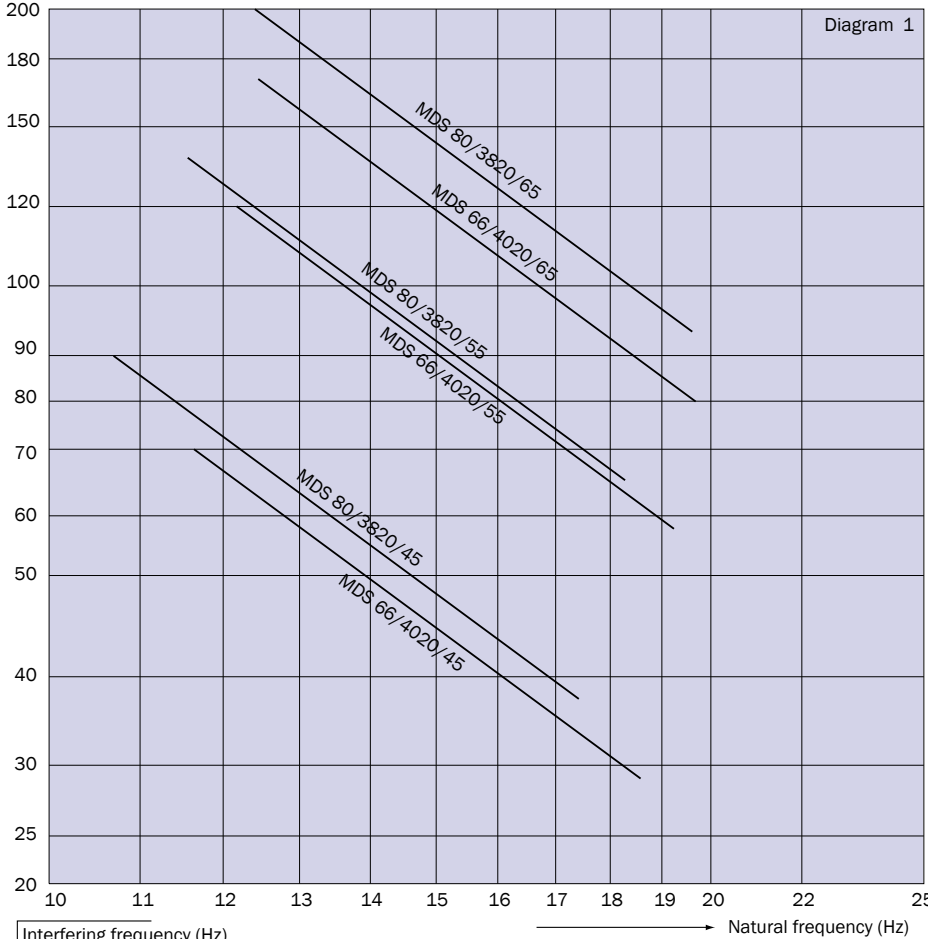


See below table showing principal sizes and models. Part listed are a selection of a wider range, details of which are available on request. Please contact our Off Highway Applications department for further advise. More product and model information are available upon request.

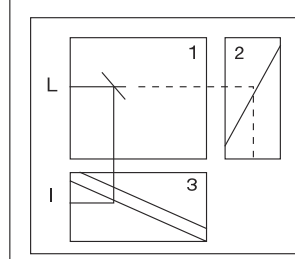
Type	Drawing no.	Part no.	Dimensions in mm							Bolt Size	Max. Bolt Torque(Nm)	Max Load (Kg)
			d	D	D1	H	H1	C	E			
MDS80-45	17-2280	10-01802	16,2	80	37,8	40,5	31	38	19/20	M16	240	90
MDS80-55	17-2280	10-01803	16,2	80	37,8	40,5	31	38	19/20	M16	240	140
MDS80-65	17-2280	10-01804	16,2	80	37,8	40,5	31	38	19/20	M16	240	200
MDS66-45	17-2243	10-01799	18,8	66	39,8	38	28,5	40	19/20	M16	240	70
MDS66-55	17-2243	10-01800	18,8	66	39,8	38	28,5	40	19/20	M16	240	120
MDS66-65	17-2243	10-01801	18,8	66	39,8	38	28,5	40	19/20	M16	240	170

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz)
 (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3.
 The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.



Metaxentric™ Bushes

Features

Metaxentric™ bushes have a large rubber section with the central pin offset towards one radial plane. These bushes can provide a relatively large radial deflection, but have excellent motion control characteristics.

The Metaxentric™ bush has the following features:

- ▼ Three dissimilar translational stiffnesses for the best vibration isolation and motion control.
- ▼ Load range from 135 to 480 kg.
- ▼ 'Rising rate' stiffness characteristics for overload conditions help to limit motion and transmitted acceleration.
- ▼ Robust and fail-safe, suitable for ROPS and FOPS cab structures.
- ▼ Simple to fit, the housing lends itself to robust structures.



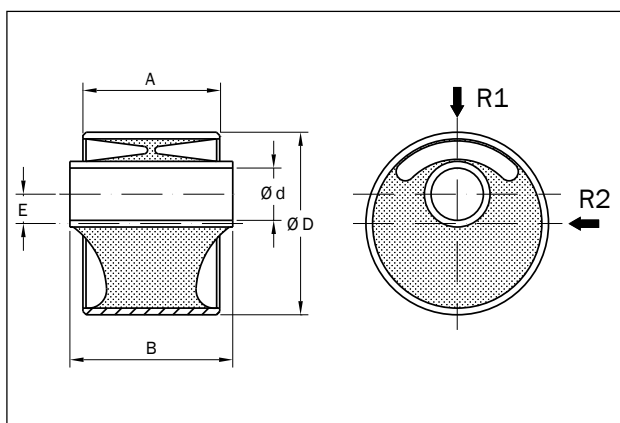
Metalastik® type Metaxentric™ Bushes

Similar to conventional Ultra Duty Bushes but with inner and outer sleeves offset radially. This feature provides a greater rubber thickness and hence increased flexibility in the normal direction of loading while maintaining control in other modes and still allowing torsional movement.

The rubber section is relieved to eliminate harmful tensile stresses.

Applications:

- ▼ Vehicle spring eye mounting
- ▼ Tilt Cab pivot bush
- ▼ Engine mounting



Drawing no.	Part no.	Dimensions in mm					Radial Properties			Weight (Kg)	
		d	D	A	B	E	Stiffn (N/mm)	Direction R1 Max Defl. (mm)	Direction R2 Max Load(Kg)		Direction R2 Stiffn (N/mm)
13-1270	10-00252	16	47,6	50,8	63,5	7,1	675	2	135	1600	0,18
13-2174	10-00297	24	75,3	20,8	70	10,5	910	3,5	318	1200	0,59
13-1165	10-00244	25,4	88,9	66,7	79,4	14,3	475	3,8	180	640	0,86
13-1165	10-00245	25,4	88,9	66,7	79,4	14,3	900	3,8	340	990	0,86
13-1355	10-00263	43,7	101,6	63,5	72,4	9,5	1300	3,5	482	2200	0,86

Metacone™ & HK™



Metalastik® type Metacone™

Novibra® type HK™

A range of mountings designed for high load capacity with relatively large static deflections. The high loading for a given size is achieved by utilising the rubber to best advantage in shear and compression. Normally, mountings are assembled with overload and rebound washers to control and limit movement of the suspended equipment under shock loads. Centre fixing bolts should be torque tightened to the recommended values.

Applications include suspensions for:

- ▼ Off-road and road vehicle engines
- ▼ Vehicle Cabs
- ▼ Oil Tanks/Tankers
- ▼ Mobile applications

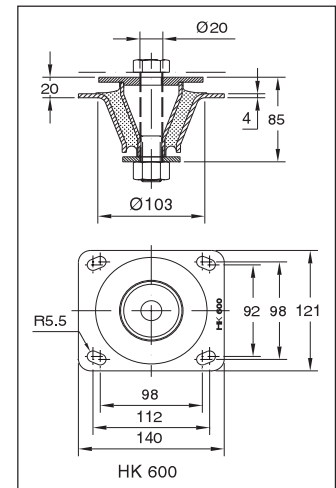
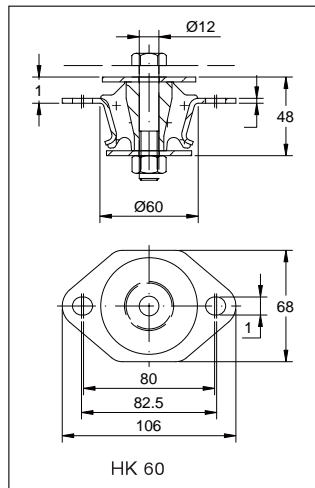
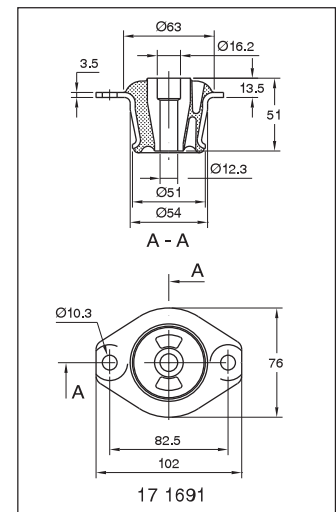
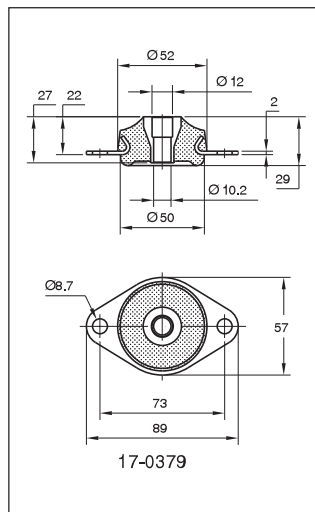
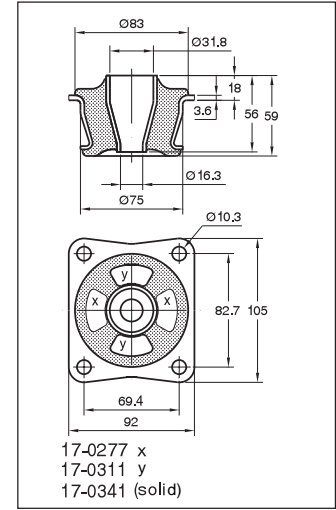
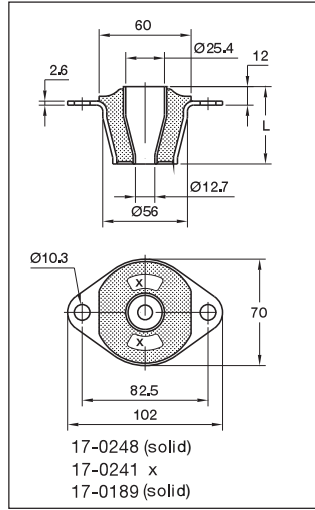
Drawing no. Metacone™	Part no.	Max vert. Load (Kg)	Weight (Kg)
17-0189	10-00365	145	0,28
17-0189	10-00367	400	0,28
17-0241	10-00374	62	0,18
17-0241	10-00375	122	0,18
17-0248	10-00379	95	0,19
17-0248	10-00380	190	0,19
17-0277	10-00385	125	0,56
17-0277	10-00387	230	0,56
17-0379	10-00402	35	0,12
17-0379	10-00404	70	0,12
17-0341	10-00394	160	0,54
17-0341	10-00395	300	0,54
17-0341	10-00396	430	0,54
17-0311	10-00391	125	0,58
17-0311	10-00392	220	0,58
17-1691	10-00566	72	0,44
17-1691	10-00567	144	0,44
HK			
HK60-40	10-01119	90	0,24
HK60-50	10-01122	115	0,24
HK60-60	10-01120	180	0,24
HK60-70	10-01121	250	0,24

Features

A compact fail safe design, available for a wide range of loadings with in some cases alternative fixings.

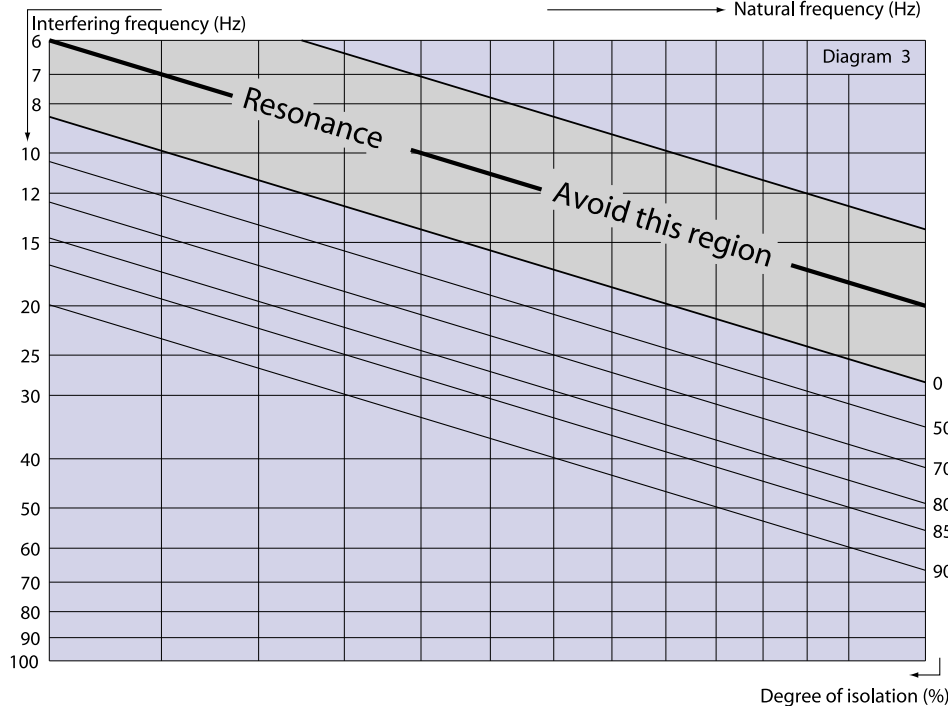
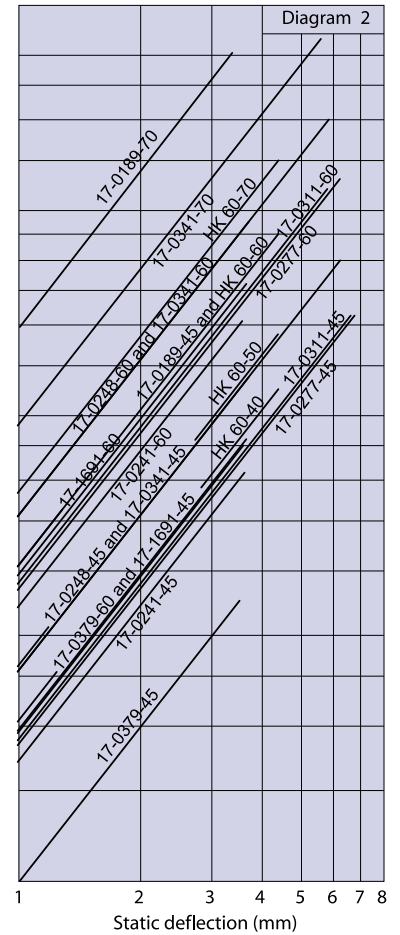
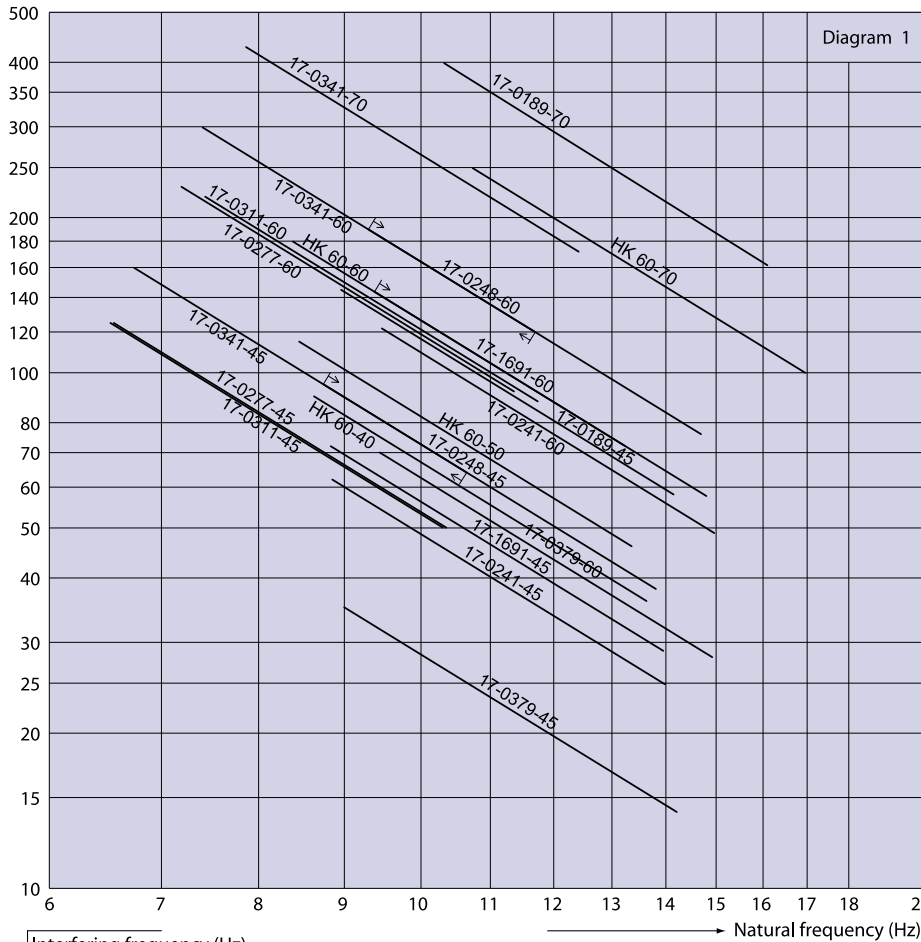
Cutouts in rubber section on various sizes provide different vertical/horizontal stiffness ratios.

Most sizes can be supplied complete with overload and rebound washers.

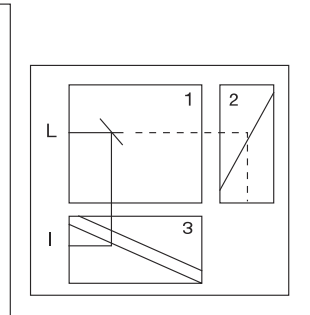


Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



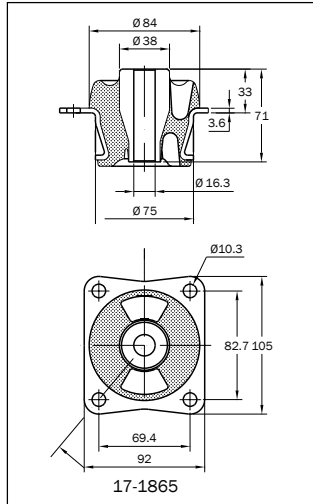
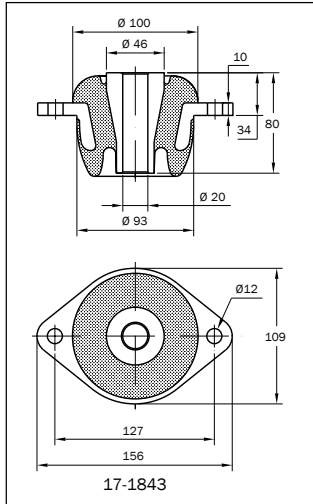
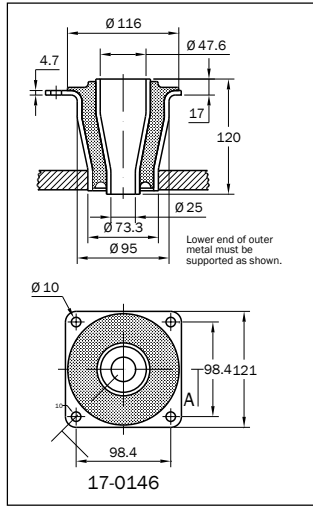
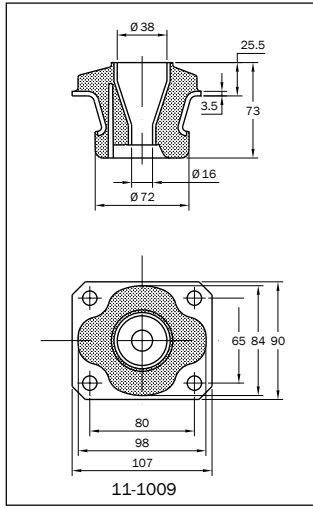
To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz) (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.





TRELLEBORG

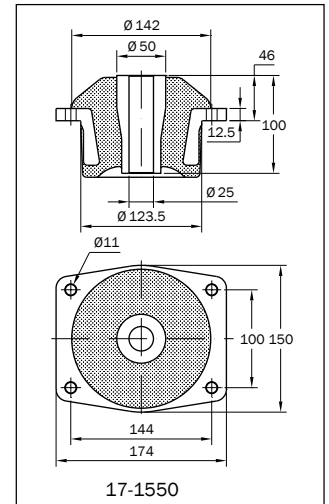
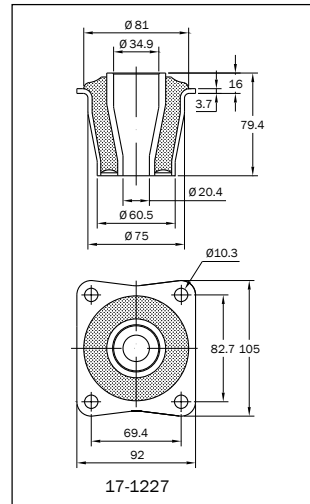
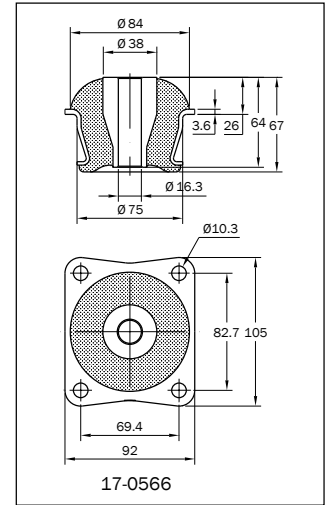
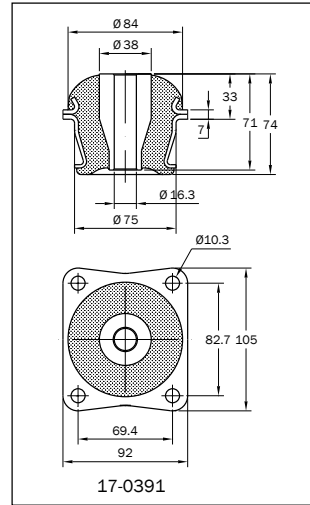
Metacone™ & HK™



Drawing no. Metacone™	Part no.	Max vert. Load (Kg)	Weight (Kg)
11-1009	10-00192	140	0,59
11-1009	10-00193	200	0,59
17-0391	10-00411	290	1,1
17-0391	10-00414	500	1,1
17-0391	10-00415	610	1,1
17-0566	10-00433	200	0,82
17-0566	10-00434	380	0,82
17-0566	10-00435	525	0,82
17-1227	10-00459	560	1,1
17-1227	10-00460	1000	1,1
17-1550	20-02522	720	4,4
17-1550	20-02523	1250	4,4
17-1843	20-02529	320	1,7
17-1843	20-02530	600	1,7
17-1865	10-00615	180	0,86
17-0146	10-00360	950	2
17-0146	10-00361	1700	2
HK™			
HK600-40	10-00190	940	1,0
HK600-60	10-00191	1700	1,0



Metacone™ & HK™

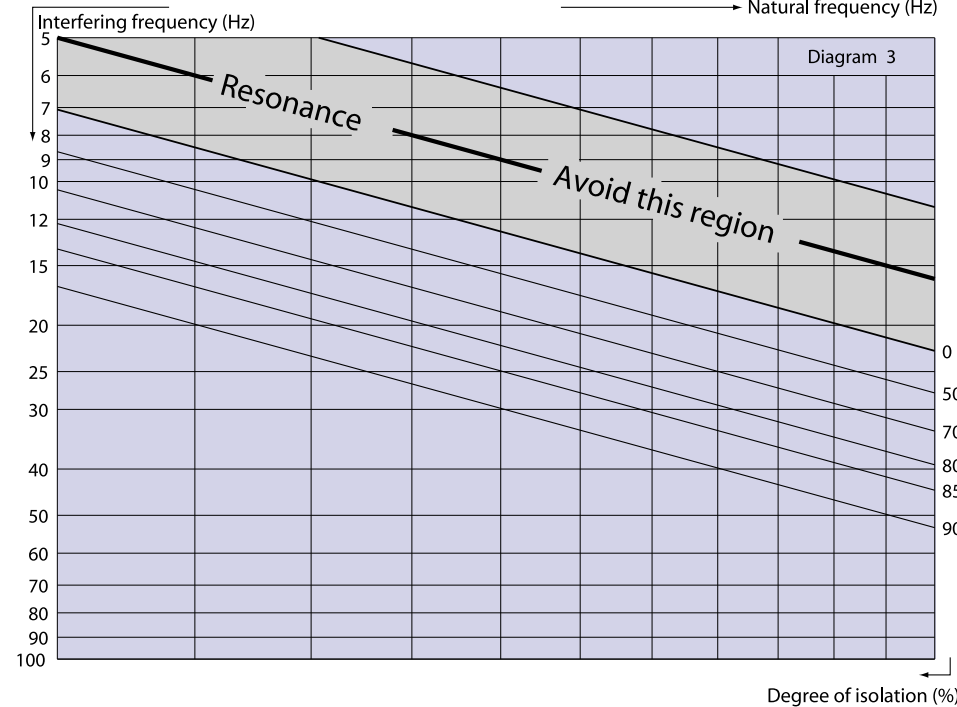
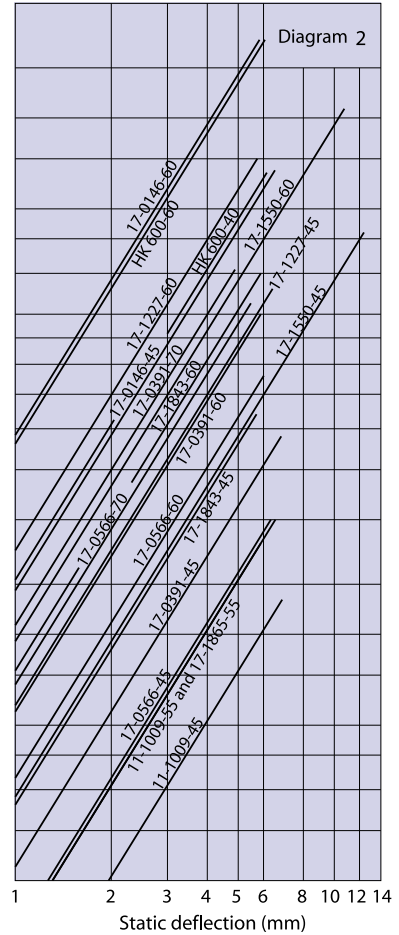
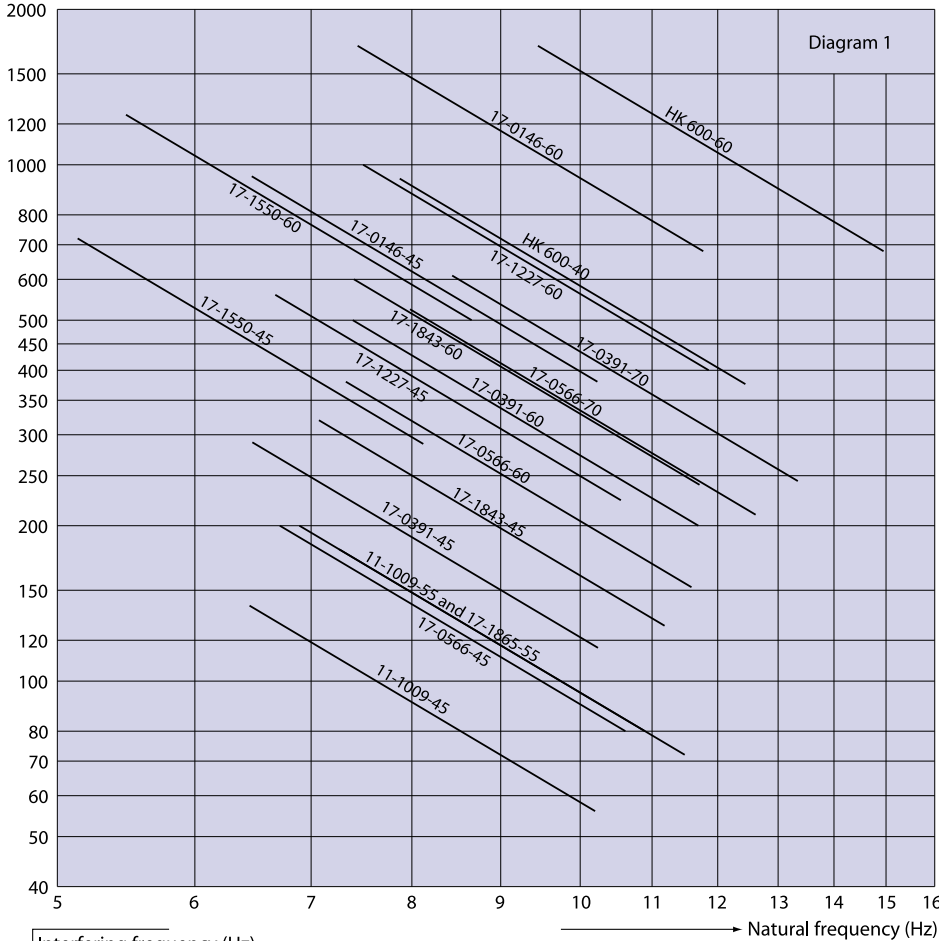


Drawing no. Metacone™	Top Washer Part no.	Bottom Washer Part no.
17-0189	20-00529	10-03666
17-0241	20-00529	10-03666
17-0248	20-00529	10-03666
10-0277	20-00773	20-00532
17-0379	20-00531	20-00531
17-0341	20-00773	20-00532
17-0311	20-00773	20-00532
17-1691	20-00535	20-00536
11-1009	20-00532	20-00532
17-0391	20-00532	20-00532
17-0566	20-00532	20-00532
17-1227	20-00528	10-03707
17-1550	20-02818	20-00534
17-1843	20-00533	20-00533
17-1865	20-00532	20-00532
17-0146	20-00527	10-03862
HK™		
HK60	20-01103	20-00416
HK600	20-00643	20-00644

Metacone™ & HK™

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



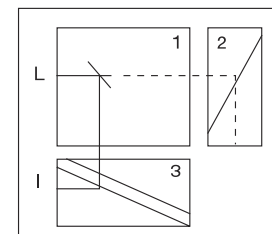
To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz)
(Hz = rpm / 60)

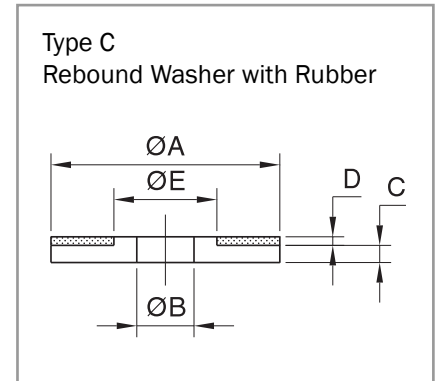
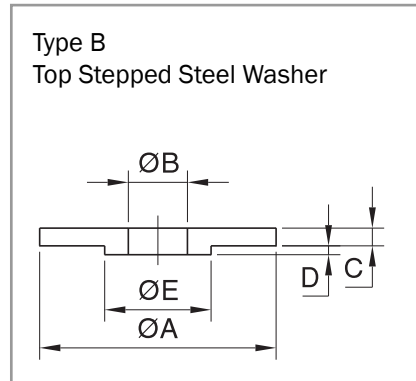
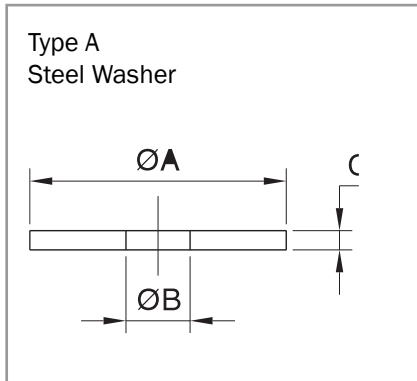
Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.

Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.

For static deflection, see diagram 2.



Metacone™ & HK™ Washer



Recommended tightening torque for center fixing bolts	
Thread Size	Torque (Nm)
M10	25
M12	40
M16	60
M20	120
M24	200

Top and bottom washers

Overload and rebound washers (top and bottom) are necessary to limit maximum movement in the event of shock loading.

Designation	Drawing no.	Part no.	Model	Dimensions in mm				
				A	B	C	D	E
Washer 50*12C	15-0286	10-03666	C	50	12	3	3	28,5
Washer 95*24C	15-3526	10-03862	C	95	2,5	8	6	38
Washer 67,5*20C	15-3528	10-03707	C	67,5	20	5	5	30
Washer 116*24B	18-0146C	20-00527	B	116	24	8	4	47
Washer 80*20B	20-0562N	20-00528	B	80	20	6	3	34,5
Washer 55*12B	18-0241D	20-00529	B	55	12	5	2,5	25
Washer 80*16B	18-0311B	20-00773	B	80	16	6,5	3	31,5
Washer 50*10A	18-0379C	20-00531	A	50	10	4		
Washer 80*16A	18-0391C	20-00532	A	80	16	5		
Washer 100*20A	18-1101C	20-00533	A	100	20	6		
Washer 139*24A	18-1550C	20-02818	A	139	24	10		
Washer 55*12A	18-0472C	20-00535	A	55	12	5		
Washer 51*16A	18-0472D	20-00536	A	51	16	4		
Washer 57*12A	20-0562K	20-01103	B	57	16	3	1,5	22
Washer 52*12A	20-0562B	20-00416	A	52	16	3		
Washer 110*20B	20-0562C	20-00643	B	110	20	5	3	52,5
Washer 55*20A	20-0562D	20-00644	A	55	20	5		

Drawing no. Metacone™	Cone Mount	Top Washer Part no.	Bottom Washer Part no.
	17-0189	20-00529	10-03666
	17-0241	20-00529	10-03666
	17-0248	20-00529	10-03666
	10-0277	20-00773	20-00532
	17-0379	20-00531	20-00531
	17-0341	20-00773	20-00532
	17-0311	20-00773	20-00532
	17-1691	20-00535	20-00536
	11-1009	20-00532	20-00532

Drawing no. Metacone™	Cone Mount	Top Washer Part no.	Bottom Washer Part no.
	17-0391	20-00532	20-00532
	17-0566	20-00532	20-00532
	17-1227	20-00528	10-03707
	17-1550	20-02818	20-00534
	17-1843	20-00533	20-00533
	17-1865	20-00532	20-00532
	17-0146	20-00527	10-03862
HK™	HK60	20-01103	20-00416
	HK600	20-00643	20-00644

Novibra® AV Plate



Features

The AV Plate, made of oil and grease resistant rubber material, is available either as a single (4.5 mm) or as a double (8 mm) version.

The single version has ribs on one side only, while the double has ribs on both sides applied at a 90 degree angle to each other.

Good performance is obtained when using the Novibra® AV Plate in the building and construction industry as support pads between flooring and joists. This application provides for cushioning of loads and isolation of high frequency vibrations within the building.

Novibra® type AV Plate

The Anti-Vibration Plate is intended, primarily, for applications with low requirement for vibration isolation.

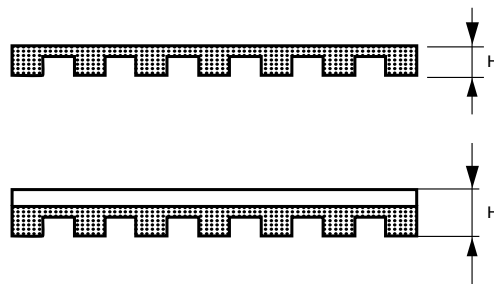
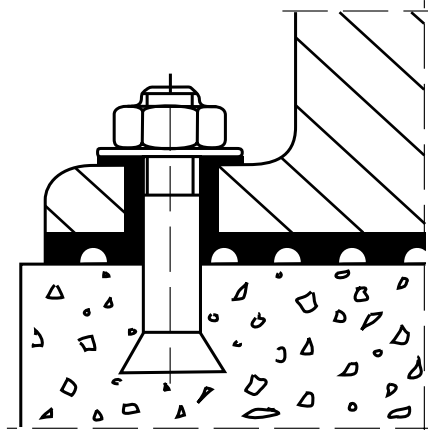
Typical installations are machinery generating vibrations in the high frequency range, and tall unstable installations, requiring secure attachments to the foundation. If insufficient deflection is achieved with a single layer, multiple layers can be used by separating each layer with a weight distributing steel plate.

In order to avoid direct contact between machine and foundation, a rubber bushing (e.g. rubber hose) should be installed in the mounting holes prior to installation of bolt and rubber washer.

Please see "Mounting instructions" on this page.

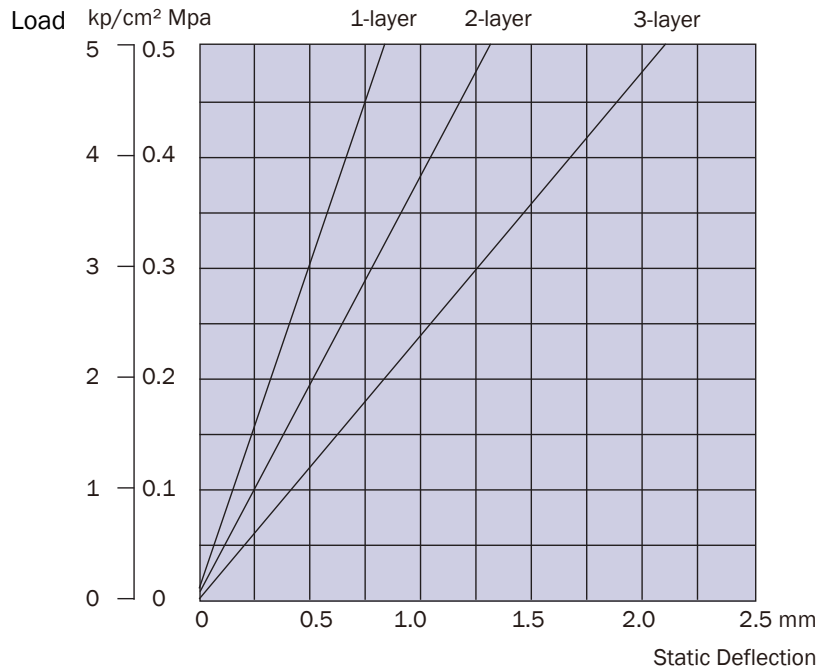
Suitable applications are:

- ▼ Pillar drills
- ▼ Transformers
- ▼ Large pumps
- ▼ Industrial fans
- ▼ Printing presses
- ▼ Textile machinery
- ▼ Large forging presses
- ▼ Horizontal drill presses

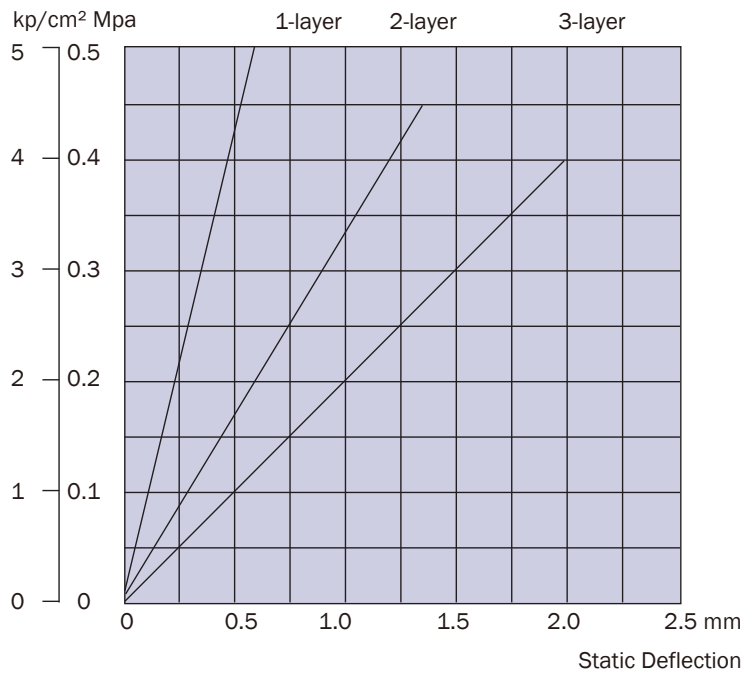


Type	Drawing no.	Part no.	Dimensions in mm L*B	Height H (mm)	M-Max Load (Kg/cm ²)	Weight (Kg)
Single Plate	15-4039	10-00019	600*500	4,5	5	1,21
Double Plate	15-4038	10-00020	600*500	8	5	1,82
AV Double Plate	15-4057	20-01798	500*500	8	5	1,51
AV Double Plate	15-4080	20-01667	500*500	10	5	1,89

Single Novibra® AV Plate



Double Novibra® AV Plate



RA™ & Failsafe EF™



Features

RA™ and EF™ uses the rubber profile in shear and compression, obtaining good vertical flexibility with the advantage of horizontal stability.

For normal speeds of approx. 1500 rpm, the RA™ and EF™ type provides a degree of isolation of 75-85%. For better isolation, the alternative RAEM™ or M™ can be chosen.

Its unique construction and the latest production methods make Novibra® type RA™ and EF™ a high performance mounting having a number of advantages:

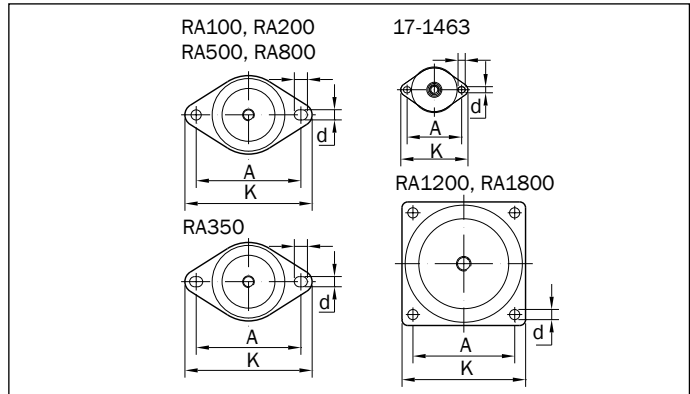
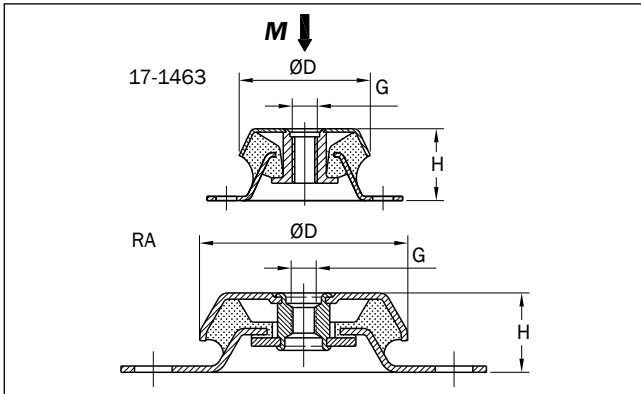
- ▼ Rubber features are utilised effectively combining compression and shear.
- ▼ Wide load rating options, 40-2100 kg.
- ▼ Corrosion protected to cope with arduous environments on land or marine applications (Fe/Zn8C as per ISO 2081).
- ▼ Fitted as standard with an integral fail-safe design device with resilient stop, making RA and EF ideal for use in mobile applications. The RA™/EF™ mounts can accommodate occasional shock loads. The mount will withstand shock loads up to 2 g without plastic deformation.
- ▼ Clear and durable product marking so that mountings can be identified even after several years in operation.
- ▼ Domed shape cover to protect against oil contamination.

Novibra® type RA™ Metalastik® type Failsafe EF™

For effective isolation of vibration and noise on machines with rotating movements, the product can be applied to:

- ▼ Pumps
- ▼ Fans
- ▼ Converters
- ▼ Compressors
- ▼ Combustion engines
- ▼ Industrial and Marine gensets
- ▼ Generators

Also suitable for use with presses, punches and other work shop machines.

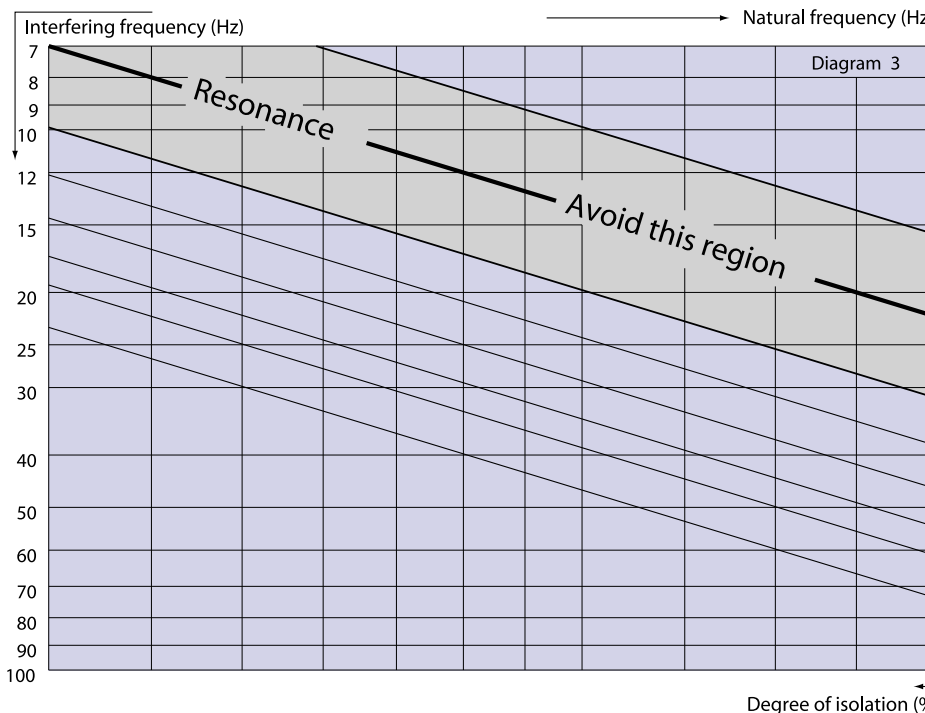
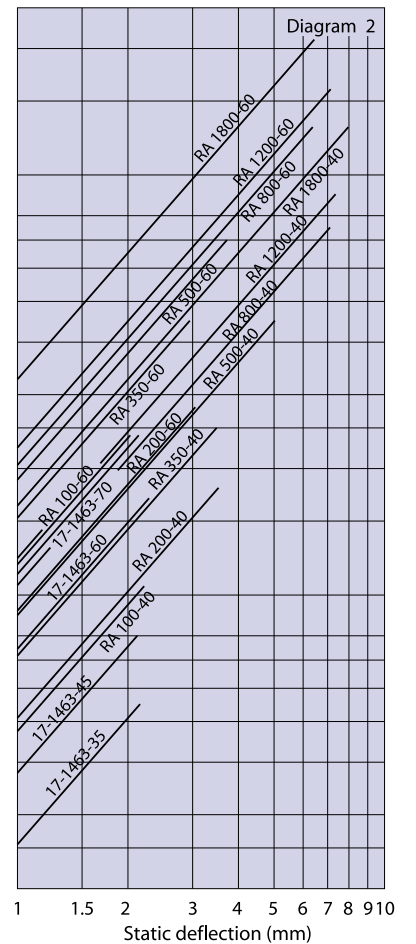
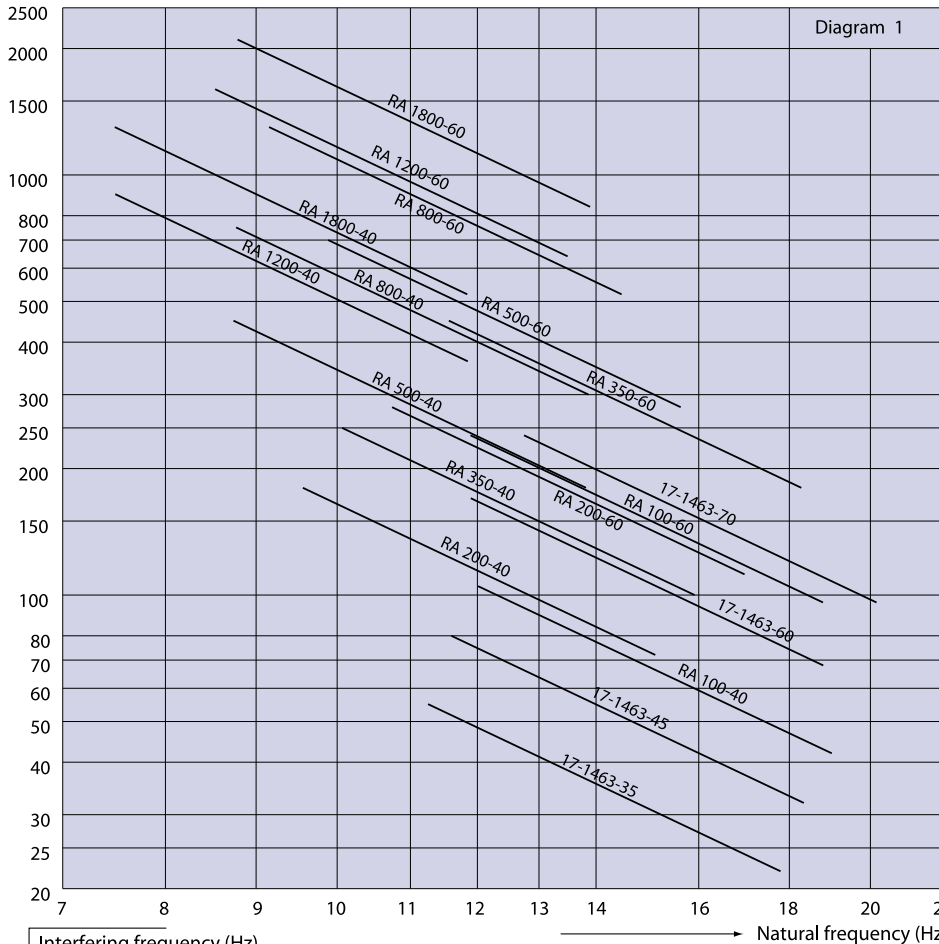


Type	Part no.		Dimensions in mm							M-Max (Kg)		Weight (Kg)	
	40°IRH	60°IRH	D	A	H	K	d	L	G	40°IRH	60°IRH		
17-1463-35		10-00503									55		0,22
17-1463-45		10-00504	65	76,2	35	94	8,5	10	M12		80		0,22
17-1463-60		10-00505									170		0,22
17-1463-70		10-00506									240		0,22
RA100/M10	10-00106	10-00107	79	110	30	130	9	12	M10	105	240		0,33
RA100/M12	10-00166	10-00167	79	110	30	130	9	12	M12	105	240		0,33
RA200/M10	10-00110	10-00111	94	124	35	150	10	15	M10	180	280		0,47
RA200/M12	10-00165	10-00091	94	124	35	150	10	15	M12	180	280		0,47
RA350/M12	10-00172	10-00173	101	140-148	38	175	14	18	M12	250	450		0,74
RA350/M16	10-00112	10-00113	101	140-148	38	175	14	18	M16	250	450		0,74
RA500	10-00116	10-00117	123	158	42	192	14	18	M16	450	700		1,02
RA800	10-00118	10-00119	144	182	46	216	14	18	M16	750	1300		1,59
RA1200	10-00154	10-00155	161	140	58	170	14		M20	900	1600		2,19
RA1800	10-00156	10-00157	181	160	66,5	190	14		M20	1300	2100		2,33

RA™ & Failsafe EF™

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

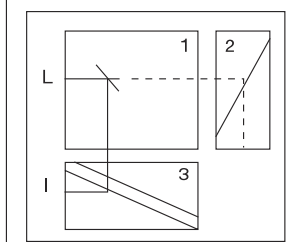
Load per mounting (kg)



To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz) (Hz = rpm / 60)

Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting. Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated. For static deflection, see diagram 2.



RAB™



Novibra® type RAB™

Effective isolation of vibration and noise on different machinery with rotating movements, e.g.

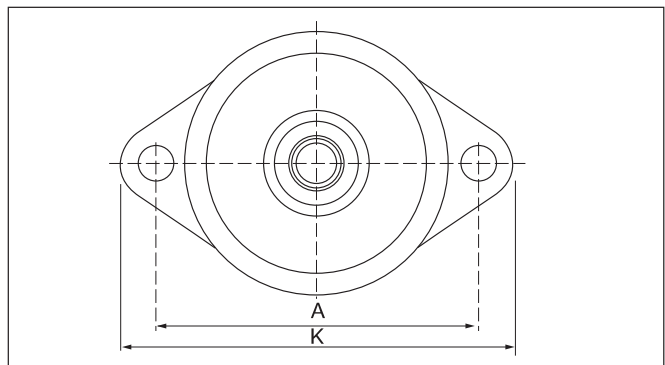
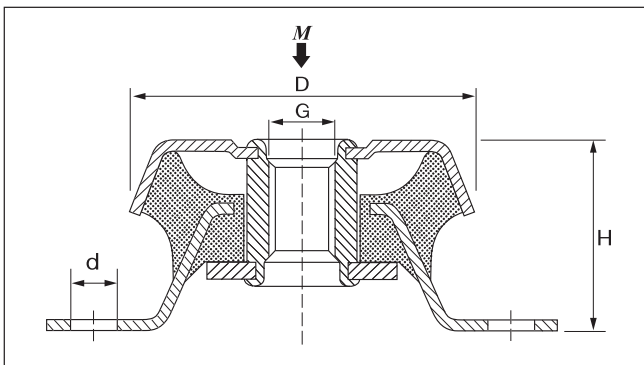
- ▼ Pumps
- ▼ Diesel engines
- ▼ Marine gensets
- ▼ Industrial gensets
- ▼ Emergency power packs

Features

Similar in design to the RA/RAEM range, type RAB uses rubber in shear and compression for optimum stiffness characteristics and horizontal stability. Especially effective on small 1, 2 and 3 cylinder diesel engines where the special compound employed provides effective isolation of vibration while eliminating much of the excessive movement normally associated with 1–3 cylinder engines.

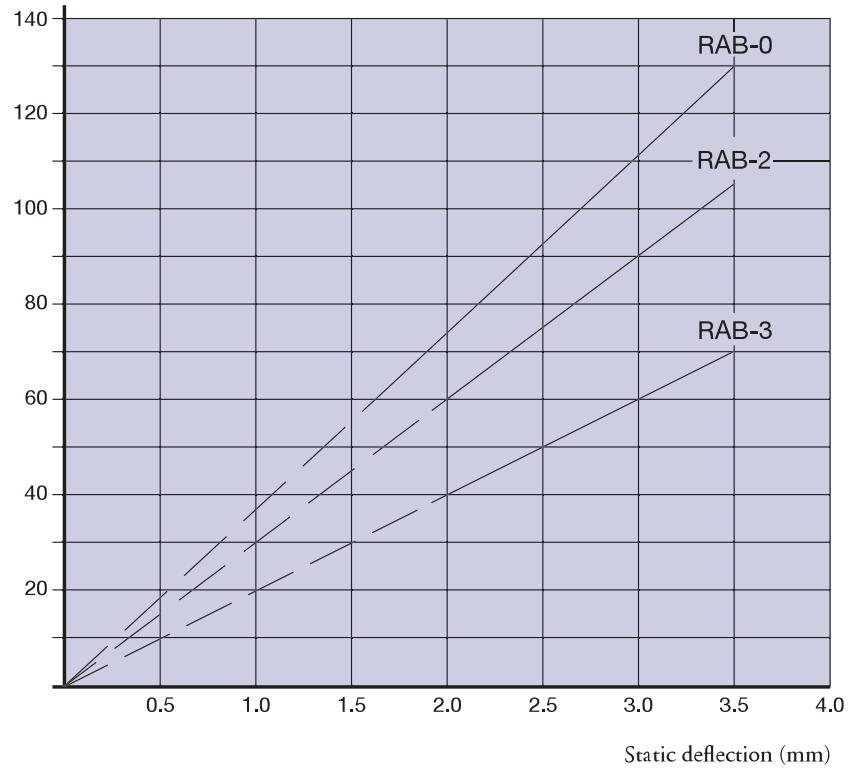
Its unique construction and the latest production methods make Novibra® type RAB a high performance mounting having a number of advantages:

- ▼ Rubber features are utilized effectively combining compression and shear.
- ▼ Tight tolerances on dynamic stiffness rate for accurate vibration calculations.
- ▼ Load rating options, 10-130 kg.
- ▼ Corrosion protected to cope with arduous environments on land or marine applications (Fe/Zn8C as per ISO 2081).
- ▼ Fitted as standard with a shock-proof device with resilient stop, ideal for mobile or marine use. The RAB mounts can accommodate occasional shock loads. The mount will withstand shock loads up to 2g without plastic deformation.
- ▼ Clear and durable product marking so that mountings can be identified even after several years in operation.
- ▼ Domed shape cover to protect against oil contamination.



Type	Drawing no.	Part no. 55°IRH	Dimensions in mm				M-Max (Kg)	Weight (Kg)		
			D	A	H	K				
RAB-0	17-4092	10-00178	63	76	35	93,5	8,5	M12	130	0,22
RAB-2	17-4141	10-00179	63	76	35	93,5	8,5	M12	105	0,22
RAB-3	17-4004	10-00180	63	76	35	93,5	8,5	M12	70	0,22

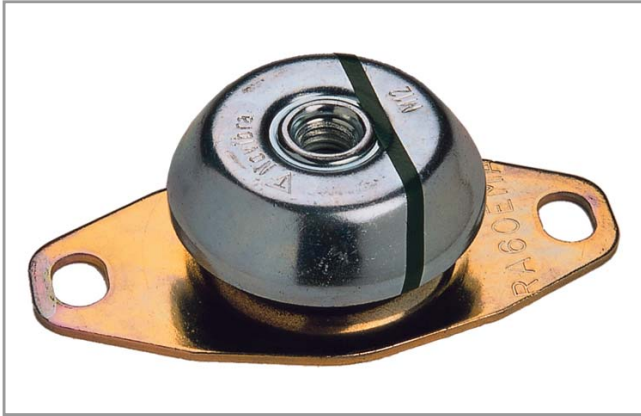
Load
per mounting (kg)



Fully approved by NATO and Europe's leading manufacturers of 1-2 and 3 cylinder versions of compact diesel engines.



Example of RAB installation on a 3 cylinder diesel engine power pack.



Features

RAEM is a universal mounting for applications demanding maximum isolation. It is a further development of RA™, where EM stands for “extra movement”. Suitable for both light and heavy machines.

For normal speeds of approx. 1500rpm the RAEM™ type provides a degree of isolation of 85-95%, and gives good isolation with low frequency machines.

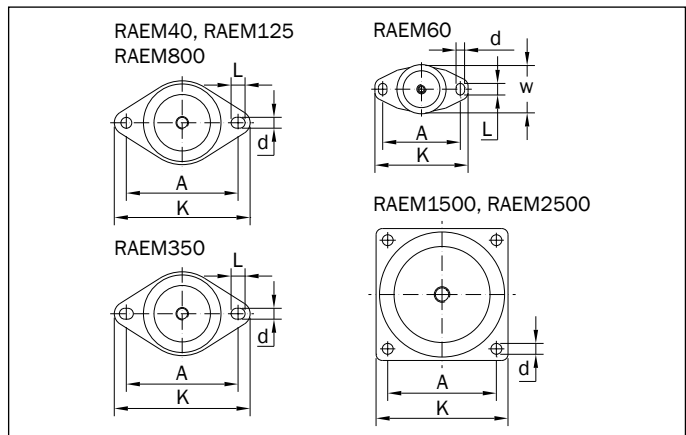
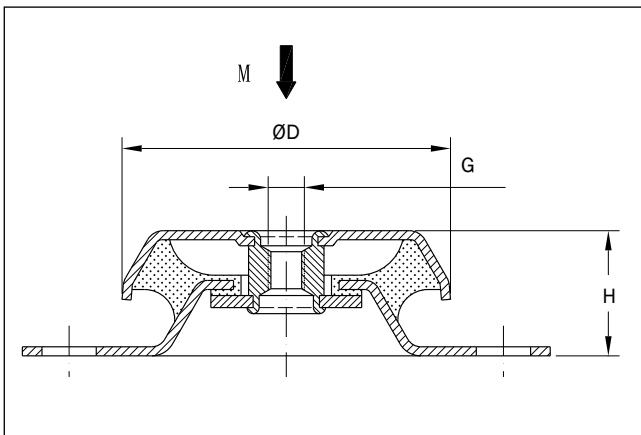
Its unique construction and the latest production methods make Novibra® type RAEM™ a high performance mounting having a number of advantages:

- ▼ Rubber features are utilised effectively combining compression and shear.
- ▼ Wide load rating options, 10-3400kg.
- ▼ Corrosion protected to cope with arduous environments on land or marine applications (Fe/Zn8C as per ISO2081).
- ▼ Fitted as standard with an integral fail-safe design with resilient stop, making RAEM ideal for use on mobile or marine applications. The mounts can accommodate occasional shock loads. The mount will withstand shock loads up to 2g without plastic deformation.
- ▼ Clear and durable product marking so that mountings can be identified even after several years in operation.
- ▼ Domed shape cover to protect against oil contamination.

Novibra® type RAEM™

For effective isolation of vibration and noise on machines with rotating movements, the product can be apply to:

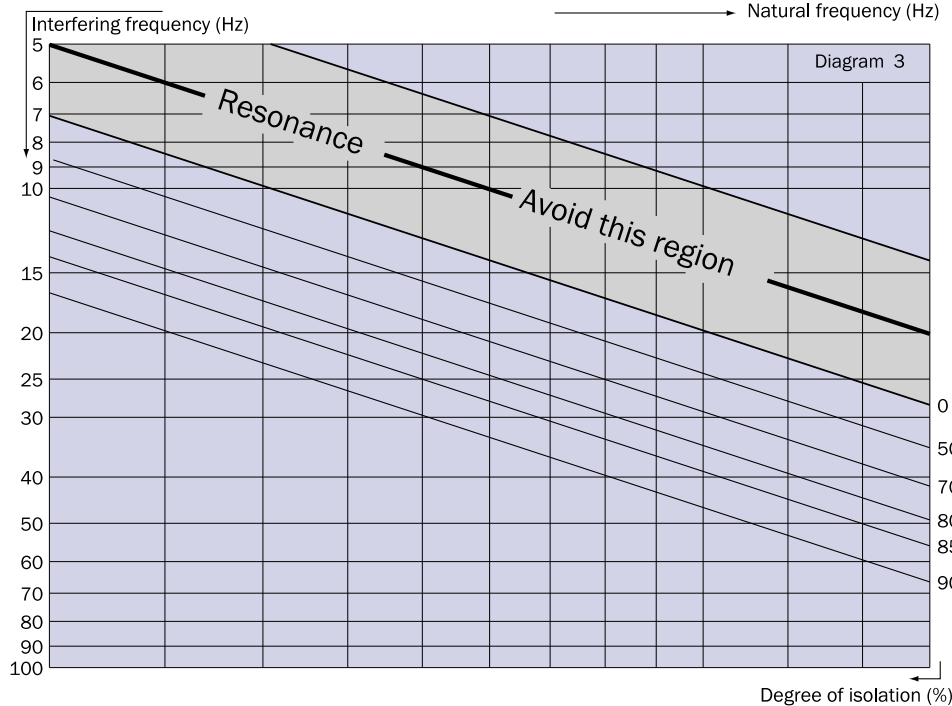
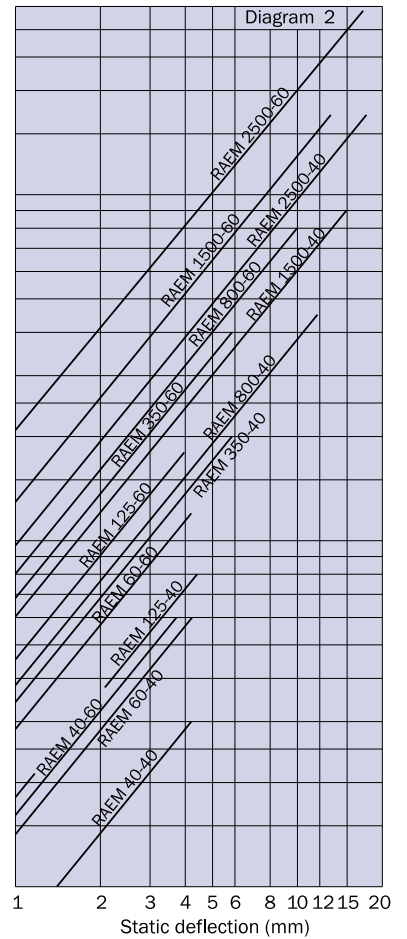
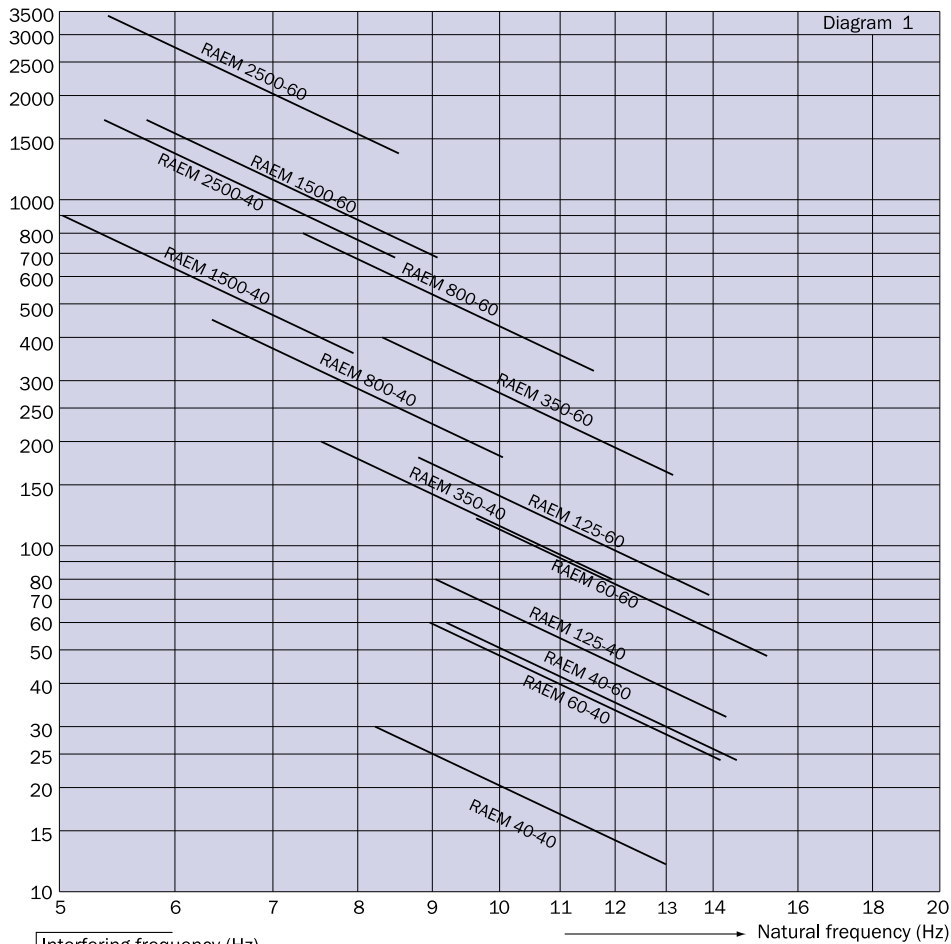
- ▼ AC Units
- ▼ Generators
- ▼ Refiners
- ▼ Compressors
- ▼ Industrial Fans
- ▼ Combution Engines
- ▼ Industrial/Marine Gensets
- ▼ Defibrators
- ▼ Emergency Power Sets
- ▼ Large Milling Machinery



Type	Part no.		Dimensions in mm								M-Max (Kg)		Weight (Kg)
	40°IRH	60°IRH	D	A	W	H	K	d	L	G	40°IRH	60°IRH	
RAEM40	10-00122	10-00123	64	88		35,5	110	9	12	M10	30	60	0,26
RAEM60	10-00183	10-00184	63	100	61	35,5	120	11	15	M12	60	120	0,30
RAEM125 M10	10-00108	10-00109	84	110		35,5	135	11	15	M10	80	180	0,37
RAEM125 M12	10-00168	10-00169	84	110		35,5	135	11	15	M12	80	180	0,37
RAEM350 M12	10-00174	10-00175	110	140-148		42	175	14	18	M12	200	400	0,80
RAEM350 M16	10-00114	10-00115	110	140-148		42	175	14	18	M16	200	400	0,80
RAEM800	10-00120	10-00121	155	182		54	216	14	18	M16	450	800	1,80
RAEM1500	10-00158	10-00159	182	146		85	180	14		M20	900	1700	3,00
RAEM2500	10-00160	10-00161	224	180		105,5	220	17,5		M24	1700	3400	4,60

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



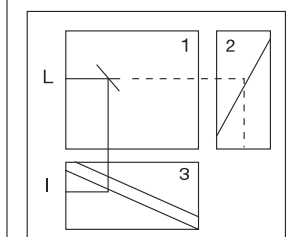
To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz)
(Hz = rpm / 60)

Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.

The load line intersects with required type of mounting. Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.

For static deflection, see diagram 2.



Rectangular SAW™ Mountings



Features

Rectangular SAW mountings are also known as 'Sandwich' mountings because they feature a rubber section sandwiched between plates of metal.

This arrangement allows a large difference between the compression and shear stiffnesses, thus providing the potential to 'tune' a mounting system by rotating the mountings.

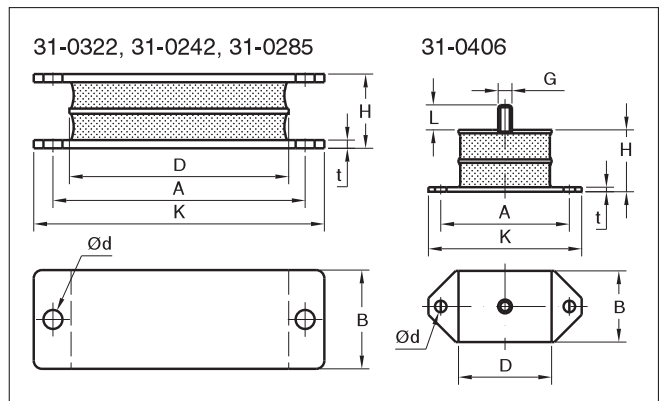
These mountings are commonly installed in a 'Vee' formation to utilize this feature.

The Rectangular SAW Mountings has the following features:

- ▼ Available with plate or stud fixings.
- ▼ Can be loaded in compression or shear, or a combination of both, for example in a 'Vee' arrangement.
- ▼ Can be manufactured with or without interleaves to change the ratio of shear to compression stiffness.

Metalastik® type Rectangular SAW™

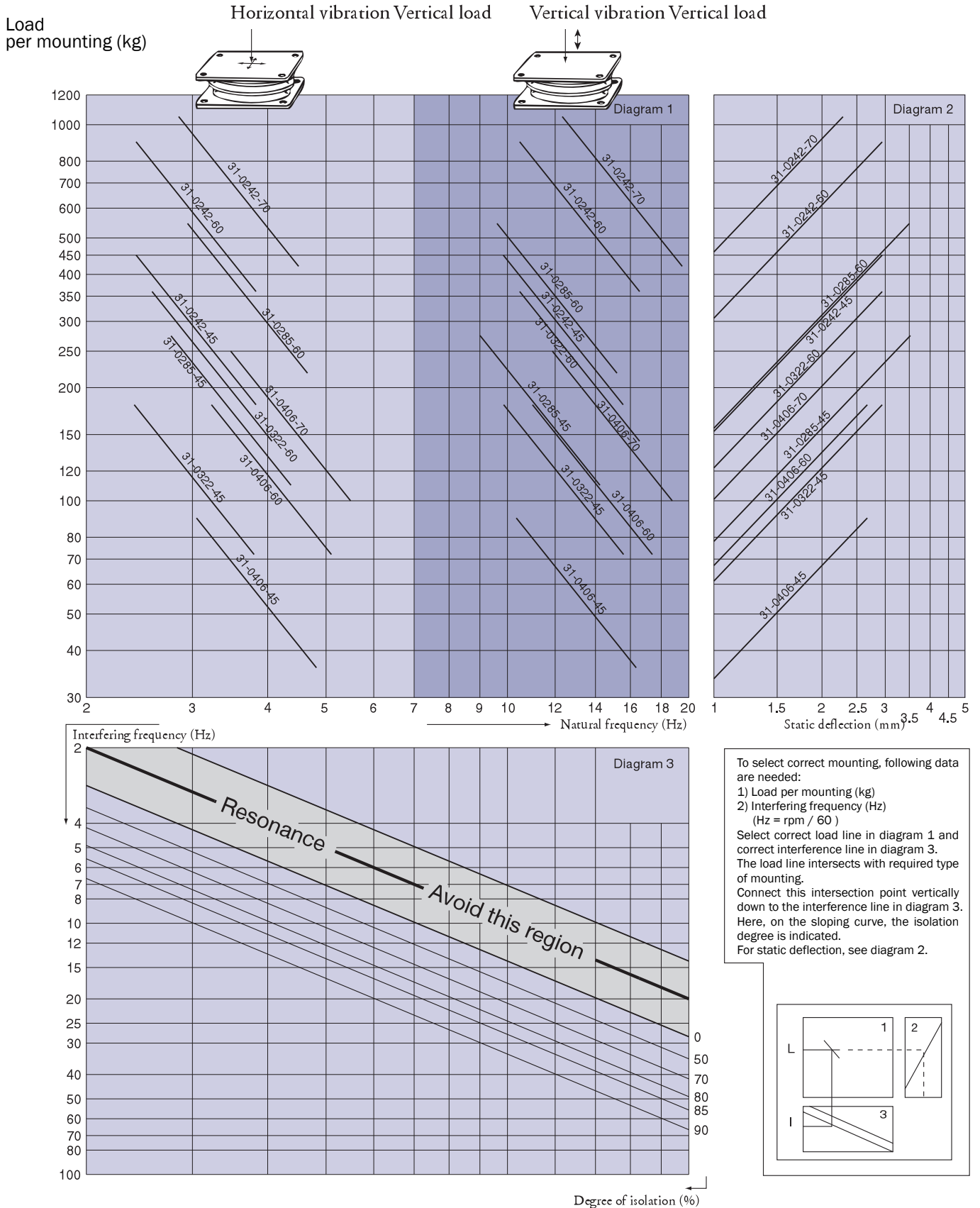
Widely used for suspending engines on road vehicles and may also be employed as springs for vibratory equipment.



Drawing no.	Part no.	Dimensions in mm									Max Load in Compression ((Kg)	Max Load in Shear (Kg)	Weight (Kg)
		A	B	K	H	D	d	t	G	L			
31-0322-45	10-00658	89	57	108	43	63,5	11	5			180	50	0,65
31-0322-60	10-00659	89	57	108	43	63,5	11	5			360	75	0,65
31-0242-45	10-00648	146	57	168	43	127	11	5			450	120	1,1
31-0242-60	10-00651	146	57	168	43	127	11	5			900	150	1,1
31-0242-70	10-00652	146	57	168	43	127	11	5			1050	150	1,1
31-0406-45	10-00661	74,5	41	89	36	54	6,5	2,5	M8	14	90	40	0,23
31-0406-60	10-00971	74,5	41	89	36	54	6,5	2,5	M8	14	180	70	0,23
31-0406-70	10-00663	74,5	41	89	36	54	6,5	2,5	M8	14	250	90	0,23
31-0285-45	10-00656	146	57	168	43	127	11	5			275	150	0,9
31-0285-60	10-00657	146	57	168	43	127	11	5			546	150	0,9

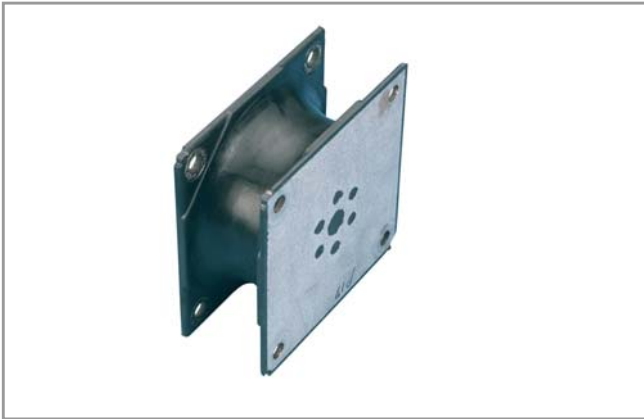
Rectangular SAW™ Mountings

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.





3" Shearmount™



Features

3" Shearmounts are also known as 'Sandwich' mountings because they feature a rubber section sandwiched between plates of metal.

This arrangement allows a large difference between the compression and shear stiffnesses, thus providing the potential to 'tune' a mounting system by rotating the mountings.

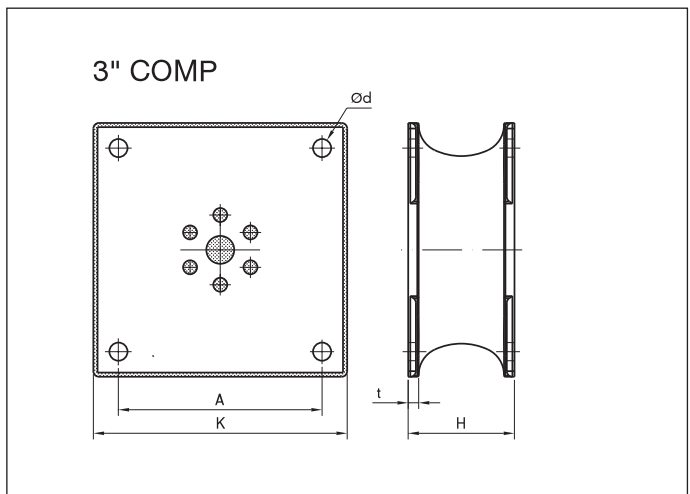
These mountings are commonly installed in a 'Vee' formation to utilize this feature.

The Rectangular SAW Mountings has the following features:

- ▼ Available with plate or stud fixings.
- ▼ Can be loaded in compression or shear, or a combination of both, for example in a 'Vee' arrangement.
- ▼ Can be manufactured with or without interleaves to change the ratio of shear to compression stiffness.

Novibra® type 3" Shearmount™

Widely used for suspending engines on road vehicles and may also be employed as springs for vibratory equipment.

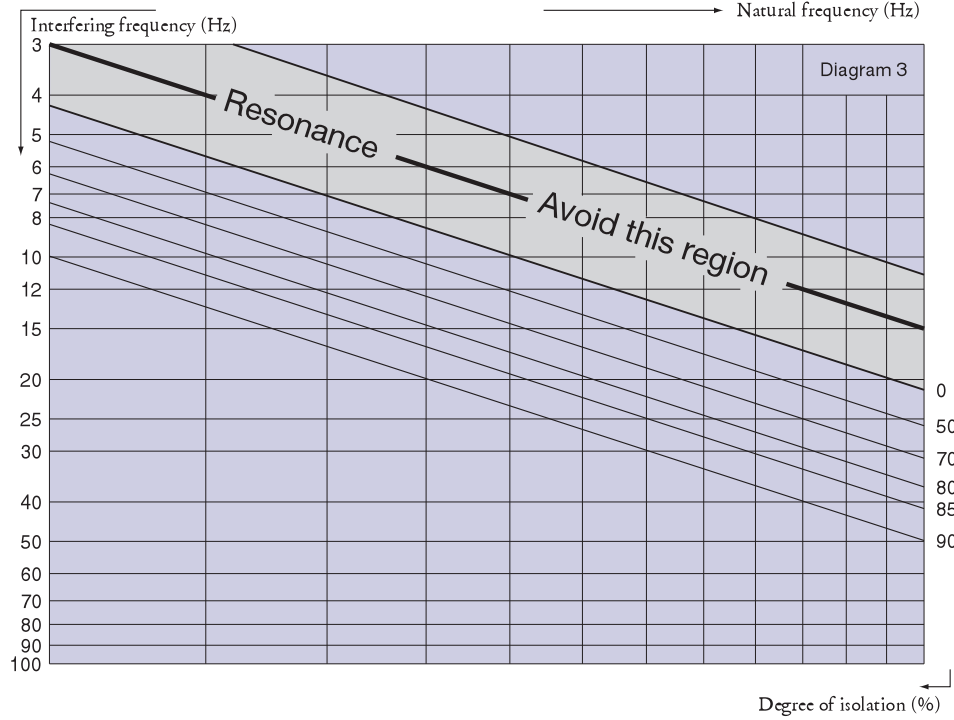
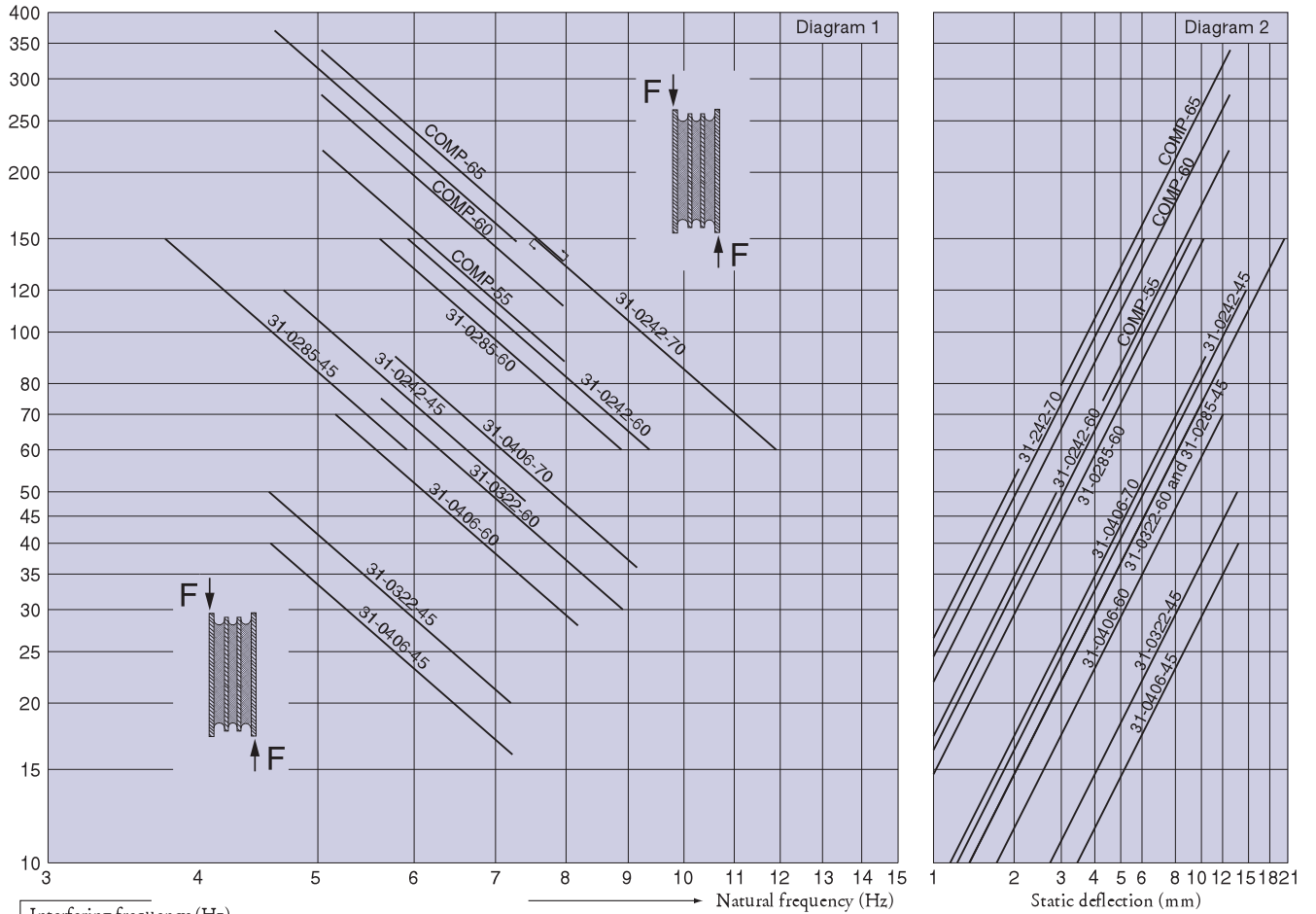


Type	Drawing no.	Part no.	Dimensions in mm					Max Load in Shear (Kg)	Weight (Kg)
			A	K	H	d	t		
3"COMP 55	17-4348-02	10-00067	146	182	76	13	7,5	220	3,4
3"COMP 60	17-4348-00	10-00065	146	182	76	13	7,5	280	3,4
3"COMP 65	17-4348-01	10-00066	146	182	76	13	7,5	340	3,4

3" Shearmount™

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

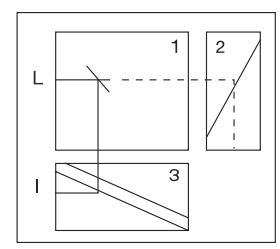
Load per mounting (kg)



To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz)
(Hz = rpm / 60)

Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting. Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated. For static deflection, see diagram 2.





Features

Novibra® type SAW™ mountings consist of a cylindrical shaped rubber section with integrally bonded interleaf metal plates bonded to two square heavy duty outer metal fixing plates. Designed for large compressive forces with minimum deformation, while providing low shear stiffness rates.

The combination of a stable low installation height, high compressive strength and low shear stiffness makes Novibra® type SAW™ a versatile high performance anti-vibration mounting. Ease of installation due to 4 clearance holes in each fixing plate.

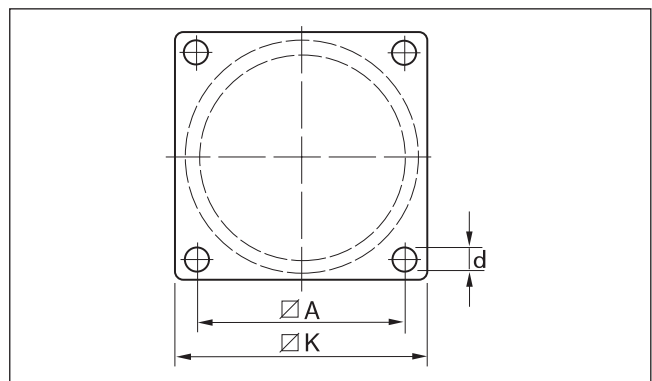
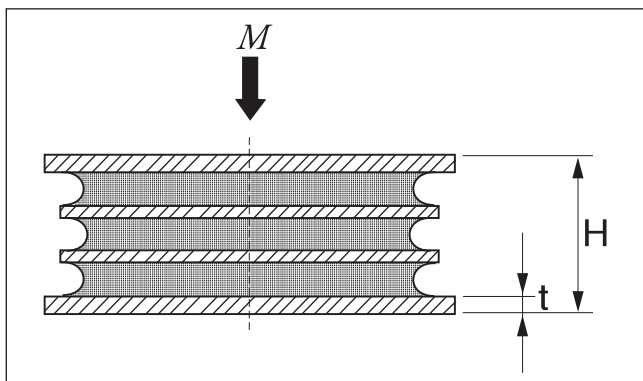
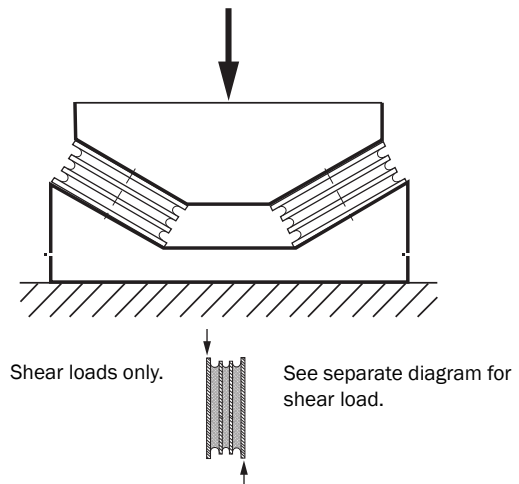
By connecting 2 SAW-elements in series, i.e. one on top of the other, an increased isolation efficiency is achieved in both shear and compression planes. Where larger deflections are required in the vertical plane, Novibra® type SAW™ mountings are mounted at a calculated angle configuration to provide the optimum spring rate.

Novibra® type SAW™

Novibra® elements type SAW is heavy duty mountings for static and shock loads in compression. Provides high isolation in the horizontal shear direction.

Typical fields of application are:

- ▼ Mills
- ▼ Grinders
- ▼ Screens
- ▼ Crushers
- ▼ Edge runners
- ▼ Vibratory rollers
- ▼ Hoppers and feeders
- ▼ Other very heavy machines and equipment

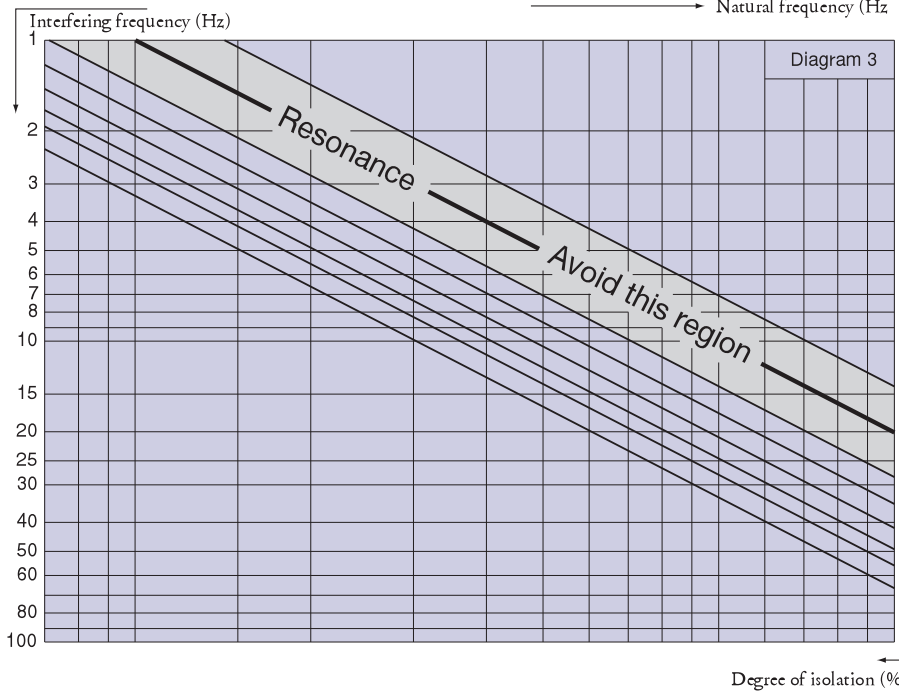
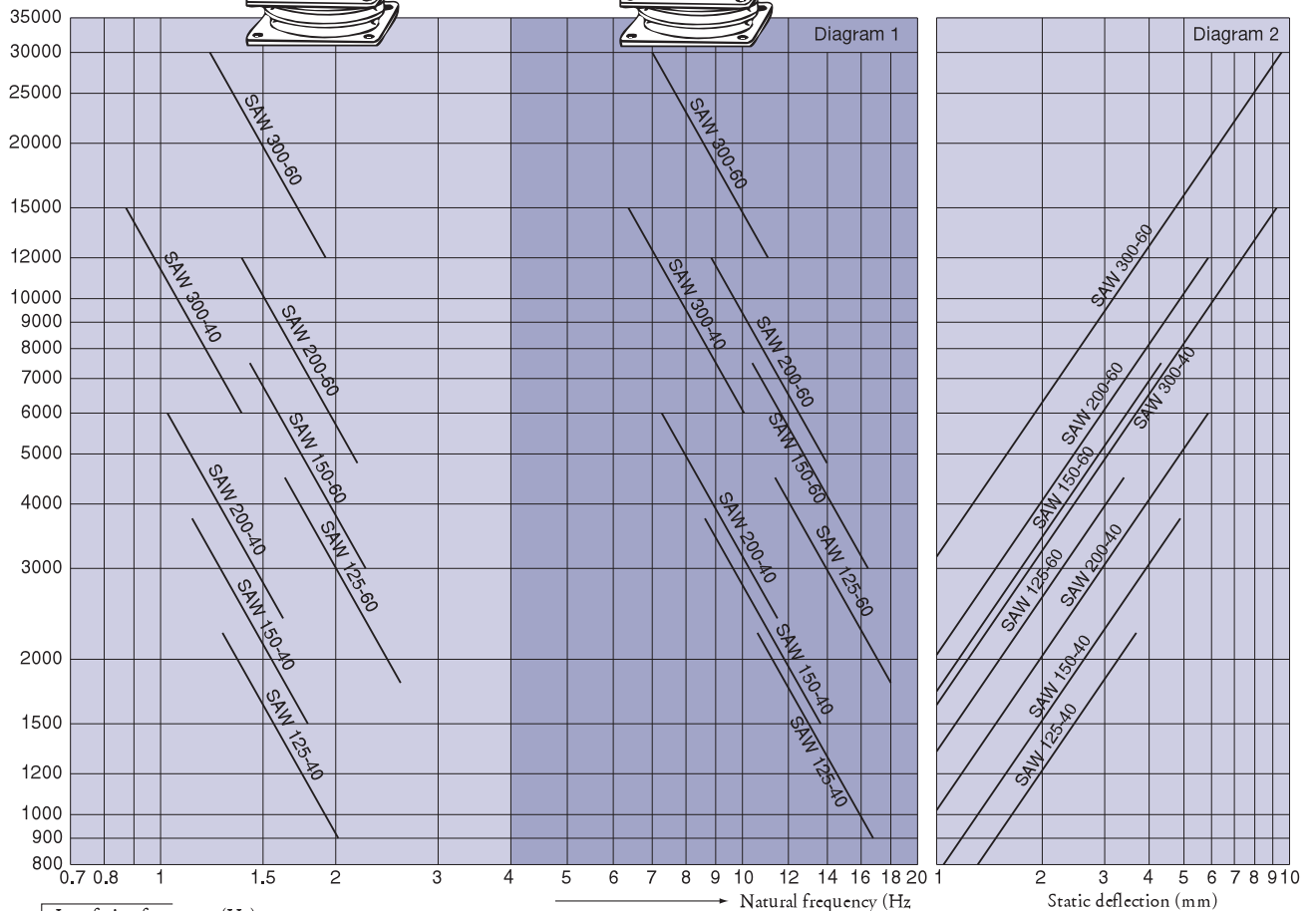


Type	Part no.		Dimensions in mm					M-Max (Kg)		Weight (Kg)
	40°IRH	60°IRH	A	K	H	d	t	40°IRH	60°IRH	
SAW 125	10-00141	10-00142	118	148	52	13,5	5	2250	4500	2,6
SAW 150	10-00143	10-00144	136	166	63	13,5	6	3750	7500	4,1
SAW 200	10-00075	10-00076	184	220	82	17,0	8	6000	12000	9,2
SAW 300	10-00077	10-00078	270	310	120	22,0	10	15000	30000	27,0

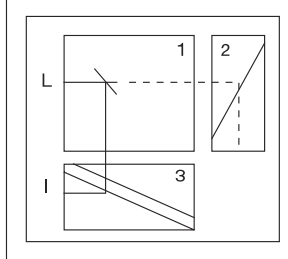
Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)

Horizontal vibration Vertical load Vertical vibration Vertical load



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz) (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.

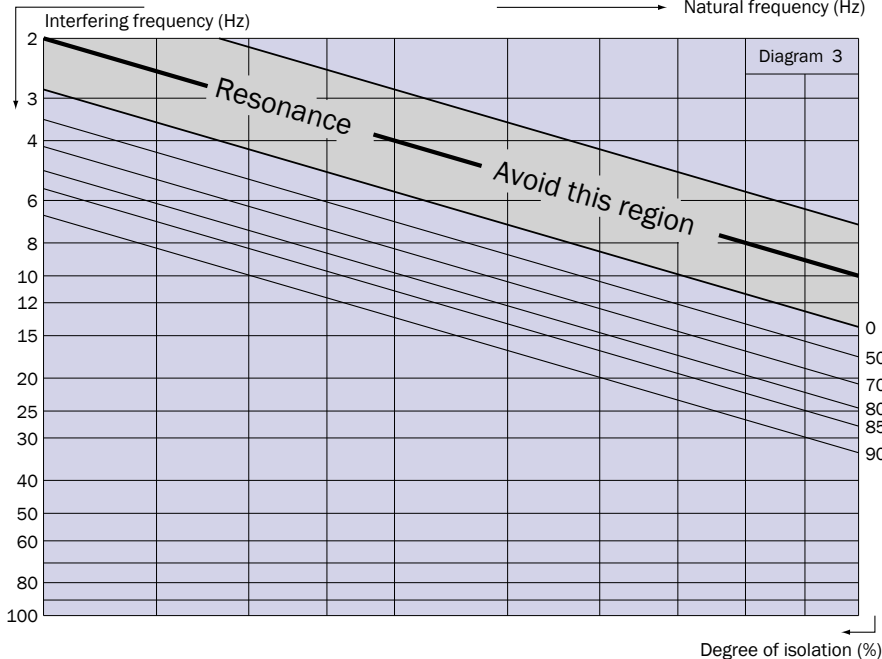
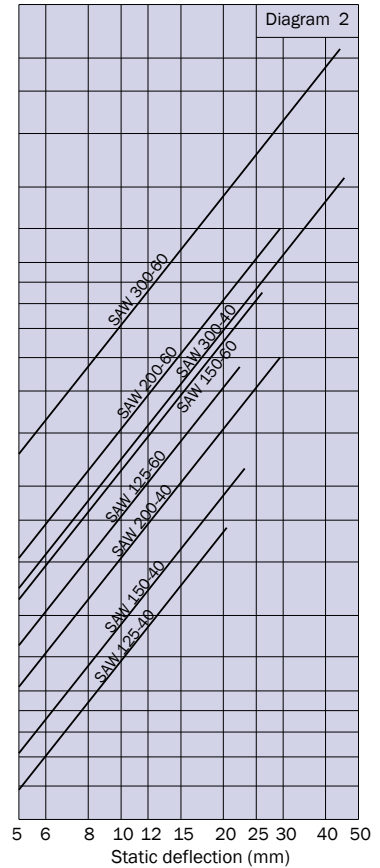
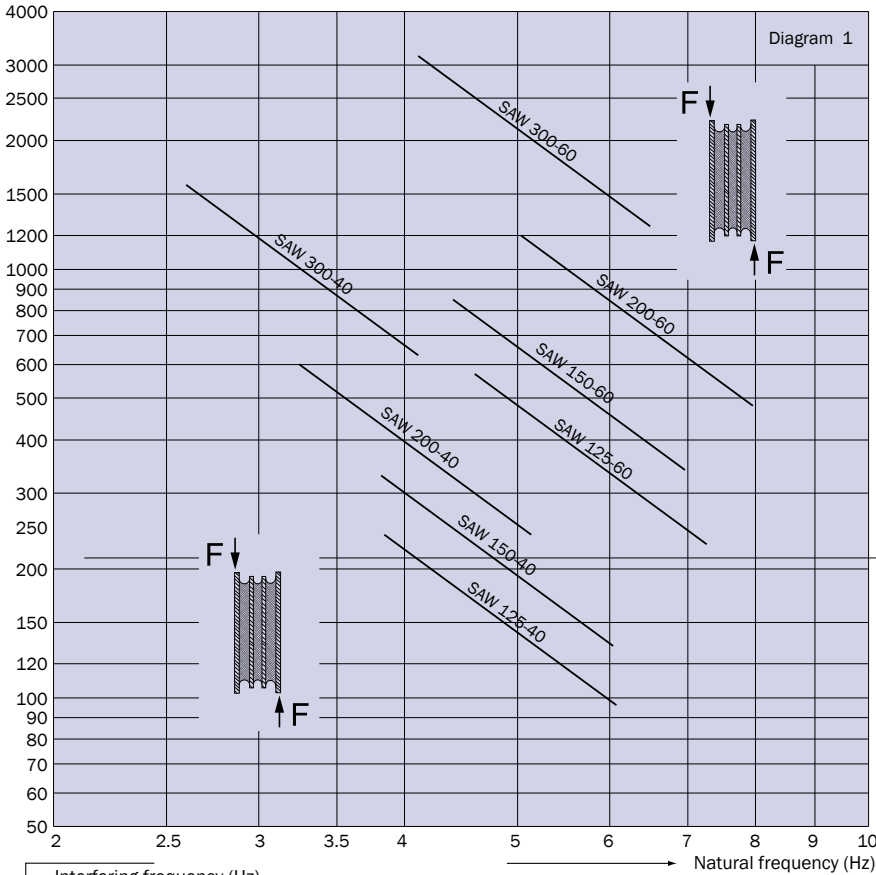


Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

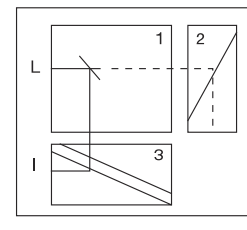
This page refers to shear load characteristics only!

Fmax (Kg)	40° IRH	60° IRH
SAW 125	240	570
SAW 150	330	850
SAW 200	600	1200
SAW 300	1575	3150

Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz) (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting. Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated. For static deflection, see diagram 2.



Features

The SE™ mounting consists of an annular rubber section, securely bonded to a single steel support plate. A clearance hole is provided which can either be left plain or tapped to suit the application.

As the rubber element is in direct contact with the supporting surface, friction is normally sufficient to prevent the suspended equipment from “walking”.

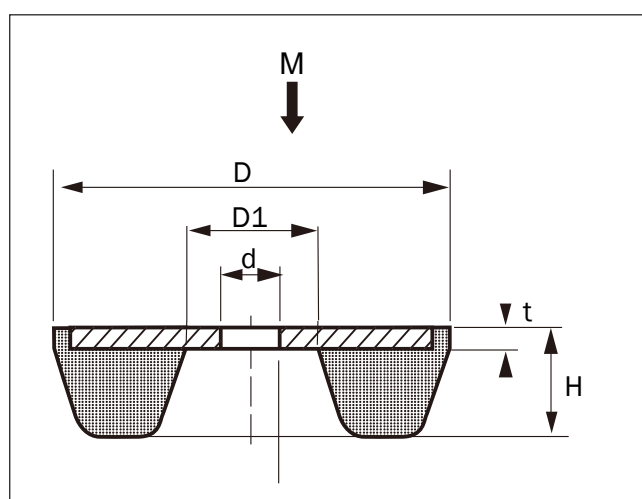
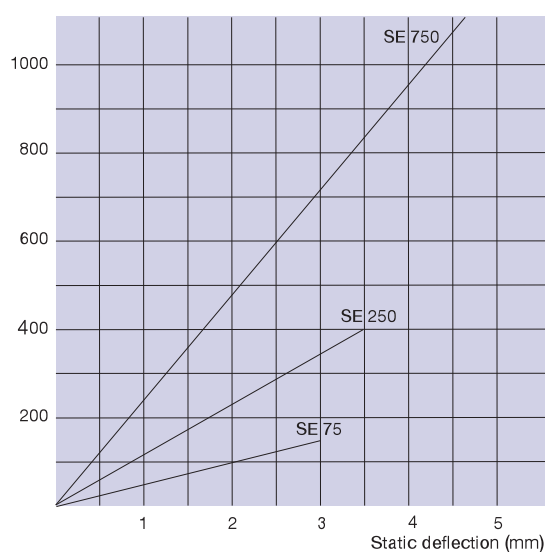


Novibra® type SE™

Type SE™ is suitable for the isolation of high frequency disturbances and provides reduction of structure-borne noise.

Specific applications are:

- ▼ Office equipment
- ▼ Textile machinery
- ▼ Domestic appliances
- ▼ Electric motors
- ▼ Weighing equipment



Type	Drawing no.	Part no. 50°IRH	Dimensions in mm					M-Max (Kg) 50°IRH	Weight (Kg)
			D	D1	d	H	t		
SE 75	19-0563	20-00612	55	18	8	15	3	150	0,069
SE 250	19-0728	20-00631	75	25	10	17	4	400	0,172
SE 750	19-0729	20-00632	115	40	14	24	4	1100	0,456



Novibra® type SIM™

Type SIM™ is used for vibration isolation of small to medium sized machines:

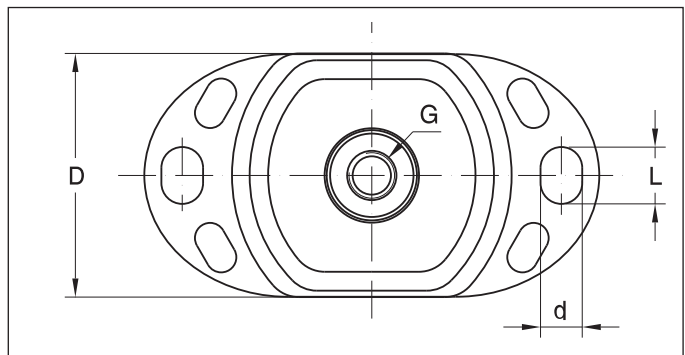
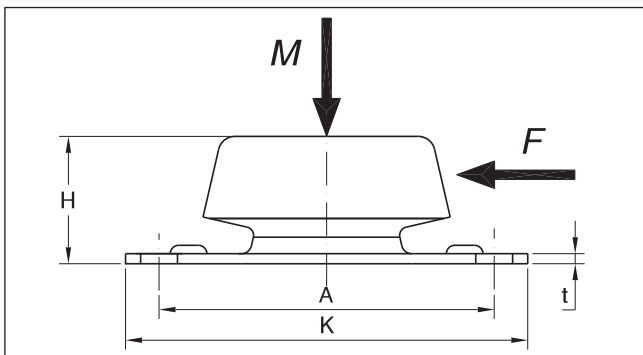
- ▼ Fans
- ▼ Pumps
- ▼ Engines
- ▼ Compressors
- ▼ Measurement equipment
- ▼ Marine propulsion engines
- ▼ Refrigeration and air-conditioning

Features

SIM™ is a mounting for mobile applications. The strong metal parts and the soft vertical stiffness combined with high stiffness in the longitudinal direction makes it suitable for suspension of marine engines both with and without thrust bearing.

Its unique construction and the latest production methods make Novibra type SIM a high performance mounting having a number of advantages.

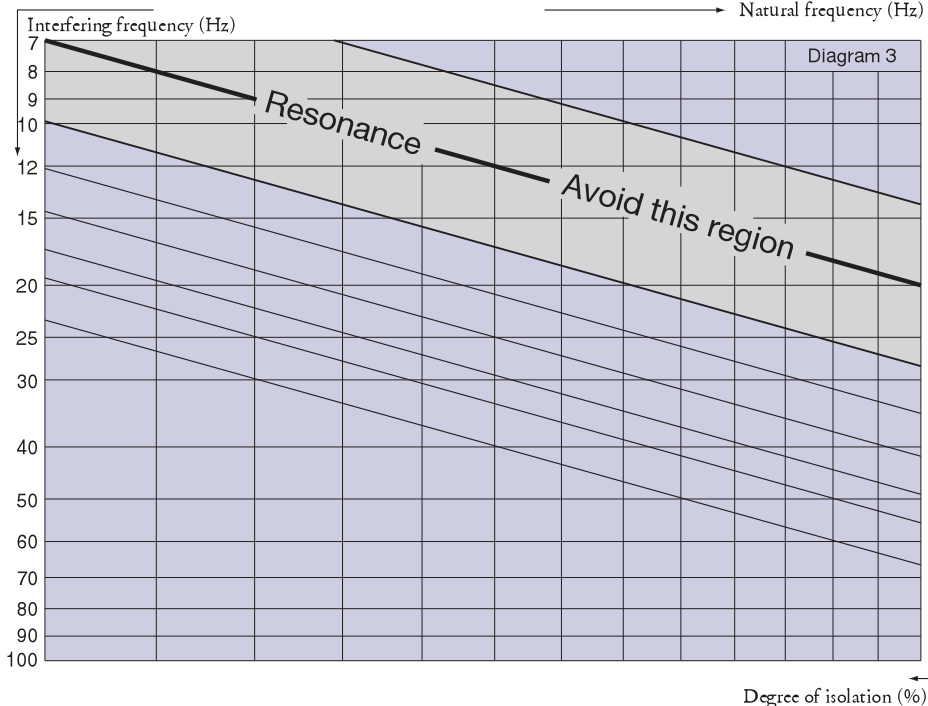
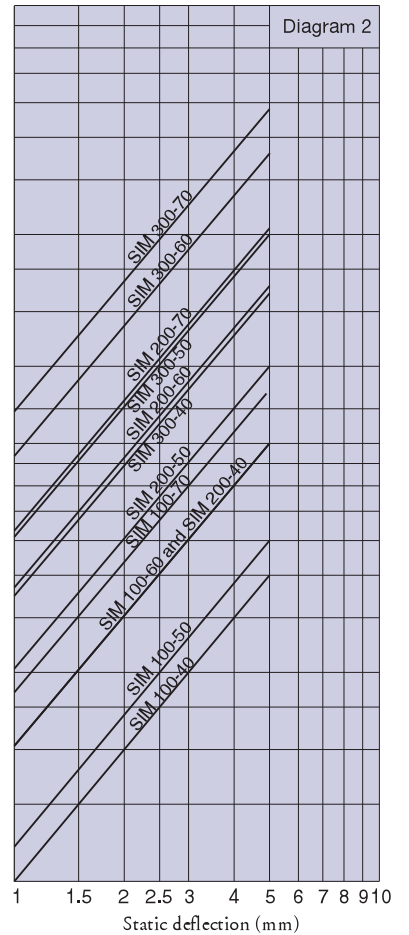
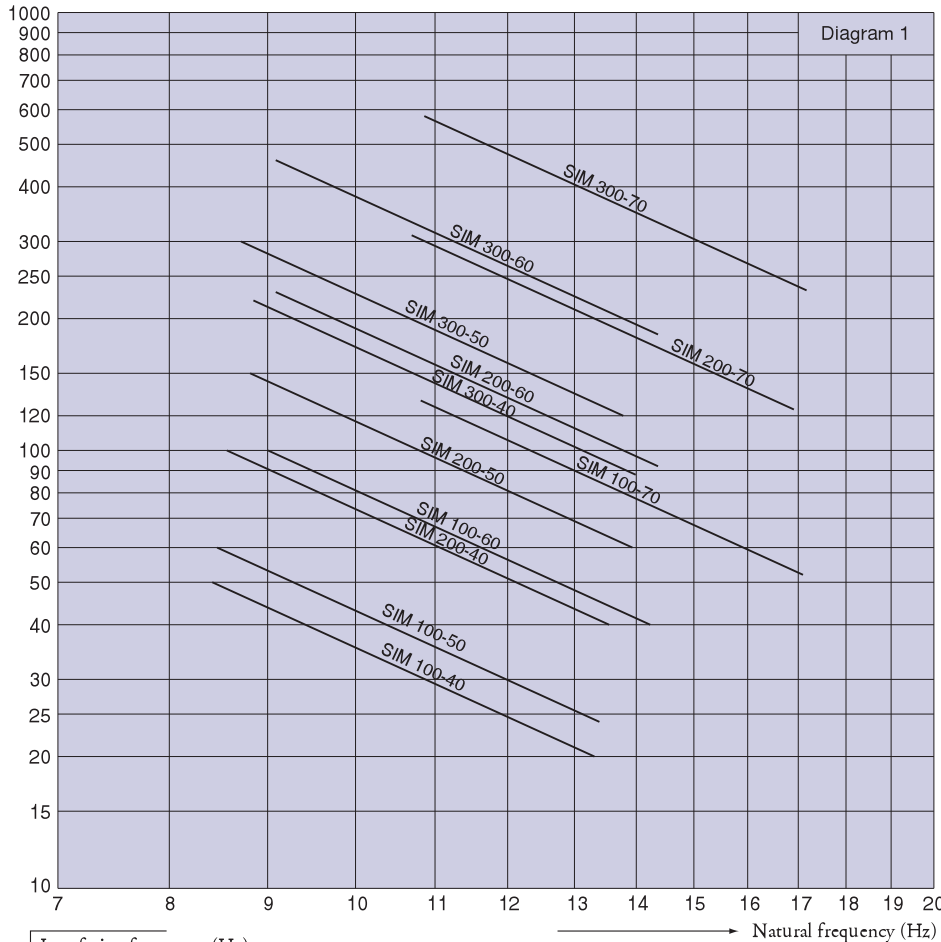
- ▼ Low vertical natural frequency 8-9 Hz combined with high longitudinal stiffness, ratio approx $k_l/k_v=3.5-5.5$.
- ▼ Special designed stronger bottom plate and top cover to withstand high shock loads from tough mobile applications.
- ▼ Load range from 50-580kg.
- ▼ Fitted as standard with a shock proof device (up to 5g) with resilient stop.
- ▼ Corrosion protected to cope with arduous environments with treatment Fe/Zn8C as per ISO 2081.
- ▼ SIM can be delivered with two types of height adjusters, one standard type HA and HAD for higher load requirements.
- ▼ Clear and durable product marking. Mountings can be identified after several years in operation.
- ▼ Domed shape top cover to protect against oil contamination.



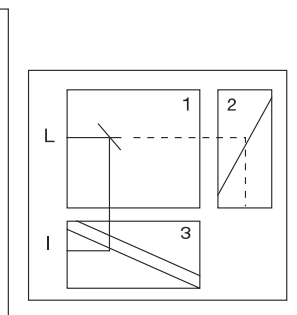
Type	IRH	Part no.	Dimensions in mm							Max Load M ((Kg)	Max Longitudinal Force F(N)	Weight (Kg)	
			D	A	K	H	d	L	t				
SIM 100	40° IRH	10-00043	64	100	120	38	11	15	3	M12	50	750	0,35
	50° IRH	10-00046	64	100	120	38	11	15	3	M12	60	1000	0,35
	60° IRH	10-00044	64	100	120	38	11	15	3	M12	100	1400	0,35
	70° IRH	10-00045	64	100	120	38	11	15	3	M12	130	2000	0,35
SIM 200	40° IRH	10-00047	75	140	175	50	13	20	4	M16	100	2000	0,75
	50° IRH	10-00050	75	140	175	50	13	20	4	M16	150	3000	0,75
	60° IRH	10-00048	75	140	175	50	13	20	4	M16	230	4500	0,75
	70° IRH	10-00049	75	140	175	50	13	20	4	M16	310	6000	0,75
SIM 300	40° IRH	10-00051	112	182	216	70	18	26	5	M20	220	5000	2,03
	50° IRH	10-00054	112	182	216	70	18	26	5	M20	300	6500	2,03
	60° IRH	10-00052	112	182	216	70	18	26	5	M20	460	9000	2,03
	70° IRH	10-00053	112	182	216	70	18	26	5	M20	580	12000	2,03

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz) (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.





Spherilastik™ Bearings

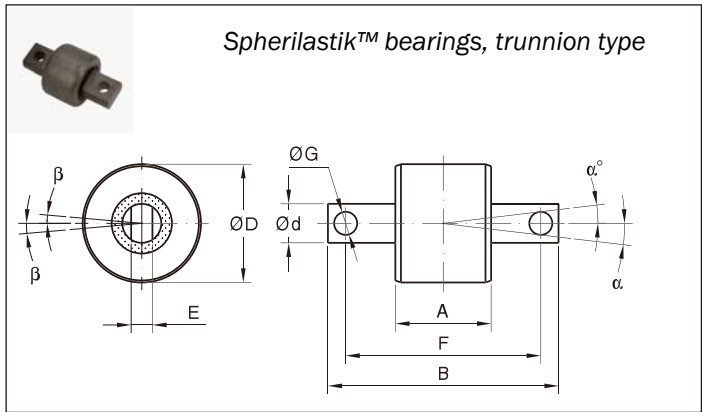
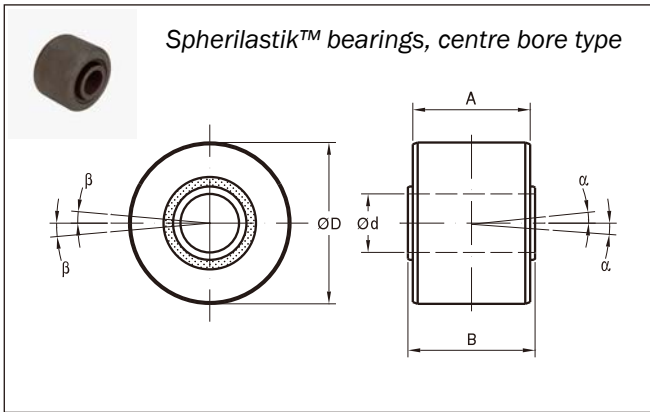


Features

A heavy duty flexible bearing which combines high load capacity with the ability to accommodate torsional and angular movements in all planes without lubrication and metal to metal wear. It is available with centre bore or solid member depending on fixing requirements.

Metalastik® type Spherilastik™ Bearings

Typical uses include traction and braking reaction rods for rail, road and off-road vehicles, hydraulic damper fixings and other applications where a high duty bearing of compact size is required.



Drawing no. Spherilastik™ Bearing	Part no.	Dimensions in mm								Radial		Torsion		Bending		Weight (Kg)
		d	D	A	B	E	F	G	Stiffness kN/mm	Max Load kN	Stiffness kNm/rad	±β degrees	Stiffness kNm/rad	±α degrees		
13-1316	10-00527	25,4	66,7	47,6	54				70	34	0,9	8	0,9	6	0,84	
13-1006	10-00237	28,6	90,5	70	76,2				93	58	2,8	8	2,8	6	2,5	
Centre Bore																
13-2106-1	10-00291	28,6	90,5	70	76,2				100	58	2,8	8	2,8	6	1,8	
13-1285	10-00255	38,1	104,8	76,2	82,6				90	78	4,5	8	3,8	7	3,4	
Trunnion																
13-2202-1	10-00302	35	66,7	47,6	120	20	90	13	70	34	0,7	8	0,9	6	1,2	
13-2033	10-00283	40	84	65	155	20	120	16,5	150	75	2,8	6	2,8	6	2,8	

Features

The TF mounting is installed in minutes by following the instructions provided. There is no need to fix the machines to the floor since the rubber base of the mounting keeps the machine in place. Whenever necessary, the machine can easily be re-positioned. The level is adjusted with load applied.

The rubber element of the TF mounting is oil and chemical resistant. All metal parts are zinc plated and chromated for protection against corrosion.

Models TF 250, TF 600 and TF 1200, also available in stainless steel.

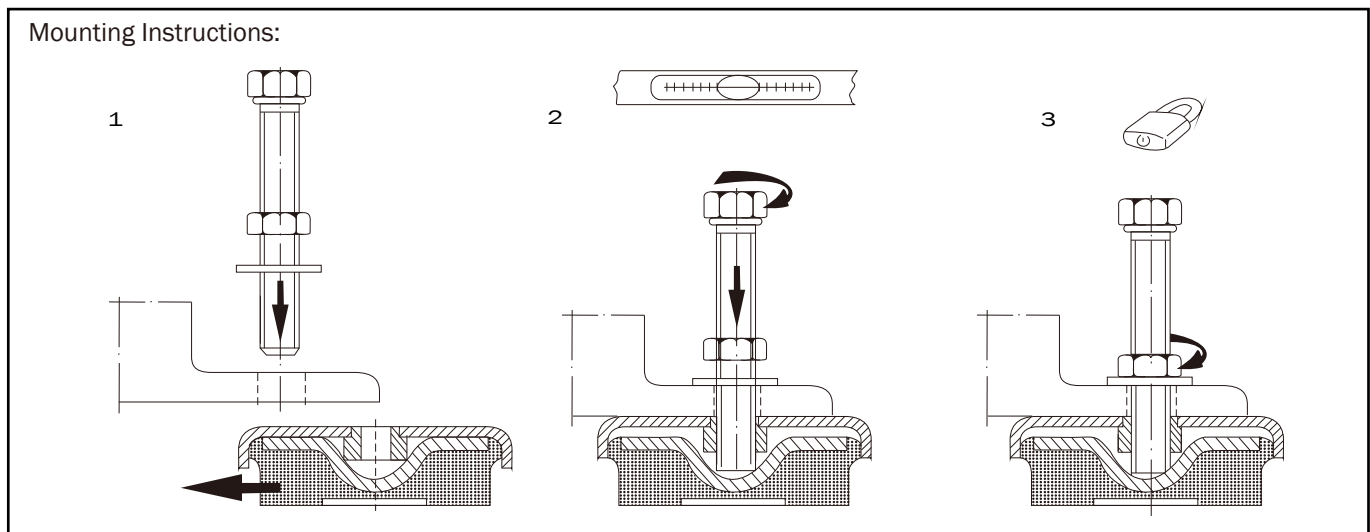
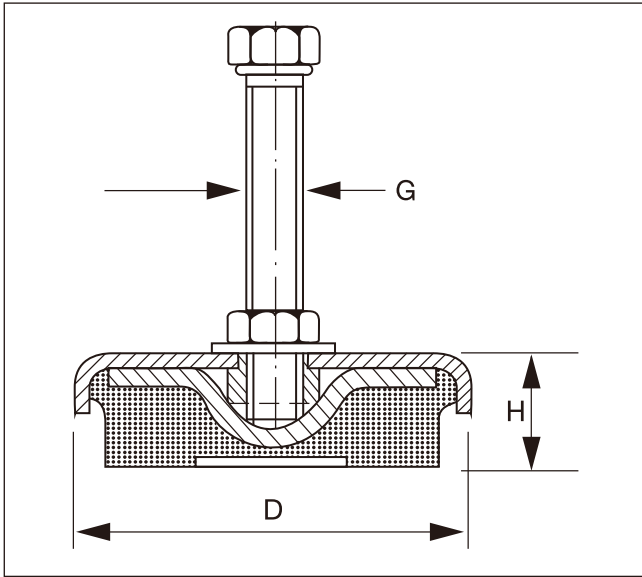


Novibra® type TF™

Novibra® type TF™ with level adjuster is suitable for a wide range of free standing workshop machines, e.g.

- ▼ Lathes
- ▼ Presses
- ▼ Plate shears
- ▼ Milling machines
- ▼ Nibbling machines
- ▼ Grinding machines
- ▼ Punches and cutters
- ▼ Woodworking machines
- ▼ Multiple operation machinery
- ▼ Plastic moulding machinery

Type	Drawing no.	Part no.	Dimensions in mm			Overall Bolt Length	Thread G	Max Load (Kg)	Weight (Kg)
			D	Hmin	Hmax				
TF 250	19-0588	20-00623	69	23	-	100	M12	250	0,40
TF 250 S/s	19-0589	20-00678	69	23	-	100	M12	250	0,40
TF 600	19-0583	20-00624	81	25	-	100	M12	600	0,49
TF 600 S/s	19-0585	20-00679	81	25	-	100	M12	600	0,49
TF 1200	19-0577	20-00625	108	29	-	100	M16	1200	1,00
TF 1200 S/s	19-0578	20-00680	108	29	-	100	M16	1200	1,00
TF 3000	19-0591	20-00626	151	35	-	120	M20	3000	2,20
TF 4000	19-0596	20-00627	170	39	-	120	M20	4000	2,90
TF 6000	19-0598	20-00628	205	44	-	150	M24	6000	4,80



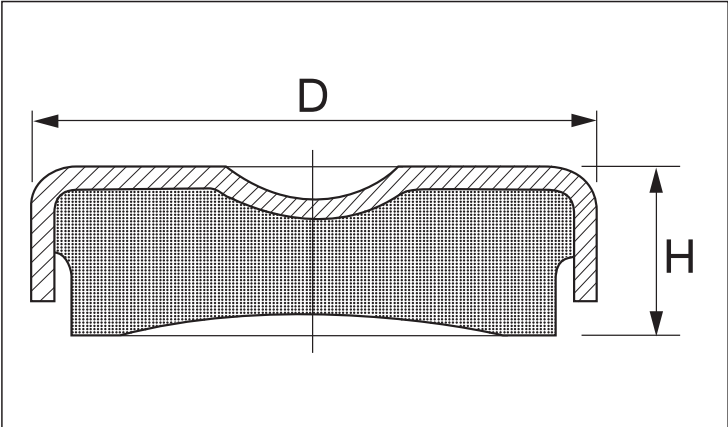
Loading range per mounting (kg)

Mounting	Type of Machine	General Workshop Machines	Presses And Punches							
			Numbers of Strokes Per Minute							
			1-	125	126-	175	176-	225	226-	275
TF 250		250	25-	125	20-	100	15-	85	10-	60
TF 600		251- 600	126-	300	101-	240	86-	200	61-	150
TF 1200		601- 1200	301-	600	241-	480	201-	400	151-	300
TF 3000		1201- 3000	601-	2400	481-	1600	401-	1000	301-	750
TF 4000		3001- 4000	2401-	3200	1601-	2100	1001-	1300	751-	1000
TF 6000		4001- 6000	3201-	4800	2101-	3200	1301-	2000	1001-	1500

Mounting TFE™ is a simpler version of type TF™ without level adjuster. It is used for machines which do not require height adjustment or where such a feature is already provided, e.g. by an adjusting screw in the machine.



Both models also available in stainless steel.



Type	Drawing no.	Part no.	Dimensions in mm		Max Load (Kg)	Weight (Kg)
			D	H		
TFE 601	19-0571	20-00629	80	25	800	0,375
TFE 1201	19-0574	20-00630	109	29	160	0,925

Two Bolt Instrumountings™



Features

These mountings are high quality products capable of protecting light equipment from vibration and shock. Two Bolt Instrumountings are available in either 45° or 60° IRH natural rubber compound. Similar to Rectangular SAW™ Mountings and Circular SAW™ Mountings, Two Bolt Instrumountings™ can be assembled in a 'Vee' arrangement for good stability and improved vibration isolation.

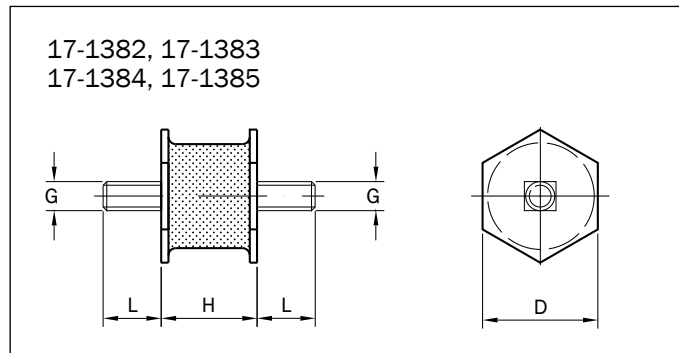
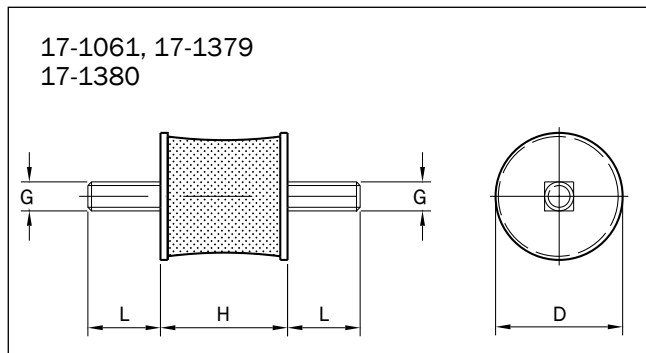
- ▼ Circular or hexagonal end plates for simple fitting.
- ▼ Can take up to 3 times rated load under shock conditions.
- ▼ Takes load in either shear or compression, or a combination.
- ▼ Fixing bolts threaded to within 2 pitches of the end plate.
- ▼ Up to 12 mm deflection in shear for a very soft suspension.
- ▼ Top quality bond strength for reliability and safety.

Metalastik® type Two Bolt Instrumountings™

Two Bolt Instrumountings provide a convenient and effective means of isolating vibration generated by light-weight machinery. Also used to protect instruments and light equipment from vibration and shock. They may be loaded in compression or shear depending on application requirements.

Typical applications:

- ▼ Instrument panels
- ▼ Electronic equipment
- ▼ Lightweight laboratory machines

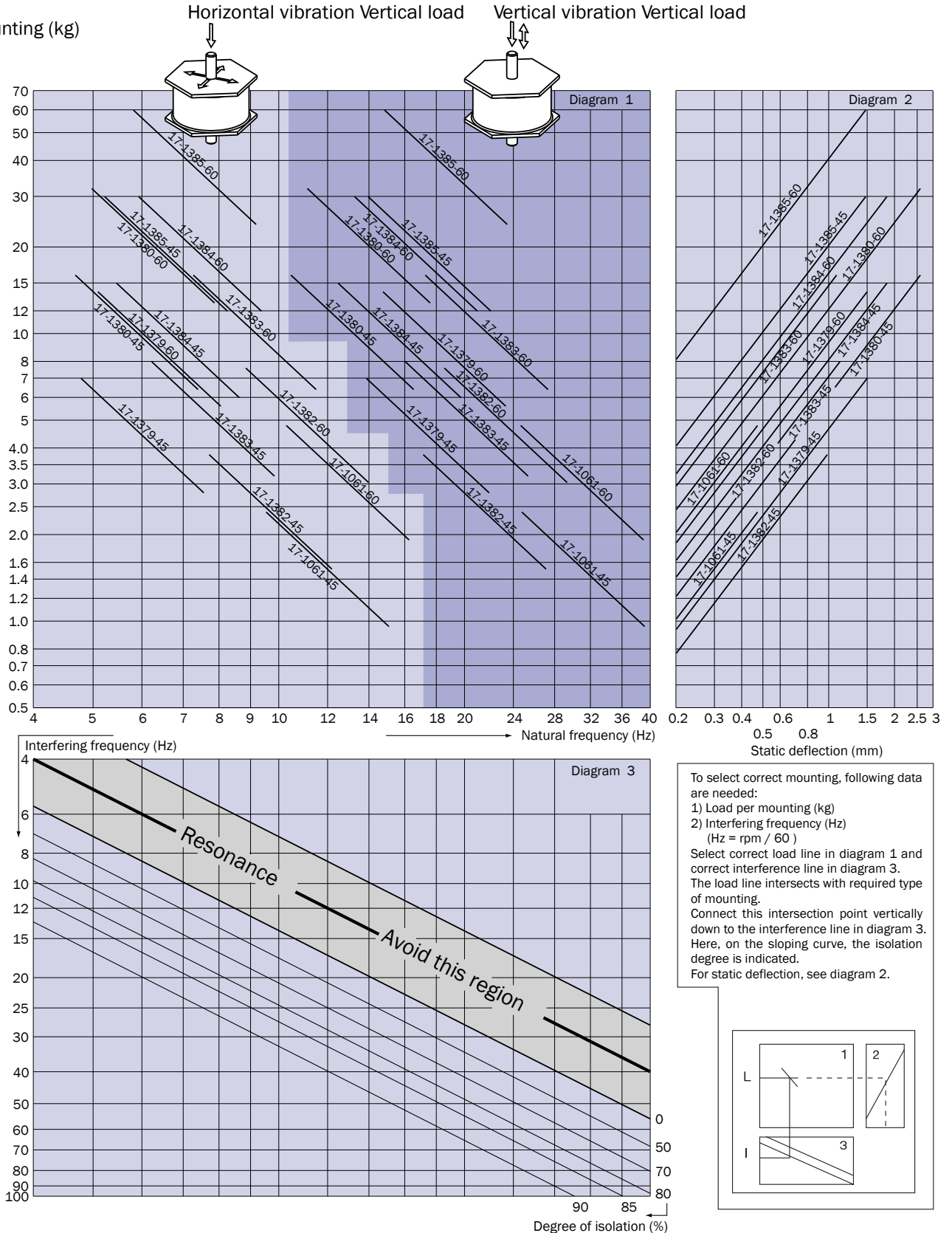


Drawing no.	Part no.	Dimensions in mm			L	Max Load in Compression (Kg)	Max Load in Shear (Kg)	Weight (Kg)
		D	H	G				
17-1061-45	10-00443	11	11	M4	10	2,4	2,3	0,005
17-1061-60	10-00444	11	11	M4	10	4,8	2,5	0,005
17-1379-45	10-00470	21	22	M6	15	7,0	5	0,02
17-1379-60	10-00471	21	22	M6	15	14	5	0,02
17-1380-45	10-00472	35	34	M8	20	16	15	0,07
17-1380-60	10-00473	35	34	M8	20	32	15	0,07
17-1382-45	10-00476	15	16	M6	15	3,8	3	0,013
17-1382-60	10-00477	15	16	M6	15	7,6	3	0,013
17-1383-45	10-00478	21	19	M8	20	8,0	6	0,03
17-1383-60	10-00479	21	19	M8	20	16	6	0,03
17-1384-45	10-00480	32	26	M8	16	15	10	0,06
17-1384-60	10-00481	32	26	M8	16	30	10	0,06
17-1385-45	10-00482	33	22	M10	25	30	14	0,11
17-1385-60	10-00483	33	22	M10	25	60	14	0,11

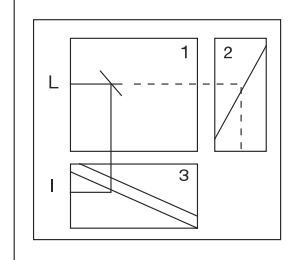
Two Bolt Instrumountings™

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



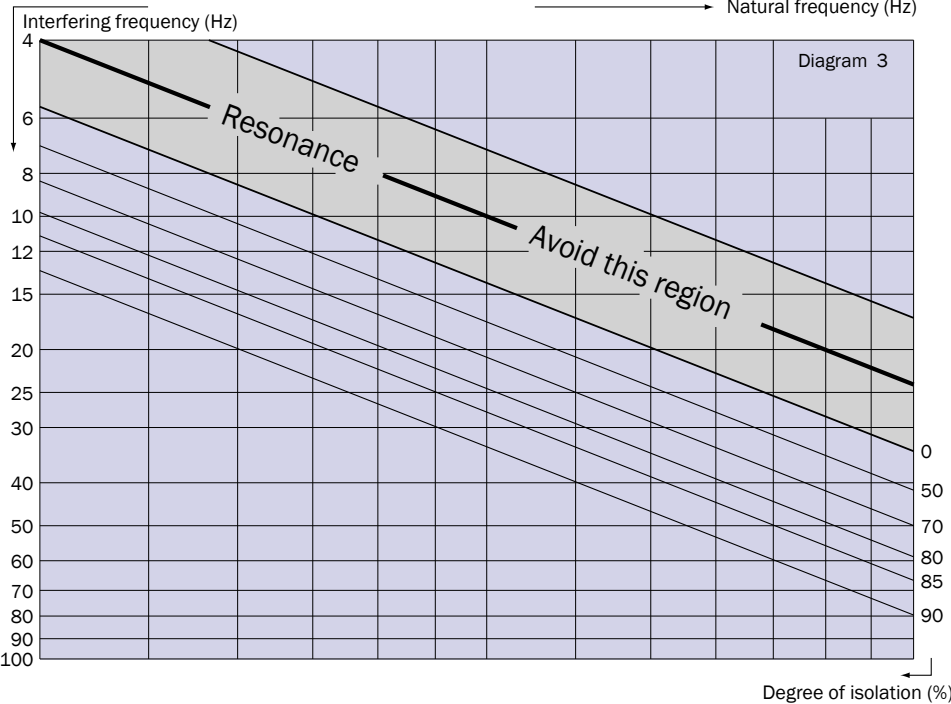
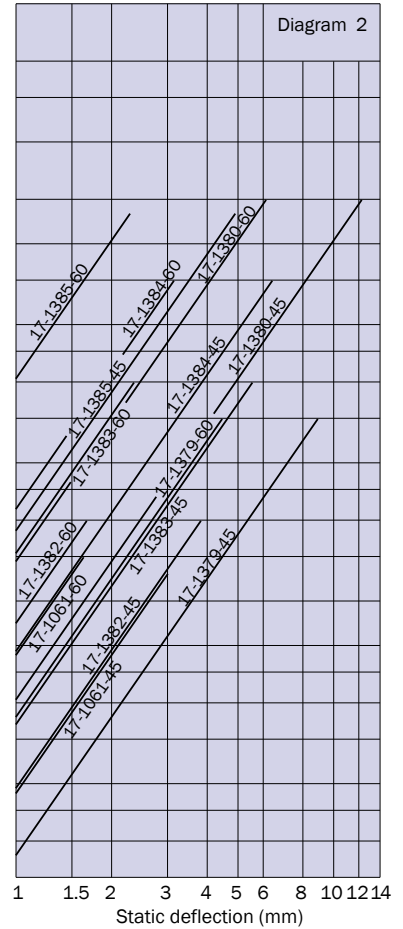
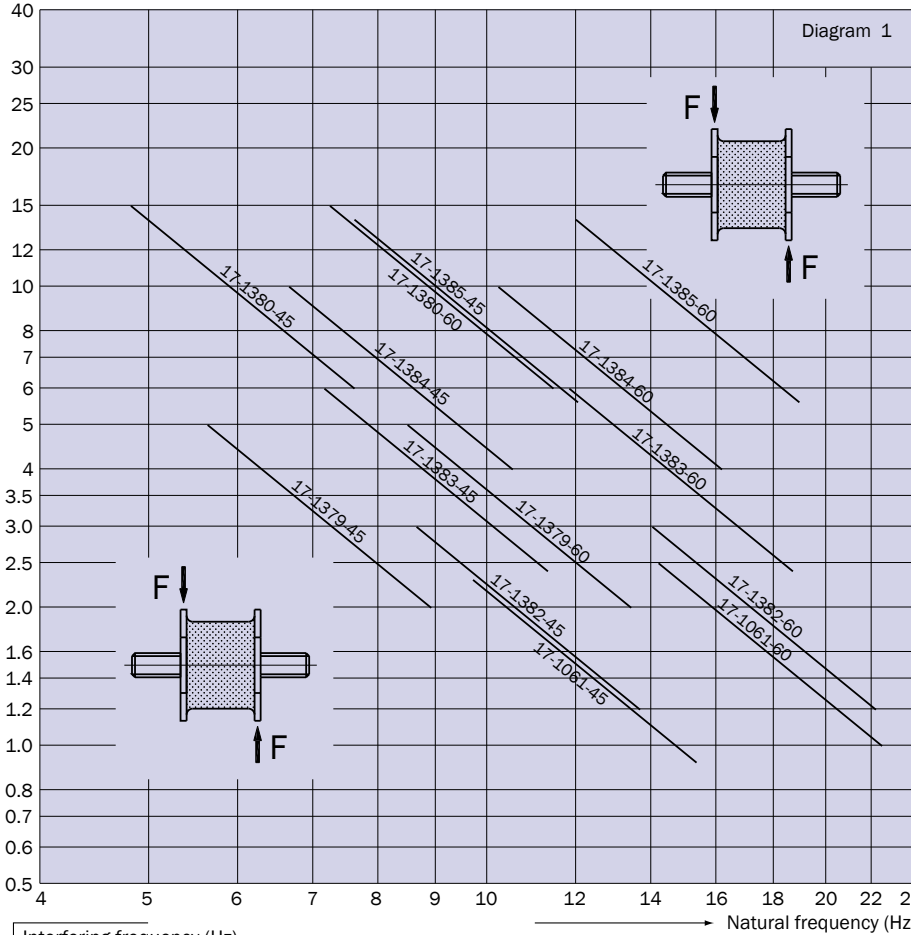
To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz) (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.



Two Bolt Instrumountings™

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

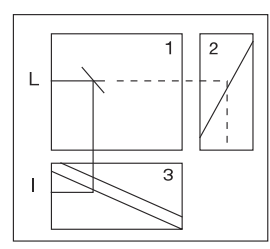
Load per mounting (kg)



To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz) (Hz = rpm / 60)

Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting. Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated. For static deflection, see diagram 2.



Features

Type U is a robust element consisting of 2 solid U-shaped steel parts securely bonded to the rubber section.

To achieve higher flexibility, two holes in the rubber are provided between the metals. The upper metal plate is fixed to the underside of the machine foot or base plate by means of a bolt, while the bottom plate should be secured to the floor by an expansion bolt. For certain applications a dowel pin may be adequate.

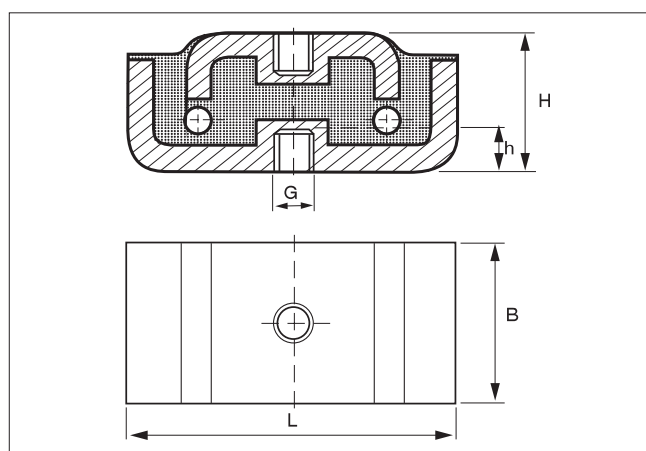
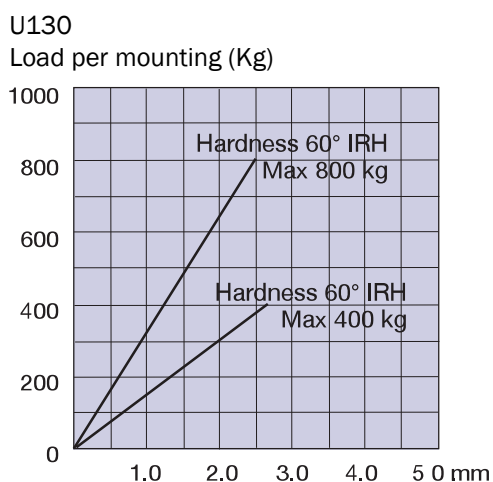
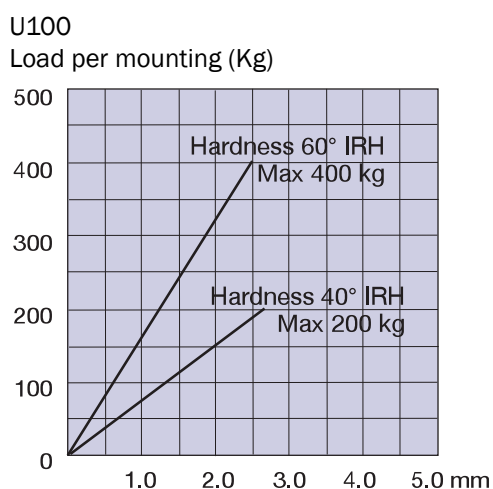


Novibra® type U™

Type U provides for a stable machine installation and is particularly suitable for the vibration isolation of heavier machinery with relatively high interfering frequencies.

Typical applications can be found on:

- ▼ Presses
- ▼ Church bells
- ▼ Punches
- ▼ Transformers
- ▼ Other heavy, high-speed Machines
- ▼ Printing machinery
- ▼ Woodworking machines
- ▼ Weaving machines



Type	Drawing no.	Part no.		Dimensions in mm					M-Max (Kg)		Weight (Kg)
		40°IRH	60°IRH	B	L	H	h	G	40°IRH	60°IRH	
U100	17-4351	10-00001	10-00002	50	100	42	12	M12	200	400	0,650
U130	17-4352	10-00003	10-00004	70	130	54	12	M12	400	800	1,318



Features

UH is an anti-vibration mounting designed to accommodate axial static and shock loads in both directions. The dynamic natural frequency is constant irrespective of the static load.

When fitted with overload/rebound washers, a high strength fail-safe installation is provided.

Moreover, it is possible to alter the characteristics of the mounting by providing a dome-shaped washer at the upper rubber section. This will provide impact resistance to deflection beyond the permissible limit.

Installation reduces build tolerances.

UH is available in 2 standard versions allowing different maximum loads i.e. type UH 50 to a load of 250 kg and type UH 70 to 400 kg per mounting.

Note: Maximum tightening torque of bolts:

- ▼ UH 50 80 Nm
- ▼ UH 70 120 Nm

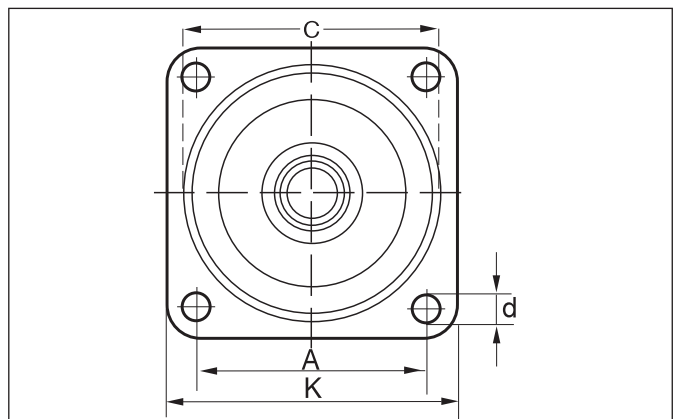
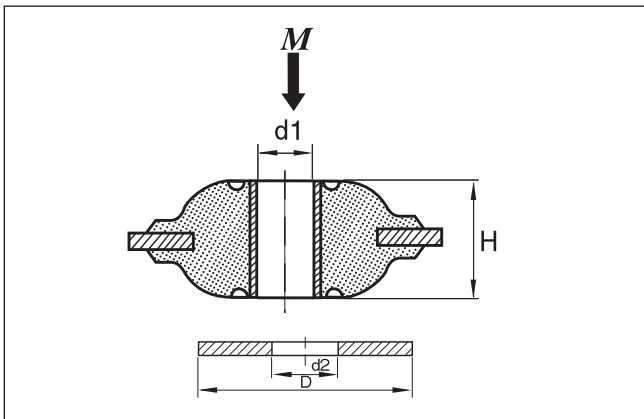
Novibra® type UH™

Mounting type UH™ is particularly suitable for the suspension of both mobile and static cabs as well as platforms on agricultural vehicles.

Effectively isolating vibration and noise, the UH™ mounting also protects tanks and ancillary equipment against metal fatigue caused by chassis distortion.

Specific applications can be found on:

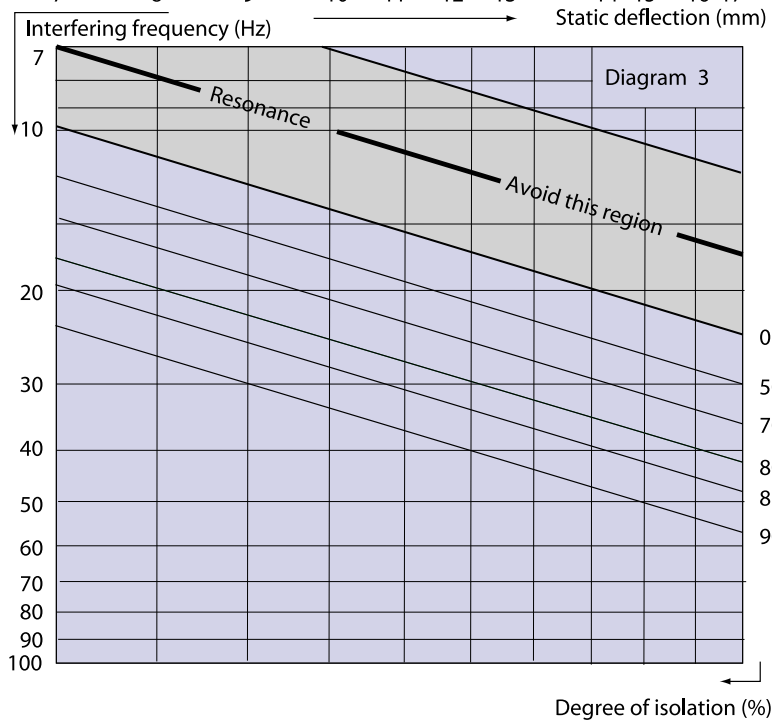
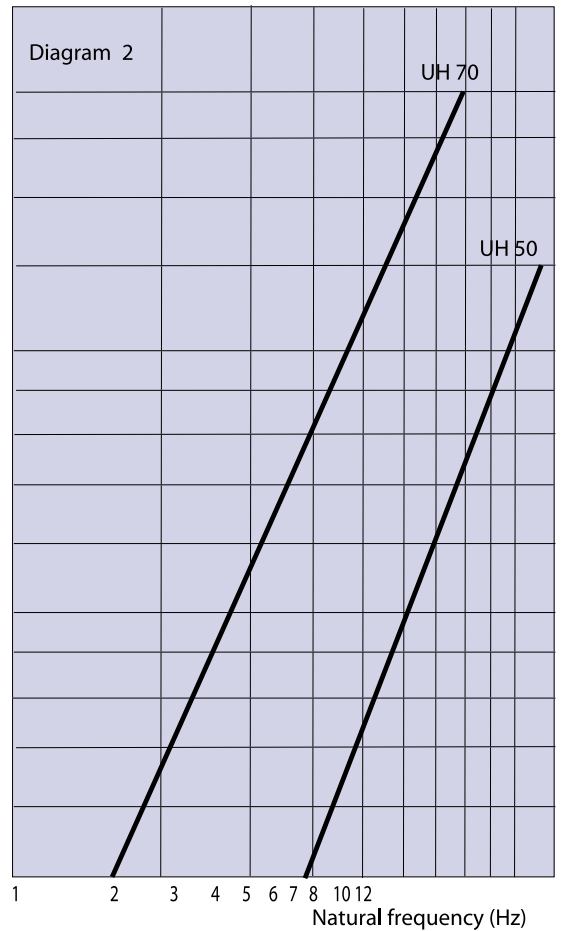
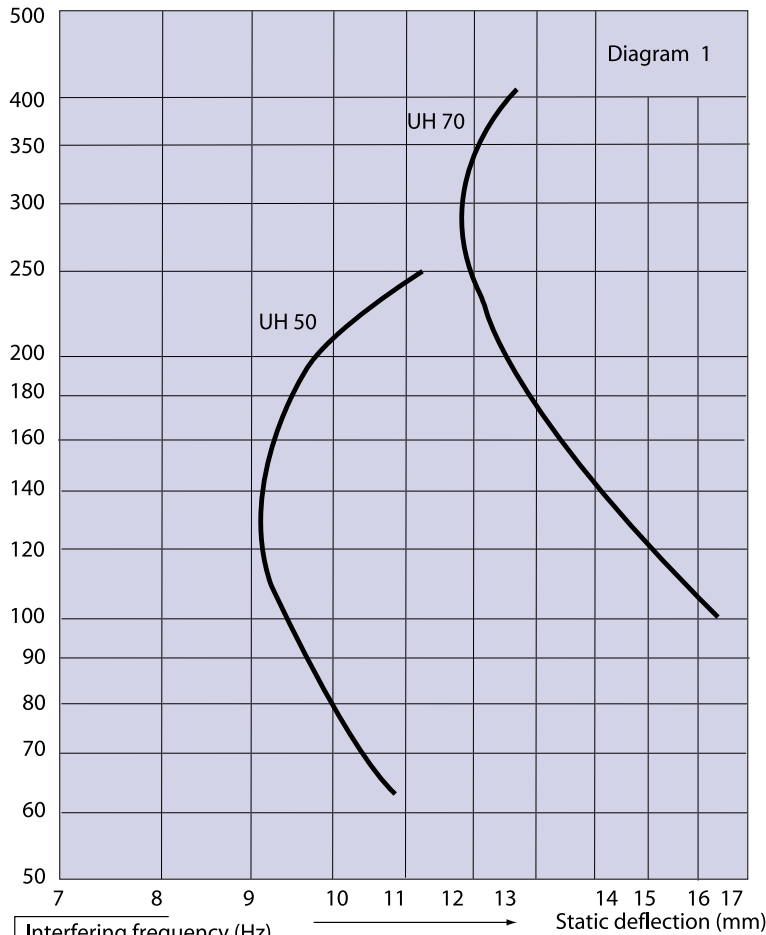
- ▼ Tractors
- ▼ Excavators
- ▼ Compactors
- ▼ Lifting cranes
- ▼ Forklift trucks
- ▼ Forestry vehicles
- ▼ Street sweepers
- ▼ Combine harvester
- ▼ Off-road equipment
- ▼ Construction vehicles
- ▼ Wheel-mounted loaders



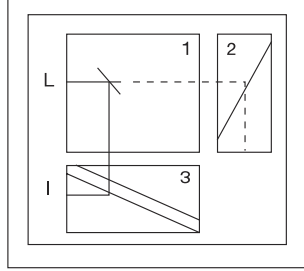
Type	Drawing no.	Part no.	Dimensions in mm						M-Max (Kg)	Weight (Kg)
			K	A	H	C	d	d1		
UH 50	15-4131	10-00086	100,5	80,4	37	91	10,5	15	250	0,41
UH 70	15-4132	10-00088	100,5	80,4	37	91	10,5	17	400	0,41
			d2	D	t					
UH Washer	N/A	20-00608	17	75	6					

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz)
 (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3.
 The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3.
 Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.



Vee Mountings™



Features

Vee mountings have ideal stiffness characteristics for rail vehicle engine suspensions.

The vertical stiffness rate ensures that when the mounting is properly loaded, the vertical natural frequency doesn't coincide with the body bending frequency. The high longitudinal stiffness controls shunting shock motion.

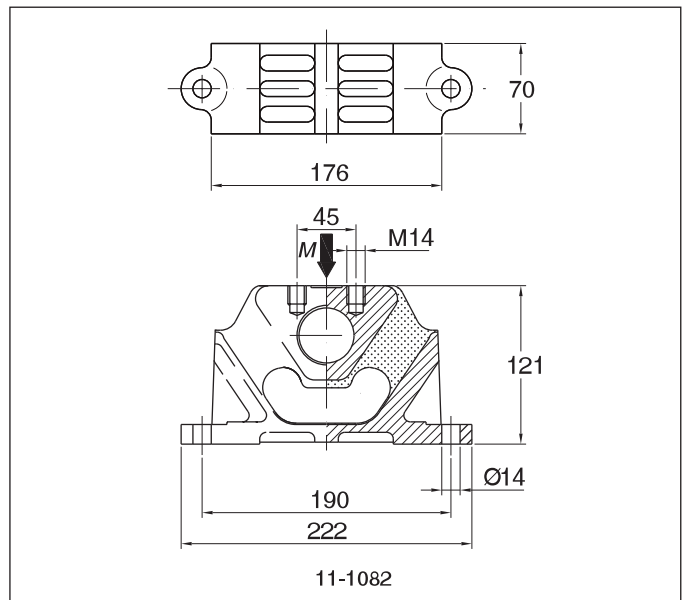
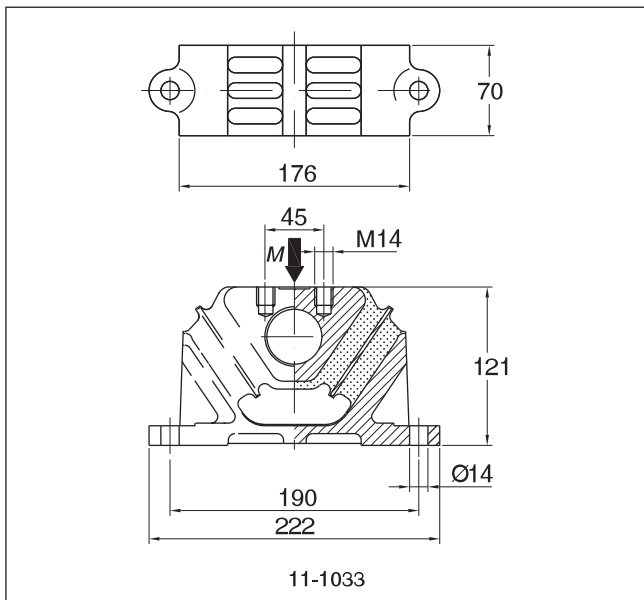
The mounting is usually connected to the sole bars via the base casting, and a buffer is attached to the Vee section casting to limit tensile loads.

The Vee mounting has the following features:

- ▼ Three dissimilar translational stiffnesses for the best vibration isolation and motion control.
- ▼ Strong castings for safety and reliability.

Metalastik® type Vee Mountings™

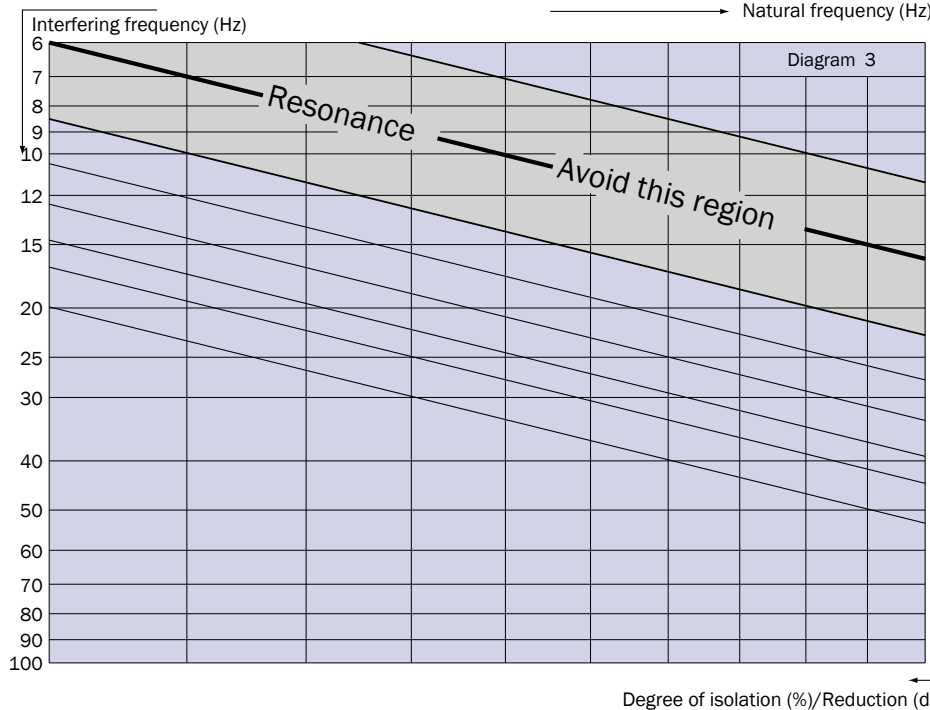
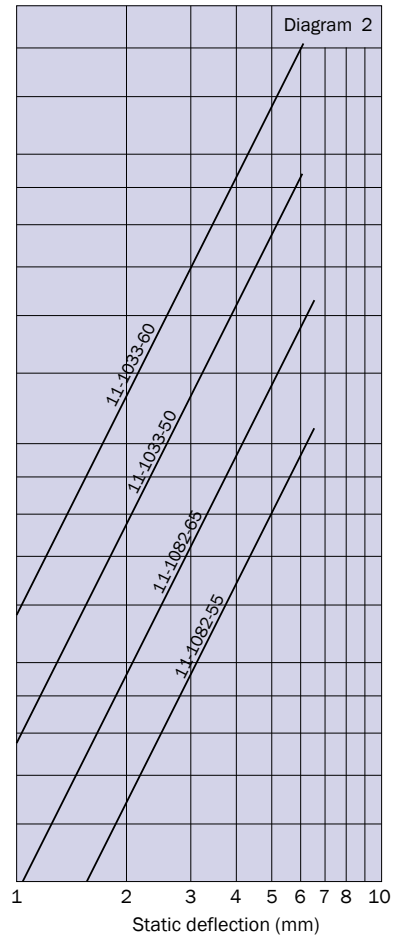
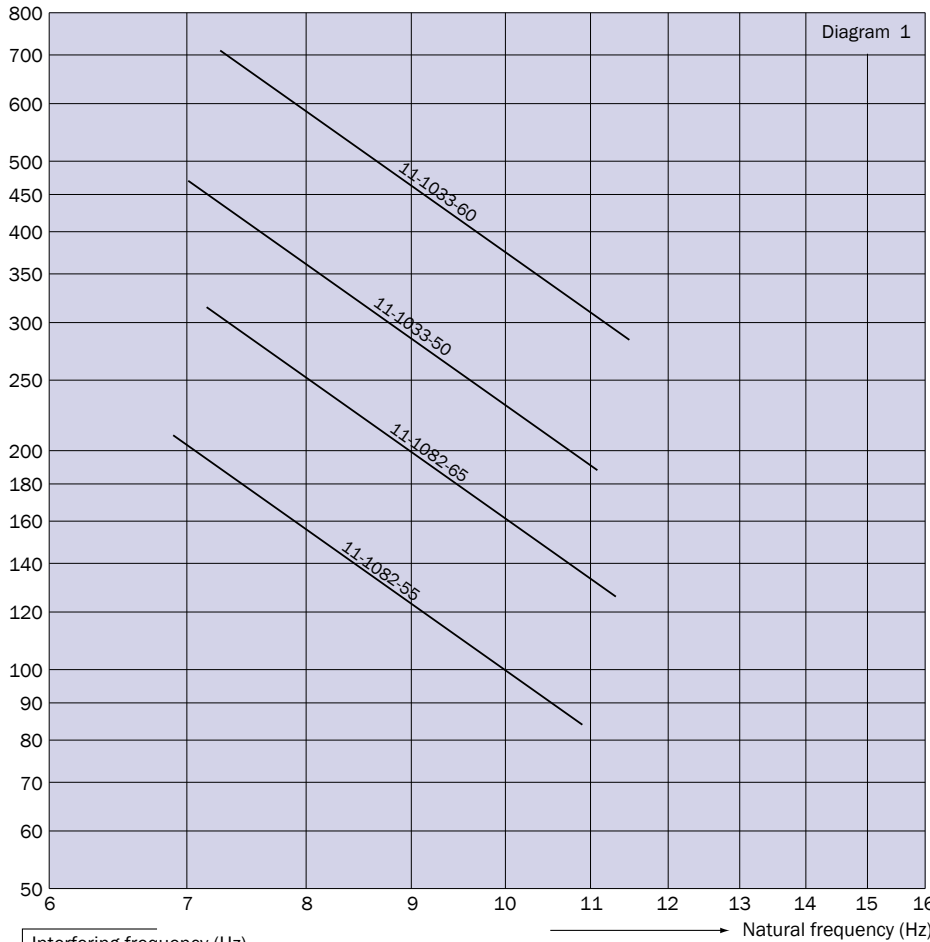
A high load capacity mounting with relatively large rubber volume providing a high degree of vibration and noise isolation and makes it ideally suited for suspending engines installed in public service and goods vehicles.



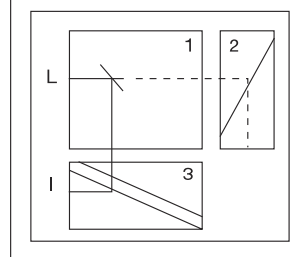
Drawing no.	Part no.	M-Max (Kg)	Weight (Kg)
11-1082	10-00205	210	4,2
11-1082	10-00206	315	4,2
11-1033	10-00196	470	4,5
10-1033	10-00197	710	4,5

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

Load per mounting (kg)



To select correct mounting, following data are needed:
 1) Load per mounting (kg)
 2) Interfering frequency (Hz) (Hz = rpm / 60)
 Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting.
 Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated.
 For static deflection, see diagram 2.



VP™ & UD™ Bushes



Features

Novibra® type VP™ and Metalastik® type UD™ consist of two concentric sleeves with rubber securely bonded between them. Designed to accommodate torsional movements and axial and radial loads. The rubber is prestressed to give maximum dynamic strength and durability.

The bonded rubber takes up the full movement.

Lubrication or other bearing maintenance is not required. The bush has excellent sound and vibration isolation characteristics.

Metalastik® type UD™ Bushes

Novibra® type VP™ Bushes

For vehicle suspension, pivot arms and all types of mechanical linkage, permits oscillating movement through the deflection of rubber in shear. Suitable to replace roller bearings where small motions are required (up to 20 degrees). Reduces shock loads and noise transmission in structures.

Applications:

- ▼ Pivot bearings
- ▼ Conveyor tracks
- ▼ Vibratory feeders
- ▼ Mechanical linkages
- ▼ Vehicle suspension arms

Drawing no.	Part no.	Dimensions in mm				Torsion		Axial		Radial		Weight (Kg)
		d	D	I	L	Stiffness Nm/rad	±β degrees	Stiffness N/mm	Max defl. mm	Stiffness N/mm	Max Load kN	
13-1232	10-00520	8	20	15	17	10	13	205	1,3	2000	0,7	0,02
13-1230	10-00249	10	24	15	18	14	13	180	1,7	1300	0,5	0,02
13-1782	10-00277	12,7	38,2	25,4	31,8	30	22	220	3,3	1200	1,1	0,08
13-1657	10-00271	12,7	38,2	44,5	50,8	42	22	330	3,3	2100	2,2	0,14
13-0785	10-00215	14,3	30,2	44,5	50,8	86	13	640	1,9	11000	6	0,11
13-0797	10-00218	15,9	33,4	60,3	65	140	13	960	2,1	18800	9,5	0,16
13-1004	10-00235	15,9	47,7	44,5	50,8	74	20	330	4,2	2500	2,5	0,20
13-1698	10-00276	35	71,2	41,1	45	395	14	550	5,1	3800	4,5	0,39

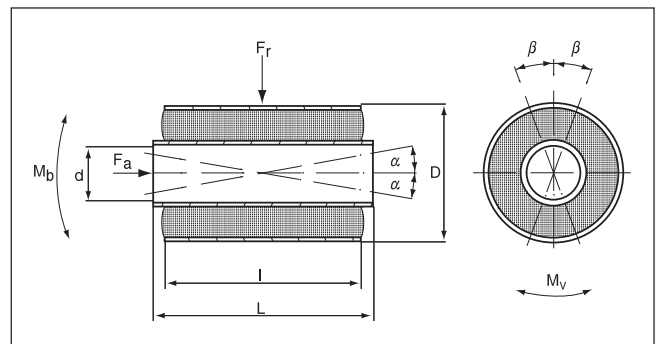
VP™ & UD™ Bushes

Features

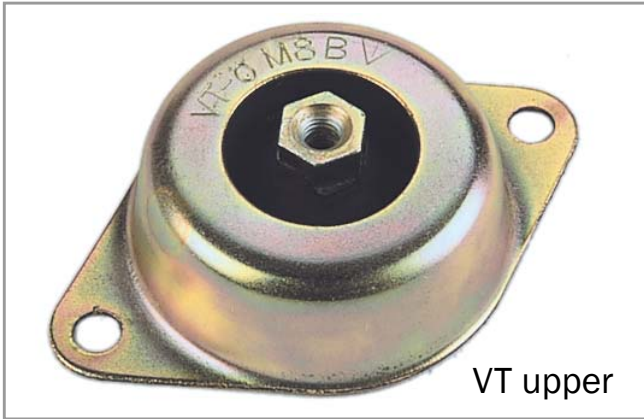
Novibra® type VP™ and Metalastik® type UD™ consist of two concentric sleeves with rubber securely bonded between them. Designed to accommodate torsional movements and axial and radial loads. The rubber is prestressed to give maximum dynamic strength and durability.

The bonded rubber takes up the full movement.

Lubrication or other bearing maintenance is not required. The bush has excellent sound and vibration isolation characteristics.



Designation Drawing no. VP Bush	Part no. 60°IRH	Dimensions in mm				Max Mv Nm/deg.	Torsion			Conical		Axial Load		Radial Load		Weight (Kg)
		d	D	L	l		Max β degr.	Stiffness Nm/deg.	Max Mb Nm	Max α degr.	Stiffness Nm/deg.	Max Fa N	Stiffness N/mm	Max Fr N	Stiffness N/mm	
10-2525	10-00021	10	25	25	20	5,0	15	0,3	6,0	8	0,7	750	170	2300	2000	0,04
10-2540	10-00022	10	25	40	35	6,0	15	0,4	38,0	8	4,8	1500	380	3800	2350	0,06
15-3530	10-00023	15	35	30	25	9,0	15	0,6	12,0	8	1,5	1500	220	3500	3000	0,08
15-3550	10-00024	15	35	50	45	15,0	15	1,0	120,0	8	15,0	2500	520	6000	6500	0,12
20-4540	10-00025	20	45	40	35	24,0	15	0,6	45,0	8	5,6	2600	330	6800	4000	0,16
20-4575	10-00026	20	45	75	70	48,0	15	3,2	365,0	8	46,0	5500	820	13500	8000	0,32
25-5045	10-00027	25	50	45	40	46,0	14	3,3	96,0	8	12,0	3800	450	9000	4500	0,21
25-5085	10-00028	25	50	85	80	49,0	14	4,9	730,0	8	92,0	7500	960	18000	10500	0,42
30-6055	10-00029	30	60	55	45	78,0	14	5,6	135,0	8	17,0	5100	530	12000	5000	0,34
35-6560	10-00031	35	65	60	50	93,0	12	7,7	180,0	6	23,0	6600	720	16000	8500	0,43
40-7065	10-00033	40	70	65	55	138,0	12	11,5	290,0	7	41,0	8300	870	20500	17000	0,56
45-7570	10-00035	45	75	70	60	240,0	12	20,0	320,0	7	45,0	10000	1100	24000	20000	0,67
50-8075	10-00037	50	80	75	65	275,0	11	25,0	700,0	7	100,0	12000	1350	28500	30000	0,77



Features

Type VT™ has been designed so that upon installation the rubber section is subjected to shear loads, thus providing high deflection even at low loads.

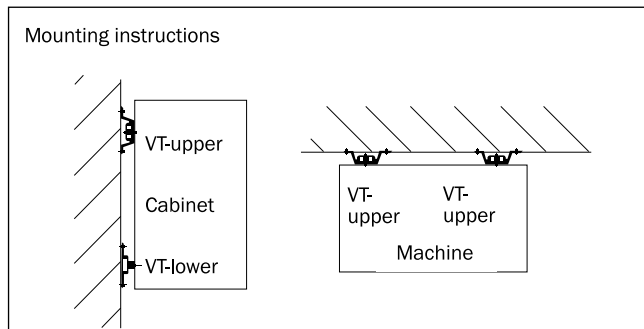
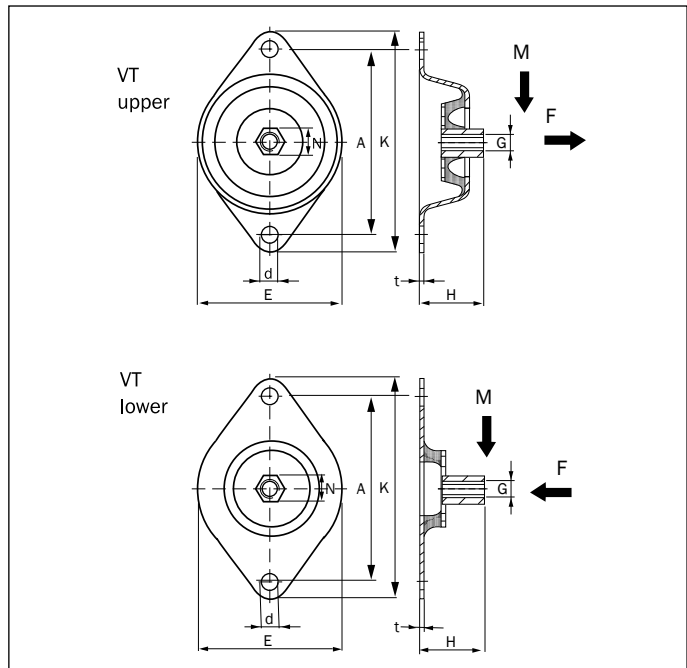
Two different parts are available. The VT-upper provides for protection against tension preventing the isolated unit from falling down if overloading occurs.

VT-lower is designed to accept horizontal compression loads and allow shear deflection vertically.



Novibra® type VT™

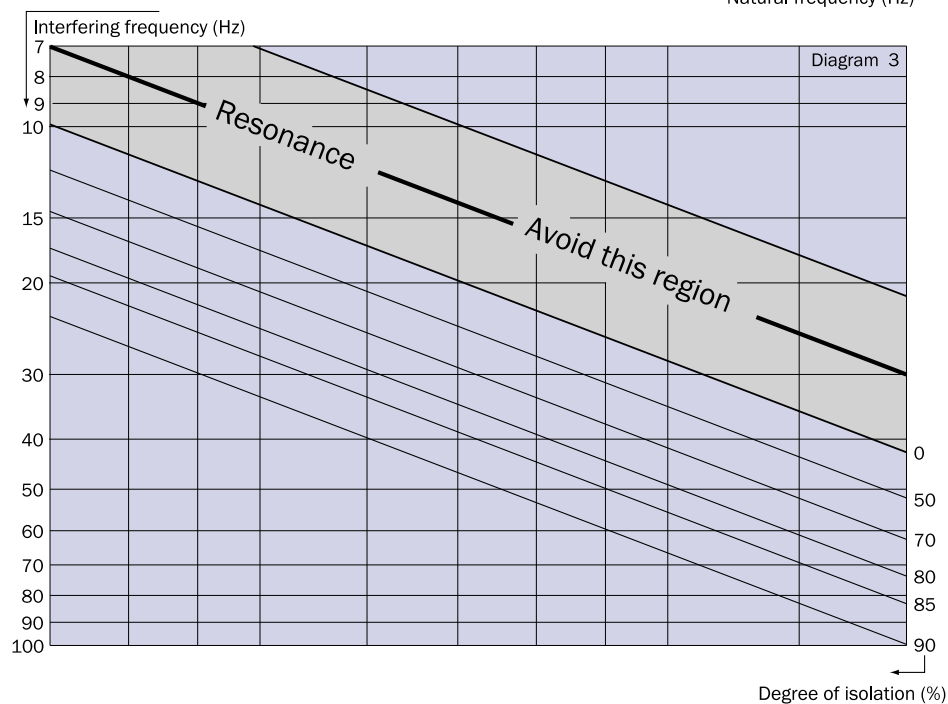
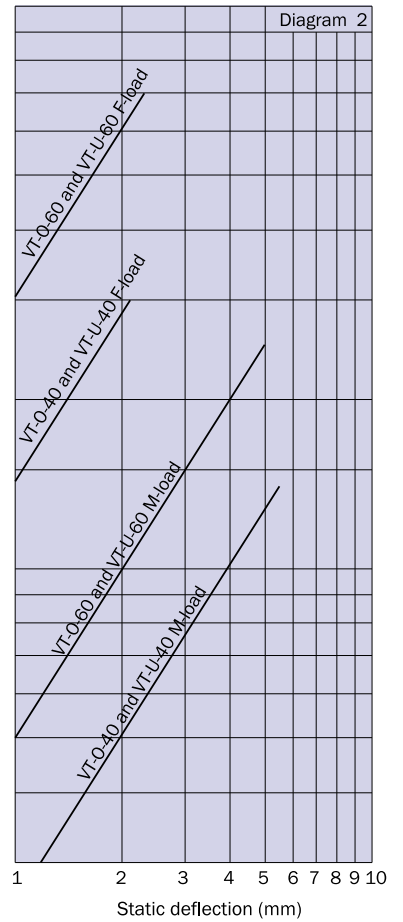
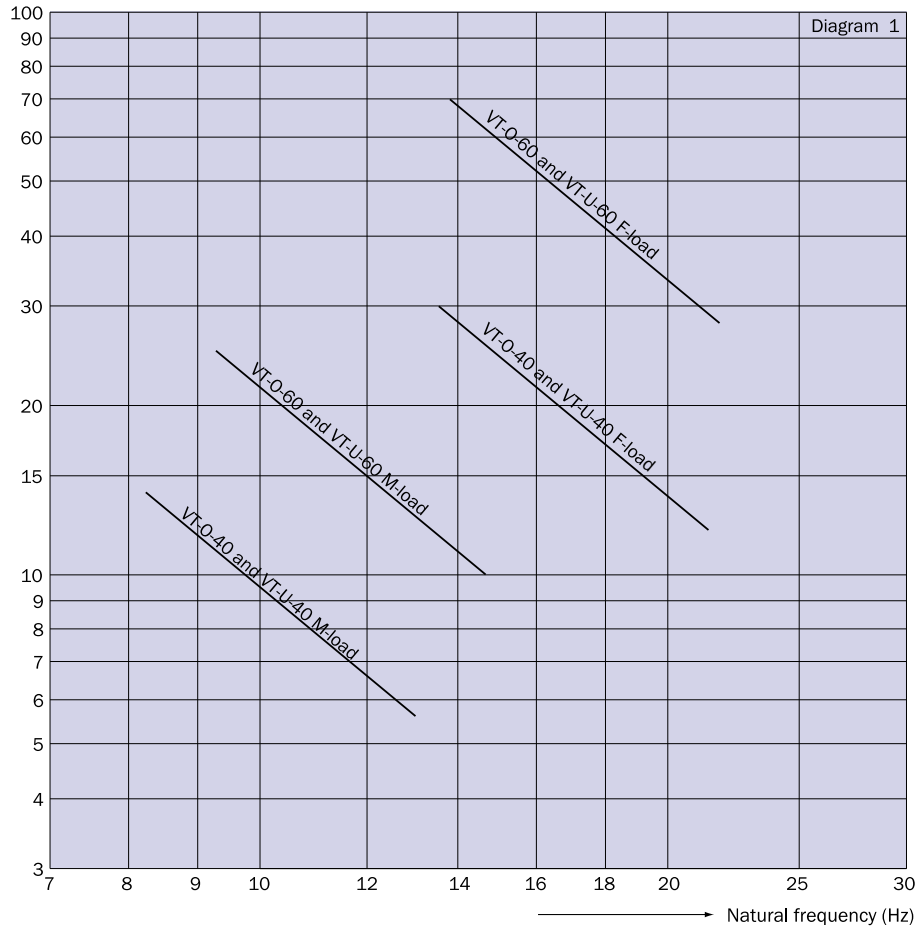
Novibra® type VT™ protects wall-mounted instrument cabinets from vibrations and shocks generated by nearby engines, workshop machinery, etc. It is also suitable to isolate light wall-mounted machines, fans, refrigerating units, etc.



Type	Part no.		Dimensions in mm								M-Max (Kg)		F-Max (Kg)		Weight (Kg)
	40°IRH	60°IRH	E	K	A	H	d	N	t	G	40°IRH	60°IRH	40°IRH	60°IRH	
VT Upper	10-01369	10-01370	75	114	96	33	9	15	1,5	M8	14	25	30	70	0,149
VT Lower	10-01373	10-00015	75	114	96	33	9	15	1,5	M8	14	25	30	70	0,104

Note: The natural frequencies and degrees of isolation are based on dynamic characteristics of the mountings.

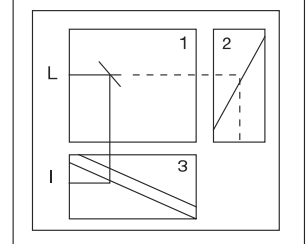
Load per mounting (kg)



To select correct mounting, following data are needed:

- 1) Load per mounting (kg)
- 2) Interfering frequency (Hz)
(Hz = rpm / 60)

Select correct load line in diagram 1 and correct interference line in diagram 3. The load line intersects with required type of mounting. Connect this intersection point vertically down to the interference line in diagram 3. Here, on the sloping curve, the isolation degree is indicated. For static deflection, see diagram 2.

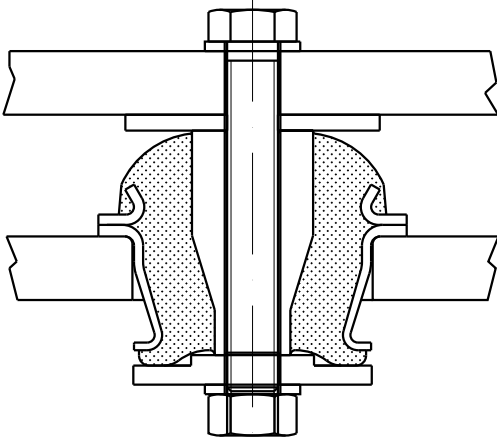




Installation Guidelines

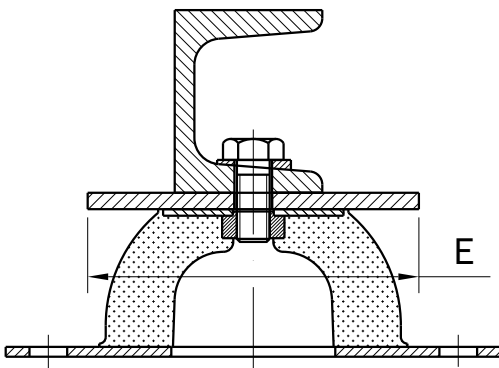
Metacone™ and HK™

Always use appropriate washers when installing conical mountings! This recommendation refers also to mountings type Cab Mountings, UH™ and EH™.



M™ Mountings

The underside surface of the suspended unit which rests on type M mountings should have an area of at least the diameter shown in the diagram and table. Otherwise a thick washer of diameter E should be fitted.



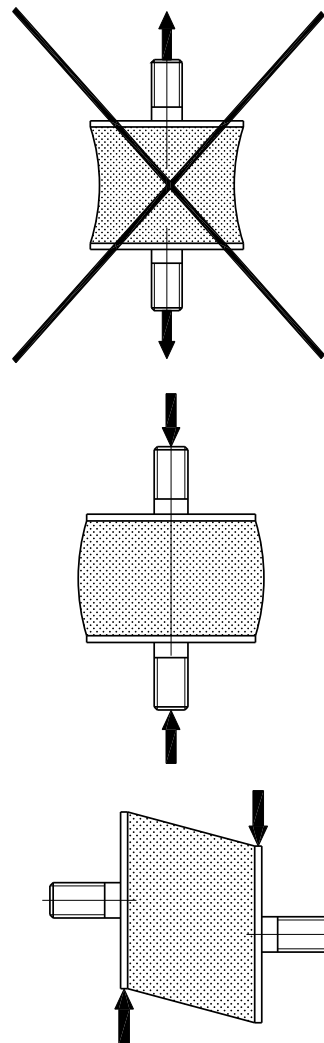
M mounting	E (mm)
M7	43
M25	56
M50	76
M100	96
M200	101
M400	125
M600	165
M1500	260

Loading directions

Do not install antivibration mountings in a way that causes the rubber to work in tension.

Compression and shear are the correct loading directions!

Take this into consideration for mounting types: Bobbins, M™, Two Bolt Instrumountings, Equi-Frequency, type SAW™, Rectangular SAW™ and Circular SAW™.

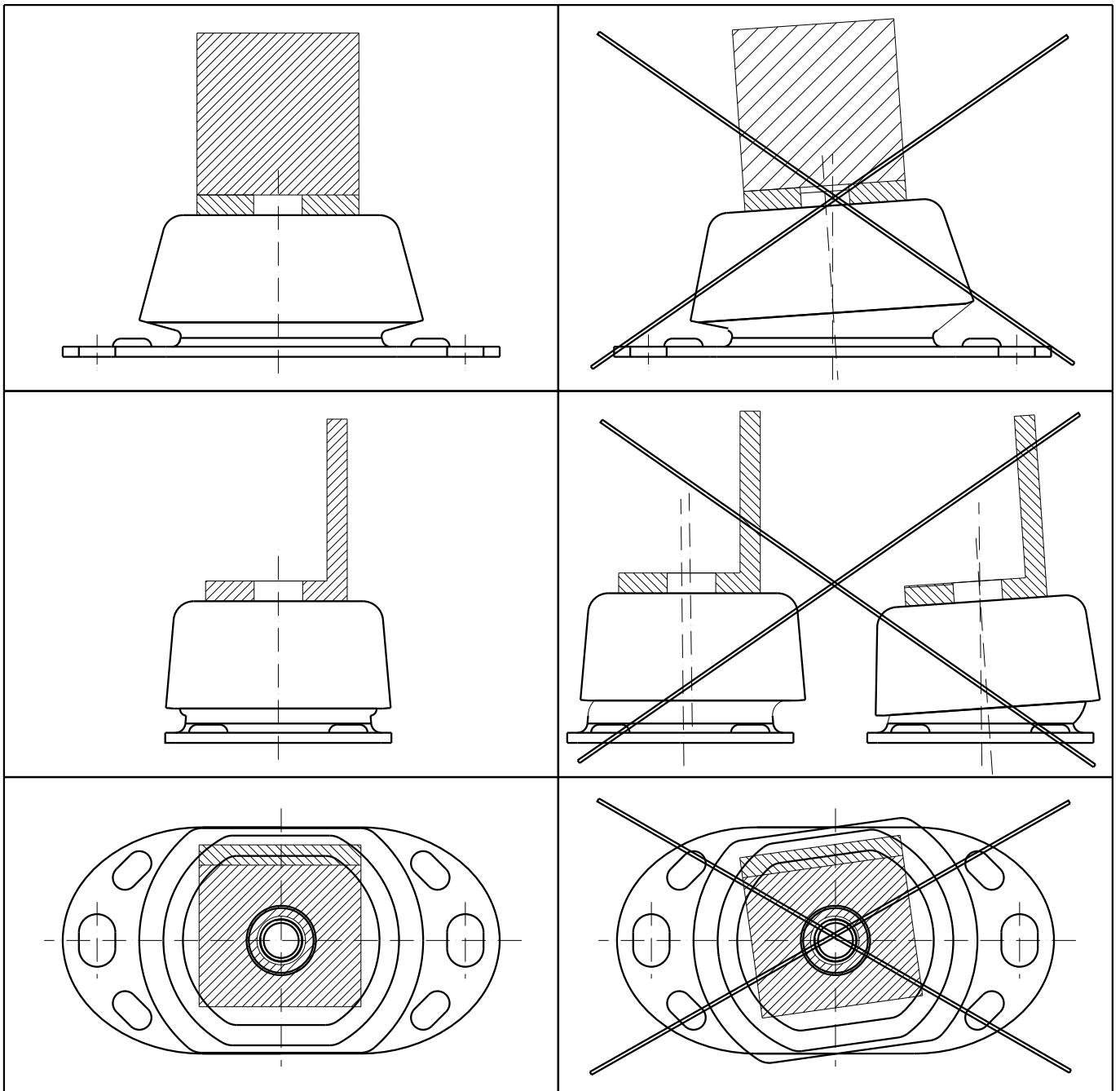


Installation Guidelines

Alignment

In order to ensure maximum performance of all Metalastik® and Novibra® anti-vibration mountings fitted with top caps, all form of misalignment should be avoided.

Actual mounting types are: RA™, RAEM™, Cushyfloat™, SIM™, Cushyfoot™ and RAB™.



Trelleborg Industrial AVS - Application Questionnaire

Customer Information

Date _____

Enquiry from	
Telephone N°	
Fax N°	
Email address	
End user	

Application Details

Vessel type	
Vertical shock criteria	
Lateral shock criteria	
Longitudinal shock criteria	
Minimum temperature @ mountings (°C)	
Maximum temperature @ mountings (°C)	
Environmental conditions	

Engine Details

Manufacturer						
Model						
Configuration	Vee		In-line		Boxer	
Weight (Kg)						
Idle speed (rpm)						
Max speed (rpm)						
Max Torque (Nm)						
Max Power (bhp)						
Datum position description						
Centre of gravity (C.O.G) position from datum (mm)	X		Y		Z	
Mass moments of inertia (Kg/mm ²)	Ixx		Iyy		Izz	
Block sizes (mm)	X		Y		Z	
Number of mount positions						

Transmission Details

Manufacturer												
Model												
Description	Standard		Offset		Down Angle		V Drive		Remote			
Weight (Kg)												
Mass Moment of Inertia (Kg/mm ²)	Ixx				Iyy				Izz			
Block sizes (mm)	X				Y				Z			
C.O.G position from datum (mm)	X				Y				Z			
Gear ratios												
Output shaft position & angle	X				Y				Z		Angle	
Number of mount positions												

Trelleborg Industrial AVS - Application Questionnaire

Mount information

Mount number	Position from datum		
	X	Y	Z
1			
2			
3			
4			
5			
6			

Additional Information

please fax, scan or post the completed Questionnaire back to your sales contact or our technical centre, the contact details are available on the back cover.

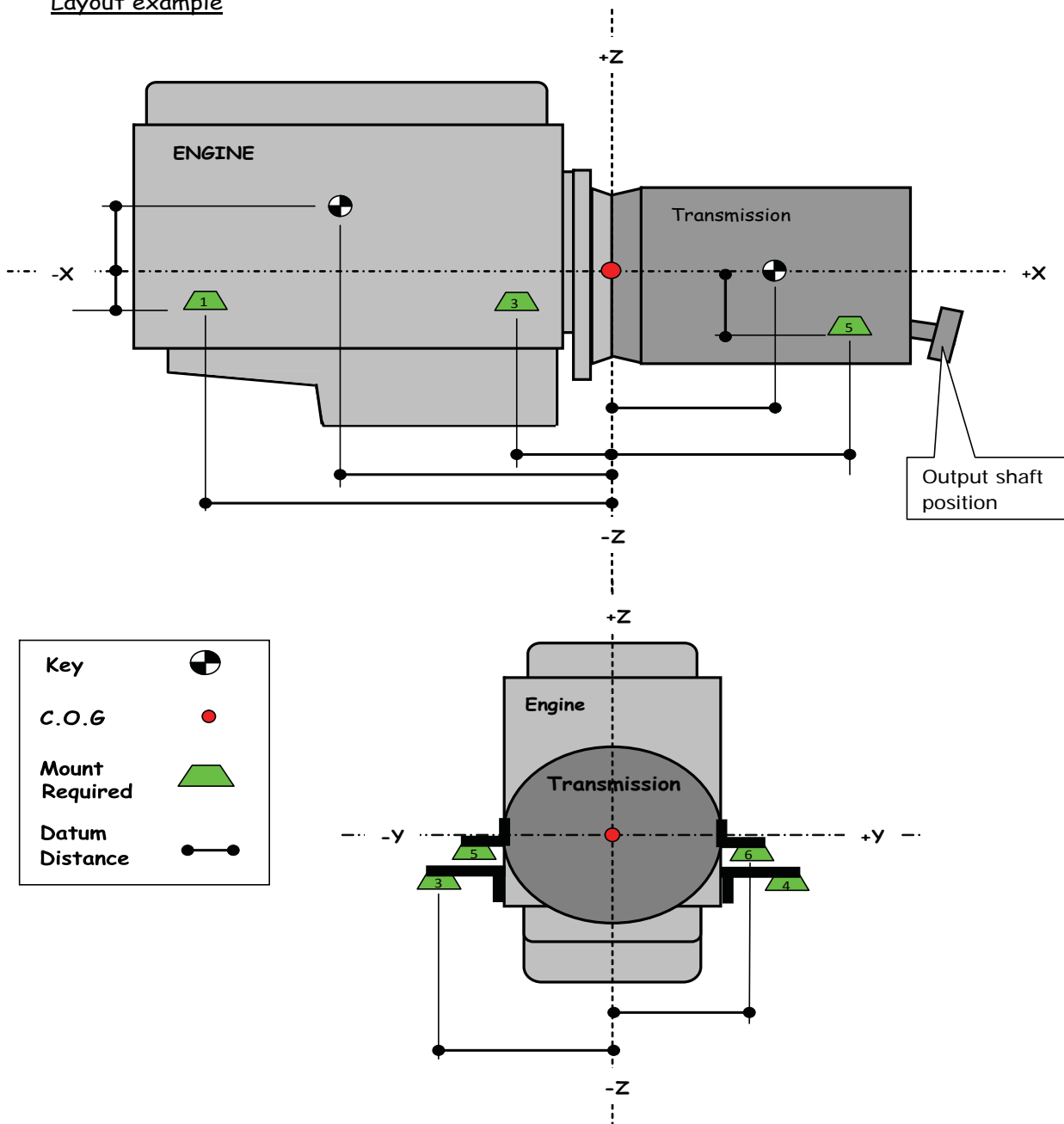
Trelleborg Industrial AVS

- Questionnaire Guide

Should you require further assistance from our Design & Application team, please fill in and tear off the 'Questionnaire' on the following pages.

- Product Selection
- New Product Design
- Application Failure Study
- Vibration Calculation
- Special Application

Layout example



The graphic above show the general position and installation of anti-vibration components, should you have any questions, please contact your sales contact and technical support.

Trelleborg AB



Trelleborg is a global industrial group exclusively focused on polymer technology

Operating in 40 countries, employing over 27,000 people and with annual sales of approximately €3 billion, Trelleborg consists of 4 business areas:

Trelleborg Engineered Systems, Trelleborg Automotive, Trelleborg Sealing Solutions and Trelleborg Wheel Systems.

Individually each Business Area contains specialized Product and process knowledge, collectively they provide market oriented, customer focused solutions.

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MI 49090
United States
Toll Free: 800 424 8857

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Co Reg No: 03847966

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Novibra®

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