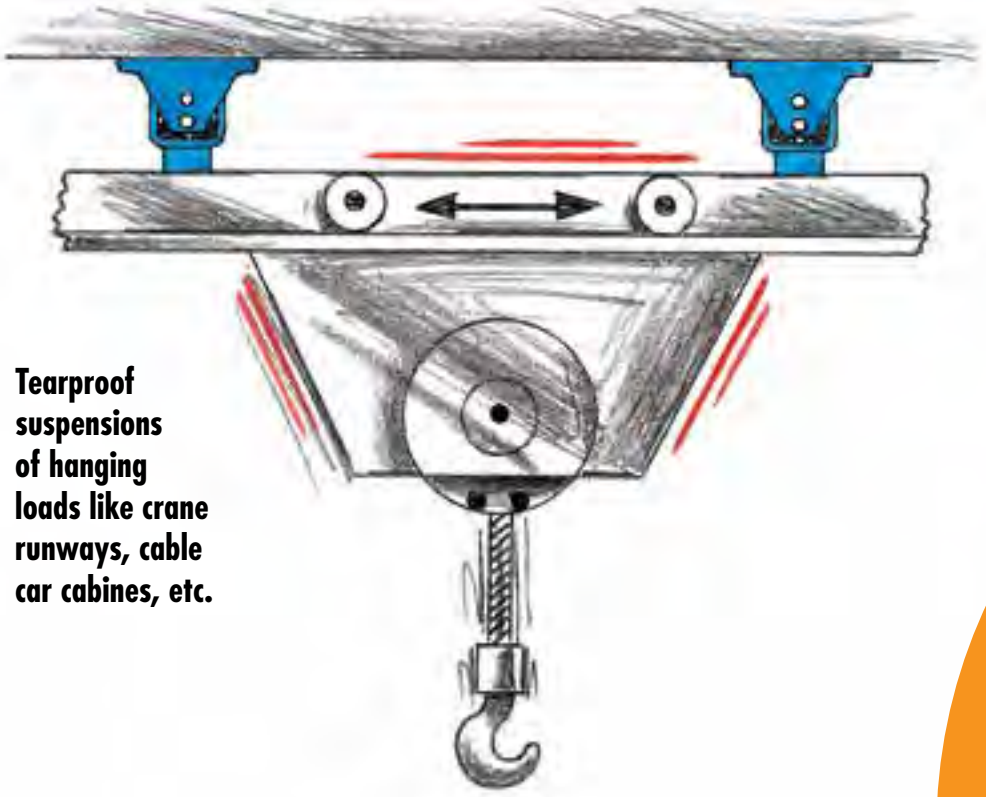
ROSTA Anti-vibration Mounts

Shock and Vibration absorbing Machine Mounts
high degree of isolation – tearproof – absorption of solid-borne noise

ROSTA
swinging solutions

ROSTA Anti-

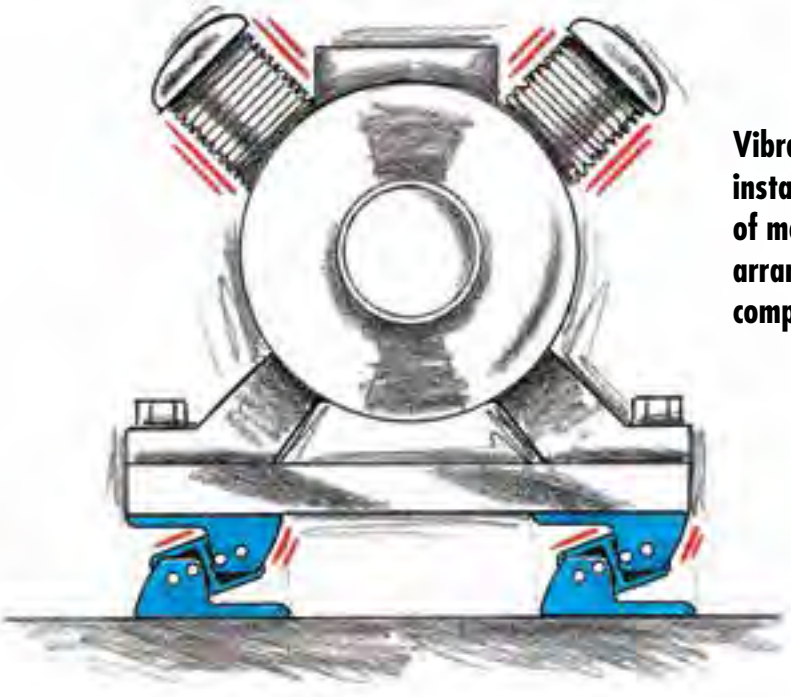
highly elastical and fully tearproof vibration



Tearproof suspensions of hanging loads like crane runways, cable car cabines, etc.

ESL

N



Vibration-free installations of motor test arrangements, compressors, etc.

long lasting
maintenance-free
absorbing solid-borne noise

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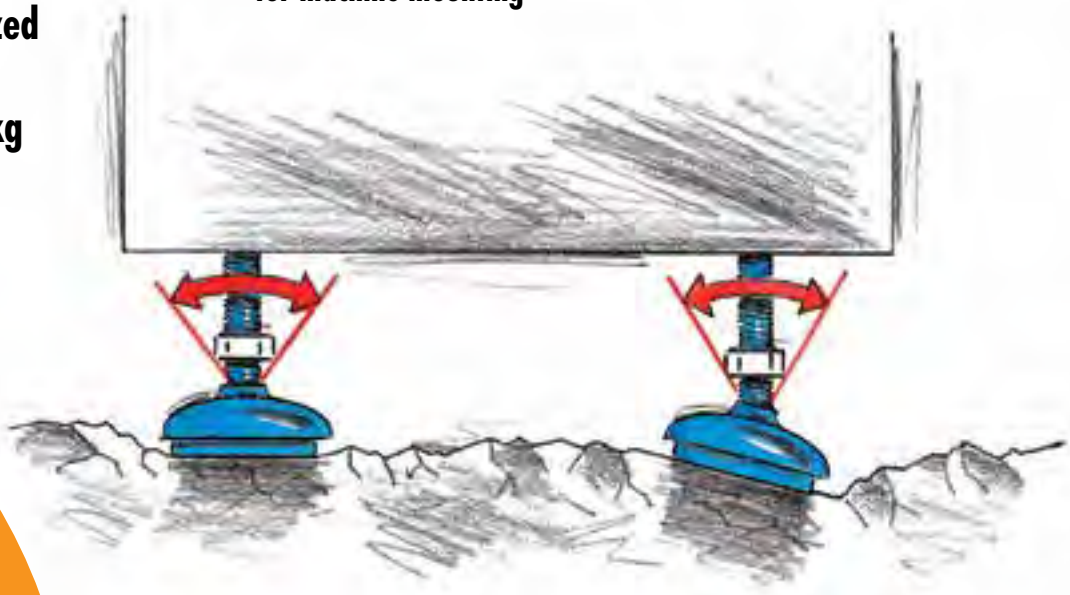
vibration Mounts

dampers based on torsional rubber pivots

Wide range of standardized mounts, for load capacities of 20–2'000 kg

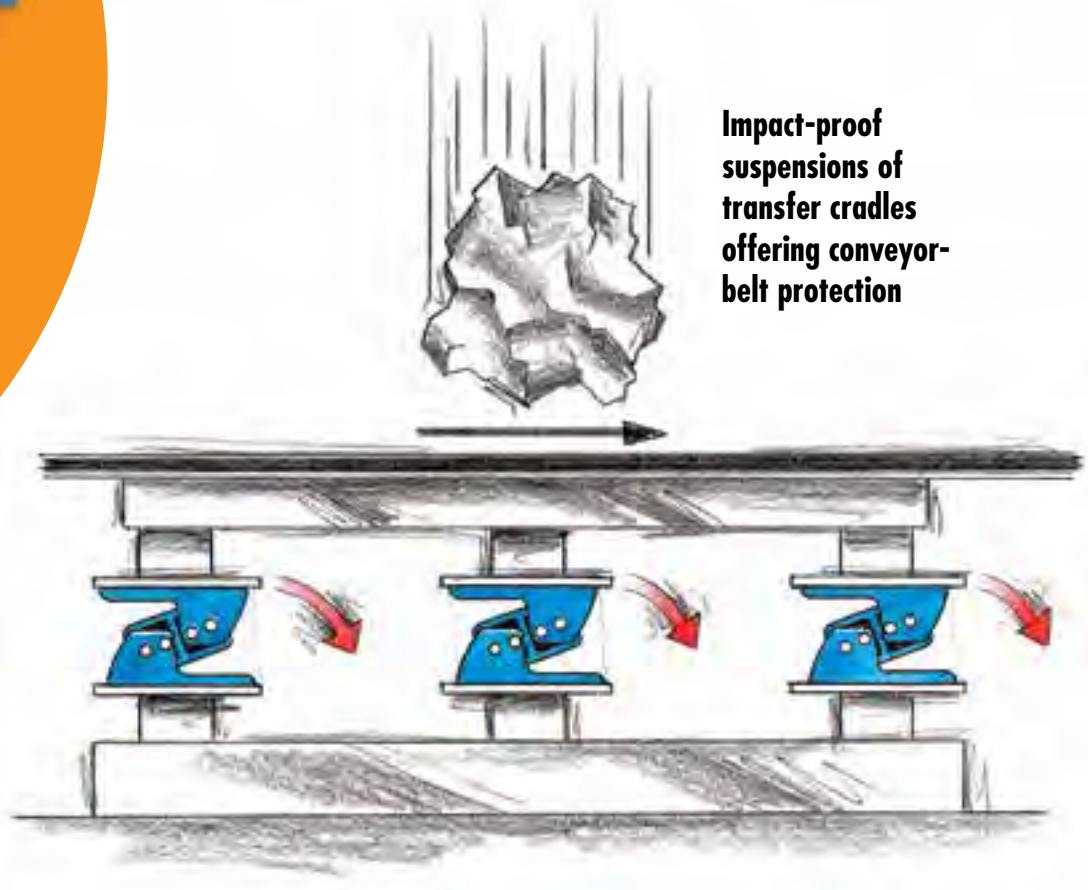
Shock absorbing levelling feet for machine mounting



V

ISOCOL

Impact-proof suspensions of transfer cradles offering conveyor-belt protection



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Selection table for Anti-vibration Mounts

Type	Description	Details	Illustration
ESL	**Anti-vibration Mounts** for the absorption of tensile, pressure and shear load. Also ideal for wall and ceiling installations. **8 load sizes from 200 N to 19'000 N per mount.** Natural frequency between 3,5 – 8 Hz. Mounts are mainly used for overcritical machine installations (machine frequency > mount frequency).	Page 3.8 – 3.9	
V	**Anti-vibration Mounts** for the absorption of tensile, pressure and shear load. Also ideal for wall and ceiling installations. **6 load sizes from 300 N to 12'000 N per mount**. Natural frequency between 10 – 30 Hz. Mounts can be used for subcritical machine installations (machine frequency < mount frequency).	Page 3.10 – 3.11	
N	**Mounting Feets** consisting of insulating plate, glued-on top cover with built-in levelling jackscrew with spherical joint for compensation of up to 5° of floor unevenness. Insulating plate oil- and acid-proof. **3 load sizes from 1'500 N to 20'000 N per mount.** Natural frequency between 19 – 25 Hz.	Page 3.12	
NOX	**Mounting Feets** consisting of insulating plate, **stainless steel** glued-on top cover with built-in **stainless** levelling jackscrew with spherical joint for compensation of up to 5° of floor unevenness. Insulating plate oil- and acid-proof. **2 load sizes from 5'000 N to 20'000 N per mount.** Natural frequency between 19 – 22 Hz.	Page 3.12	
Base plate P	**Accessories:** For all N and NOX mounting feet light metal cast **base plates** are available for the compensation of possible shear loads and/or for the positioning of the installation on the floor.	Page 3.12	
ISOCOL	**Adhesive cushioning plates,** self-adhesive plates for the installation of smaller machines/equipments. Plates oil- and acid-proof. (Adhesive power can be increased by moistening the plate with nitro thinner.)	Page 3.13	
ISOCOL U	**Adhesive cushioning plates,** self-adhesive plates with glued-on cast cover. With central hollow in cover for the positioning of the levelling jackscrew – also with lateral stop bar for machine positioning.	Page 3.13	

Further information to customized elements and installation examples as from page 3.14.

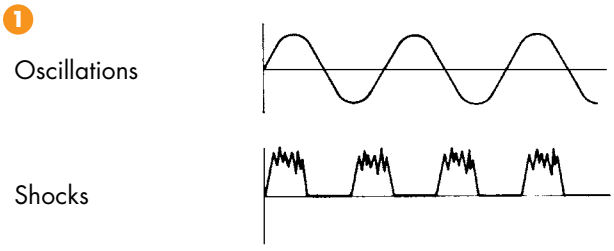
Technology Anti-vibration Mounts

Manufacturers and suppliers of anti-vibration mounts usually offer different types of machine mount with varying natural frequencies to meet the required **detuning** between the excitation frequency of the machine and the natural frequency of the anti-vibration mount.

1. Isolation of Oscillations and Shocks

The vibration technology basically differentiates between two principal types of oscillation appearances (fig. 1). Sinusoidal oscillations of working equipments are usually amortised in an **overcritical** installation manner, shocks and impacts in a **subcritical** mounting manner.

1



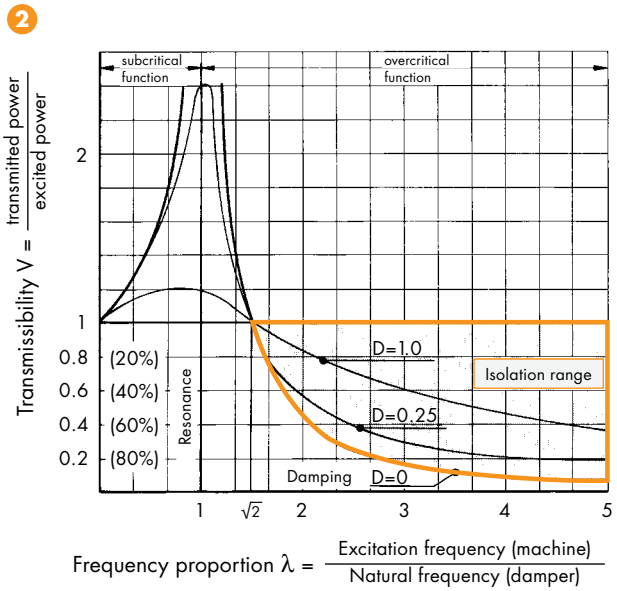
Frequency Proportion λ (fig. 2)

λ > √2: **Overcritical**
efficient vibration isolation, clearly definable effectiveness, also efficient solid-borne noise absorption

λ = 1: **Resonance field**
uncontrolled swing-up, in the long term destructive for machine and mounts

λ < 1: **Subcritical**
vibration isolation not definable, isolation results have to be measured out (before and after mount installation).

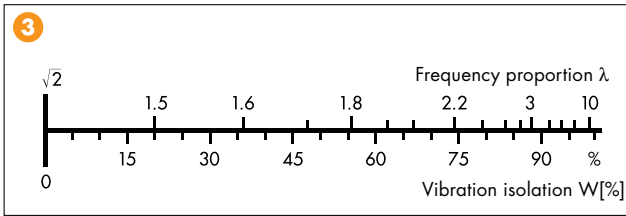
2



Overcritical installations (λ > √2)

On overcritical installations the natural frequency of the mounts should show at least a detuning factor of 1:1,414 in regard to the excitation frequency of the machine. Usually, very efficient anti-vibration mounts feature a deep deflection capability offering a low natural frequency. Most of the generators, compressors, blowers and chargers are, therefore, in **overcritical** manner installed on relatively "soft" mounts. The resulting **detuning proportion** provides information about the expected **isolation-effectiveness** in % of the machine suspension. The adjacent chart (fig. 3) and the calculation formula (fig. 4) inform about the resulting vibration isolation in %.

3



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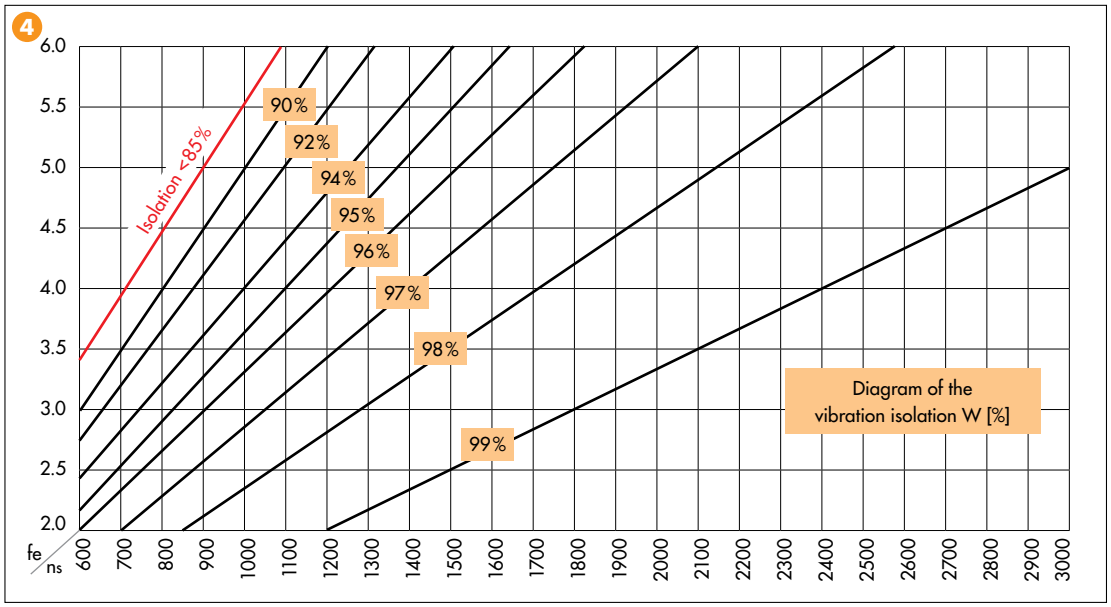


Vibration isolation

$$W = 100 - \frac{100}{\left(\frac{n_s}{60 \cdot fe}\right)^2 - 1} \; [\,\%\,]$$

n_s =
Revolution exciter (machine) [rpm]

fe =
Natural frequency damper [Hz]

Resonance field (λ = 1)

At equal values of the excitation frequency and the mount natural frequency an uncontrollable swing-up of machine and damper occurs. In the long run, this appearance will be destructive for machine and mount (fig. 2).

Subcritical installations (λ < 1)

On subcritical installations (fig. 2) an anti-vibration mount with high mechanical stiffness and only small deflection behaviours should be chosen, e. g. ROSTA V mounts (high machine stability on mounts). In spite of the fact that the degree of isolation is not definable, this suspension efficiently absorbs **shocks** and **impacts** generated by relatively slow turning machines like e. g. mixers, crushers (cone-crushers), punching presses, sheet iron shears, etc. On **subcritical** installations the degree of isolation is not definable. Isolation results have to be measured out (before and after mount installation).

2. Solid-borne Noise Isolation

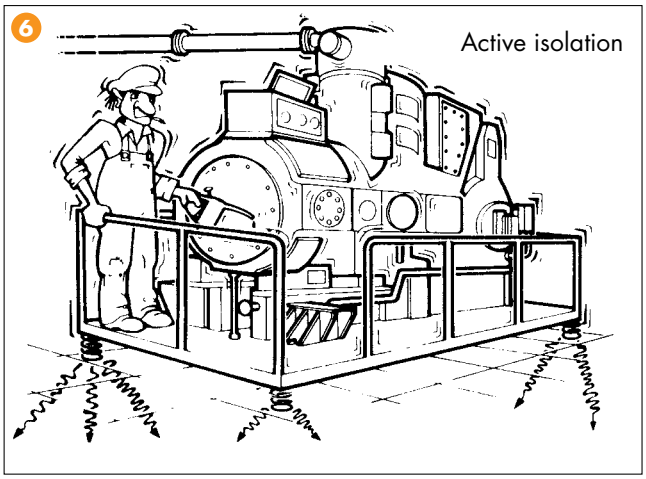
Whereas the isolation of mechanically generated oscillations and shocks are determined and dissipated by means of the aforementioned vibration dampening theory, the **solid-borne noise isolation** is subject to the technology of wave mechanics. The dampening effect is related to the proportion of the relevant acoustic resistance (acoustic resistance or wave resistance = acoustic velocity x material density). The adjacent chart (fig. 5) shows some comparative values of the resulting isolation proportions. Generally, using a rubber-steel composite mount, an ideal isolation result of the solid-borne noise can be expected – through the entire frequency range.

5

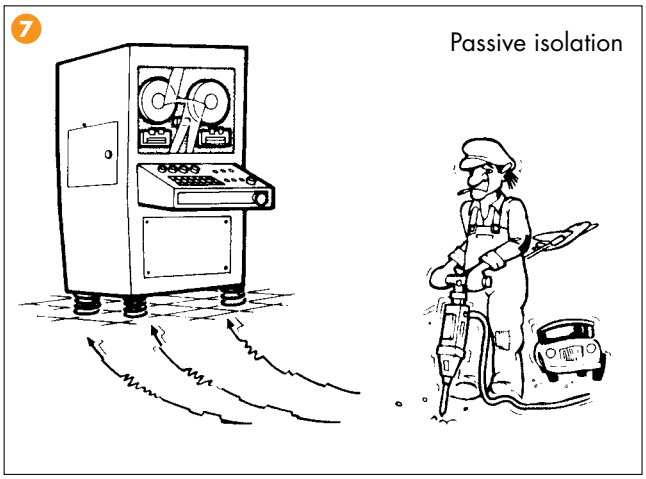
Acoustic isolation, related to steel:	Steel	1 : 1
	Bronze	1 : 1.3
	Cork	1 : 400
	Rubber	**1 : 800**
	Air	1 : 90 000

3. Active and Passive Isolation

Active or direct isolation (fig. 6) means the direct absorption of oscillations, vibrations and shocks of a running machine by anti-vibration mounts, i. e. to prevent **directly** the transfer of the numerous machine vibrations into the substructure, basis frame and entire building. For the anti-vibration mount selection the knowledge of the interfering frequency (**disturbance frequency**), the stiffness of the machine structure and its gravity center as well as of the specific machine location in the building is required. Active isolations are usually **overcritical** machine installations on anti-vibration mounts (e. g. on ROSTA ESL mounts).



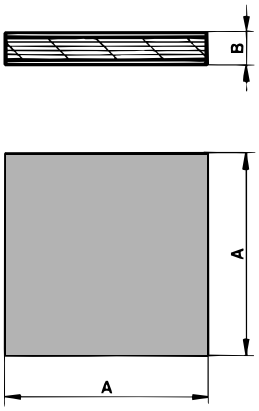
Passive or protective isolation (fig. 7) means to install a protective barrier between all kind of existing vibrations and shocks occurring in a factory or workshop towards sensitive installations like e. g. weighing and measuring instruments, laboratory equipment or electronic control units. The vibration technological situations usually vary in each case and are related to environmental situations, too. Often shocks and impacts come from outside, e. g. from motorways, railways, building sites or tooling machines, like punching presses, etc. Generally, the sensitive equipments shall be protected by installing them on rather "soft" anti-vibration mounts, e. g. ROSTA ESL or AB-D mounts absorbing most of these environmental impacts. It is frequently recommendable to consult also an engineering company having the tools and instruments to analyse the specific vibration appearances.



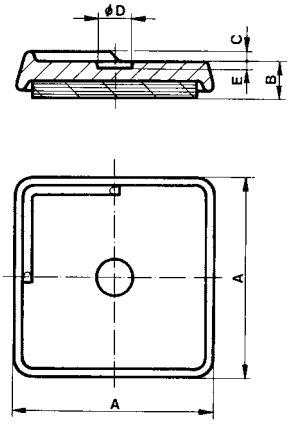
Protective suspension mounts for e.g. tooling machines are usually rather "hard" and show only little deflection under load. Too soft tooling machine mounts could actuate bending of the machine base what would influence negatively the precision of the work piece machining. Therefore, mounting feet for tooling machines are often consisting of hard rubber cushions deflecting only a few millimetres under load, but "shield" all combined vibration and shock appearances from the sensitive precision machine. Transmitted shocks and vibrations could affect the clean surface finishing of the work piece. Of course, in the interest of the fully horizontal positioning of the tooling machines, these anti-vibration mounts have to dispose of a levelling jackscrew with spherical joint for the compensation of the possible floor unevenness (e. g. ROSTA N or NOX mounts).

Adhesive cushioning plates

Type ISOCOL



Type ISOCOL U



Art. No.	Type	Load Gmin. – Gmax. [N]	Natural frequency Gmin. – Gmax. [Hz]	A	B	C	øD	E	Weight [kg]	Material structure
05 030 001	**ISOCOL 50**	500 – 1'500	25 – 16	50	8	-	-	-	0.02	Rubber NBR/SBR with 40 ShA. ISOCOL U with cast cover.
05 040 001	**ISOCOL U 50**			60	14	3	11	2	0.15	
05 030 002	**ISOCOL 80**	1'200 – 3'800	25 – 16	80	8	-	-	-	0.05	
05 040 002	**ISOCOL U 80**			90	15	3	14	2	0.40	
05 030 003	**ISOCOL 400**	32'000 – 96'000*	25 – 16	400	8	-	-	-	1.30	

Installation Guidelines

In order to obtain optimal stabilisation of the machine, it is recommended to allow the ISOCOL plates to protude approx. 10 mm from the machine base. The single plates must be mounted such as the load is evenly distributed.

In cases where levelling is not necessary the ISOCOL U elements can be layed directly under the machine base, up to the lateral stops. Additional fixation is not necessary.

In case the machine frame includes a levelling screw, the central hollow of the ISOCOL U mounting is placed directly under the screw, which allows the accurate levelling.

Applications

For extremely low installation situations, for the damping of vibrations and solid-borne noise, under air conditioning plants, heating boilers, pumps, office machines, laboratory equipment, wood working machines and workshop equipment, etc.

Notice

The deflection of the cushioning plates by the mentioned max. catalogue load capacities is 1.5 mm.

* Besides the mentioned catalogue dimensions, these cushioning plates are also available in sheet-dimensions 400x400 mm = ISOCOL 400. Relevant footprint shapes can easily be cutted out by means of carpet cutters. Calculation of load capacity with 20 to 60 N/cm².

For further information to customized elements and installation examples as from page 3.14.

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Applications!

A few examples:

ROSTA
swinging solutions

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Administrative and Technical Information

1. Guidance, services and offers
Please contact your local ROSTA representative listed in our representatives list on the back of the catalogue if you have any questions or concerns.

We require a full list of technical specifications including any available sketches and data sheets for the preparation of an appropriate offer. This information makes it possible for us to determine whether a standard or custom element is the most cost-effective solution for you. For complex applications, our representative or the home office will send you a questionnaire about the exact specifications for what you need.

Terms and conditions for payments and deliveries are included with our offer or available on our website at www.rosta.com → Company → General Terms.

2. Orders and deliveries
Please include the offer number on your order along with the exact quantity, product name and number. Please send your order to your local ROSTA representative.

3. Availability
Most of the standard products listed in our catalogue are available from stock through your local representative or directly from ROSTA AG.

Custom pieces for a specific customer requirement are produced and delivered as specified in your order confirmation. The delivery time for special custom pieces can be reduced by signing a call order agreement (make-and-hold-order) with ROSTA AG. Please contact us if you would like to discuss this.

4. Technical information
Please observe the capacity limits for our elements as specified in the catalogue. If you are in doubt, please contact us or your ROSTA representative.

Please follow the assembly instructions detailed in the catalogue. Make sure that your assembly workers are instructed correctly. If you have any questions, please contact us or your ROSTA representative.

Assembling elements: To attach our elements or mounts, please always use the largest dimensioned standard machine bolts possible with a minimum strength class of 8.8 that fit into the drilled holes in the elements or attachment clamps. Use an ISO 898 table or your screw supplier's guidelines for the maximum tightening torque.

If in doubt, control your bolt attachments using the VDI Guidelines 2230.

Use DIN 125A stamped washers to attach housings with unworked drilled holes in the casting (for example AB 50) or oblong holes (for example MB supports).

5. Proviso
This catalogue and our other technical information are intended solely for your orientation and information; they may not be construed as absolutely binding in any way. We ask that you adapt the assembly and use of our products in a way suited to the prevailing conditions and situation.

The leading manufacturer of torsional rubber springs

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