

**Mondi Štětí a.s.**

**STANDARD**

**ST 10.02.05**

**VIBRATION DAMPER**

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# STANDARD

## ST 10.02.05

### VIBRATION DAMPER

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<b>Version: 00</b>	<b>Valid from: As of the date of issue</b>
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This standard serves as presentation of vibration dampers as well as help for chooses of various models.

Point 1 - 4                      serve as appendix for contractors  
Point 5 - 6                      serve as help for calculations and for choose

## **1        General**

Vibration dampers are used to eliminate vibration and noise. They are used for vibration isolating and machine noise, which could cause errors (active disturbance). On the other hand; they protect the sensitive machines, measuring machines against the external vibrations. (Passive disturbance)

General standard for usage of aggregates does not exist.

**Following regulations are valid for Mondi :**

- Centrifugal pumps are not equipped with vibration damper except for individual case, where is it essential to use them.
- Ventilators are generally equipped with vibration dampers (exception: small room ventilation, wall ventilators).
- For other less often used moving aggregates, supplier or manufacturer must specify whether the vibration should be damped and which method should be used. (For example: vibration separator cylindrical separator, separator, refiner and so on.)

Generally, the vibration dampers are offered in 3 rubber qualities, (hard, medium hard, soft). In case there is no problem with placement, the big soft dampers should be preferred to small and hard dampers (better body noise damping qualities).

As long as technical condition enables, all vibration dampers, which are used at the present and differing from standard must be exchanged during the repairs. (For instance: base tie plates at height differences, etc.).

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## 2 Standard usage

If manufacturer or construction do not specify otherwise, the Megi- machine foot is used at all placements. It is made of soft rubber without height setting. Manufacturer in a written form must specify standard deviations with the specifying the reasons.

### Standard selection of sizes according to the total aggregate weight

(Table is valid for 4 support point. Because of construction reasons, applied strength must be calculated for more support points.).

Total weight kg	sort no.: 786014	sort no.: 786013	sort no.: 786011
100	x		
150	x		
200	x		
300	x		
400		x	
500		x	
600		x	
700			x
800			x
900			x
1.000			x

RPM	$f_{err}$ $f_e$
1.000	2,0
1.500	2,5
3.000	3,0

- Weight in between are always round number.
- There are always the same dampers used for one aggregate, in case of eccentric center point of gravity- according the greatest force acting on damper.
- For greater weights or in special case, a suitable damper must be used/ if possible Megi-machine foot / (see Standard point 4. and 5.).

### 3 Vibration dampers arrangement

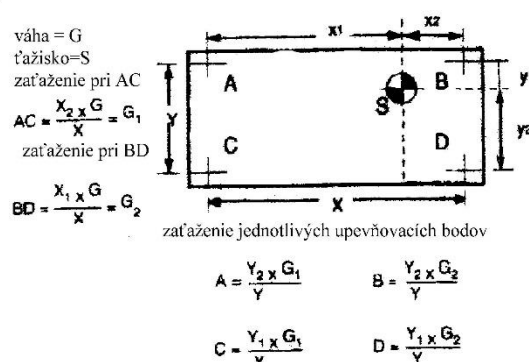
From the static point of view, we state three –point base. As few as possible support points should be selected, i.e. in normal cases 4 support points on the corners. Many manufacturers prefer parallel alignment of several small vibration dampers. However, it is not possible to specify it from the technical-vibration point of view.

Support points should be not center points of gravity of the mass (for example: motor axis or ventilator axis). There is a danger of oscillation (resonance).

Steel and concrete foundations must be aligned to  $\pm 0,2$  mm. Setting of height on the dampers may not be used to compensate inaccuracies.

### 4 Specifying the load distribution

The total center of gravity is defined, then:



### 5 Explanatory calculation of the vibration damper

Frequency  $f_e$  is calculated by using the excite frequency of pulse  $f_{er}$  (for example: ventilator frequency). Following ration is used:

$$\eta = \frac{f_{err} [1/s]}{f_e [1/s]} \quad 3^*) \Rightarrow f_e = \frac{f_{err}}{3}$$

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Then, the static spring  $S_{\text{stat}}$  (damper loss, which is loaded by force) is calculated.

$$S_{\text{stat}} = \frac{g}{(2 \cdot \pi \cdot f_e)^2} \quad [\text{m}]$$

g ... gravity acceleration (m/s<sup>2</sup>)  
f<sub>e</sub> ... frequency (Hz); (1/s)

Now we can read the table on the page 8 to find out the grade of isolation (must be greater than 70%).

Calculation of the spring –back arrangement c [N/mm]

$$c = \frac{F_A}{S_{\text{stat}}}$$

F<sub>A</sub> ... support force /N/  
S<sub>stat</sub> ... static spring /mm/

- when using Megi-dampers (buffers) it is necessary to choose the suitable damper from the tables c and F<sub>A</sub> values.
- when using feet for machines (Standard!!) or other version, it is necessary to choose the suitable size, according to load F<sub>A</sub> and static spring. S<sub>stat</sub> should not be greater than S<sub>zul</sub>.

When selecting the damper in ratio  $f_{\text{err}}/f_e = 3$  and the resulting value  $S_{\text{stat}}$  is too high, the ratio can be reduced to  $f_{\text{err}}/f_e = 2$ .

#### Maximum acceleration specification (control calculation)

Acceleration can be measured for control with CSI – measuring instrument and directly on aggregate. Maximum variation of a vibration with  $s^{\wedge}$  [mm]:

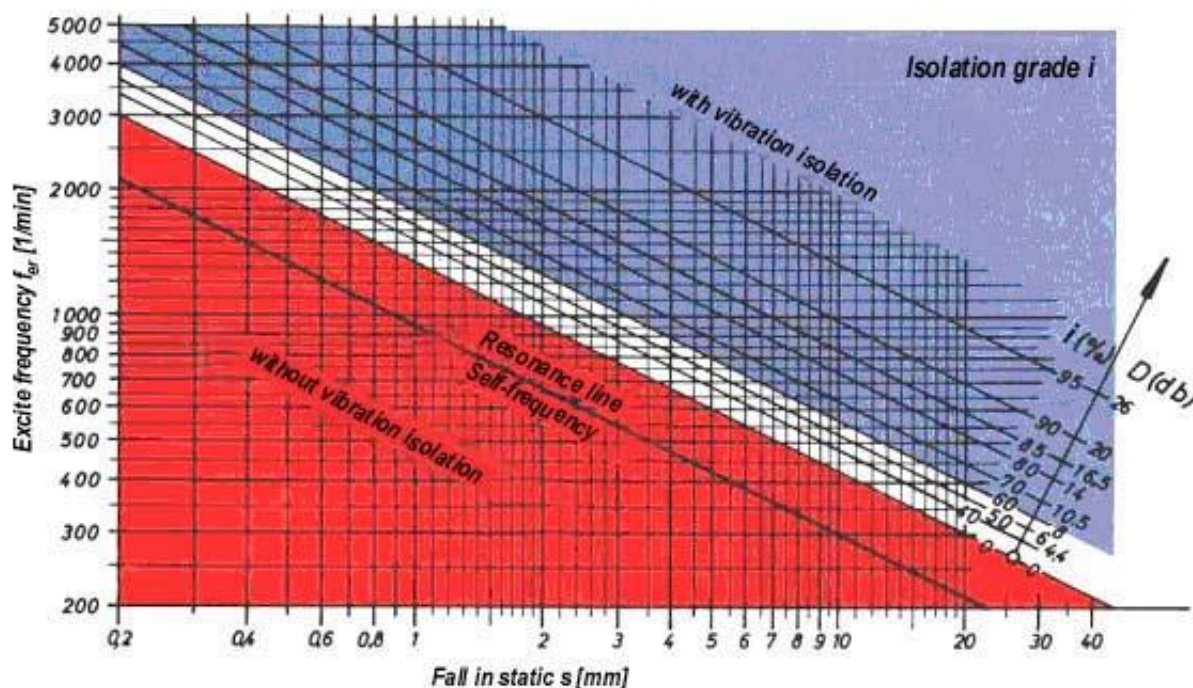
$$s^{\wedge} = \frac{S_{\text{stat}}}{1 - \eta^2} \quad [\text{mm}]$$

S<sub>stat</sub> [mm]

The table below shows that by using the extension of axis between  $s^{\wedge}$  and „f<sub>err</sub>“ ( excite frequency ) maximum acceleration and „g „ . To get the value v [ m/s<sup>2</sup> ] it has to be multiplied by number 9,81 (=g).

#### Diagram for isolation grade definition

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## 6 Vibration dampers sorts and preferred areas of use

See also figures on other pages. More exact details can be found out in the catalogues.

- Megi-damper: it is suitable as a simple and price friendly component, in many cases can be used for spring placement of light and medium heavy aggregates, motors, compressors, pumps and so on.
- Megi-rail: it is recommended for spring placement of bigger sizeable aggregates, motors, lathes, lifting machines, vibration machines (supplied length up to 2000 mm).
- Megi-machine feet: are preferably used when the greater horizontal stronghold with good vertical spring-back for spring placement eccentric presses milling cutters, print-machines and textile machines and so on.



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Megi-cone dampers: they are especially suitable for spring placement of motors and Bodies for chassis, compressors aggregates for the motor car and so on., Impacts are progressively trapped by buffer boards.

Megi-bearings: as bearing elements with high vertical softness and sufficient horizontal hardness, they are used for placement of motors and compressors

Megi-U-V-W-components: they are special bearing elements for elastic placement of the sensitive instruments, measuring instruments and instruments.

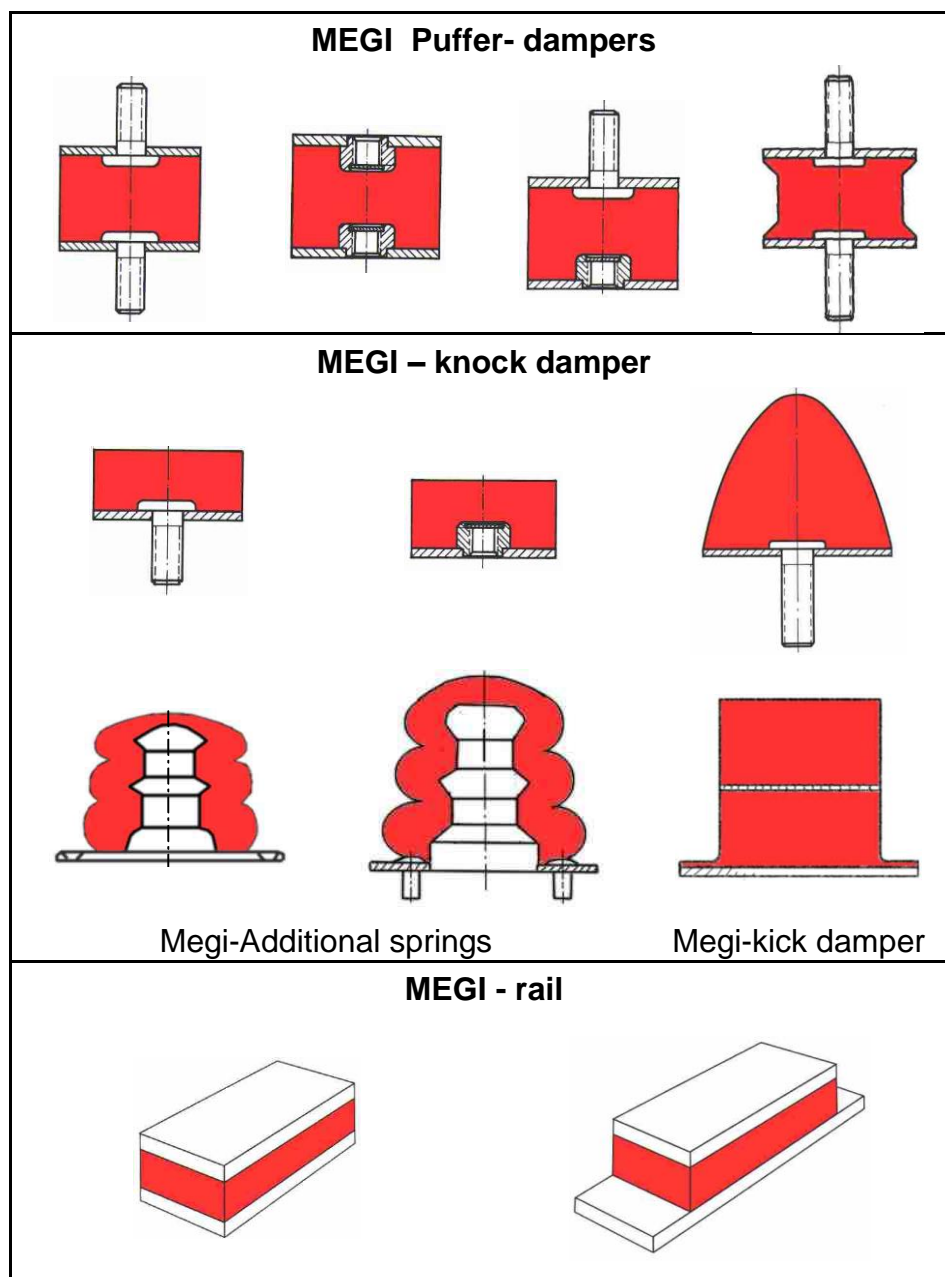
Megi-HL-cases: they are used in many ways as spring cardans with Long operation life in engineering and in truck production.

Megi-AS-cases: when there is a sufficient axial stronghold required, we recommend using them (for example in control constructions and so on).

Megiflex-disks: suitable for fallow and impact instruments as supports for (Megi-spring disks) torque, for spring – back of the rocking racks, list spring ends and so forth.

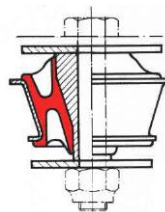
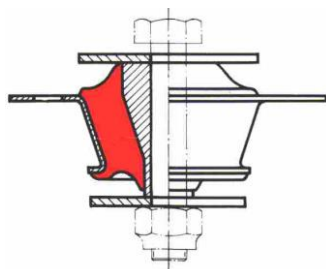
- Type for proffered usage, because its on the stock

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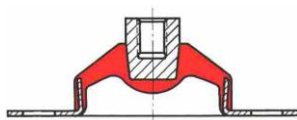
Manufacturing program „Standard“:

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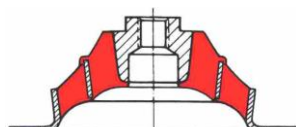
MEGI - Cone



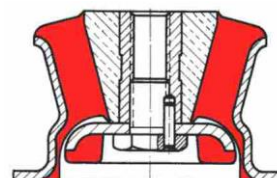
MEGI - bearing



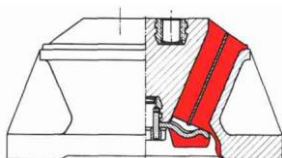
786 028



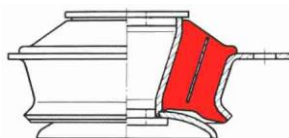
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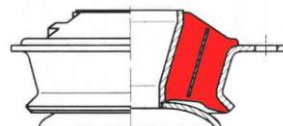
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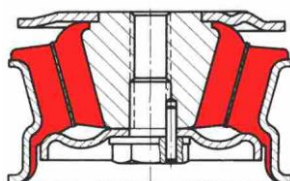
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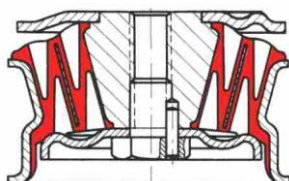
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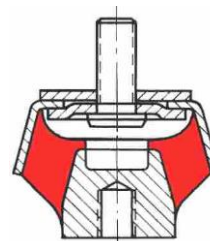
742 062 S1



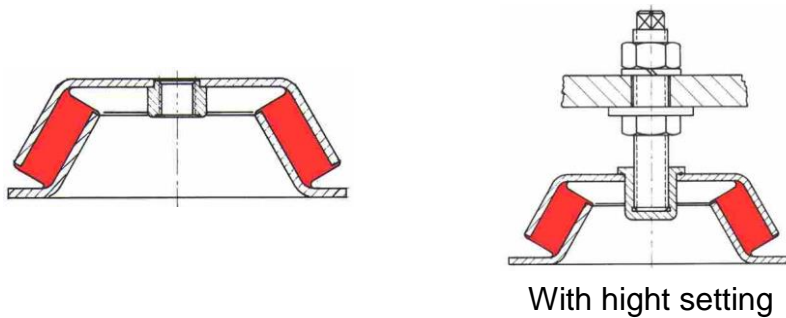
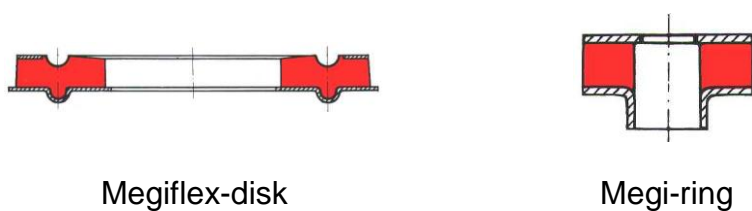
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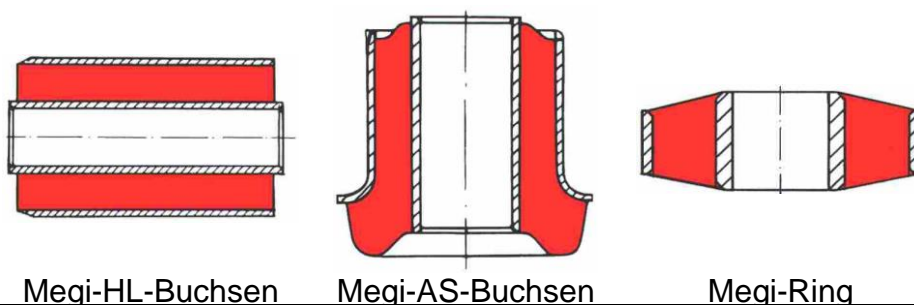


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Manufacturing program „Standard“:**MEGI – machine foot****MEGI - ring**

Megiflex-disk

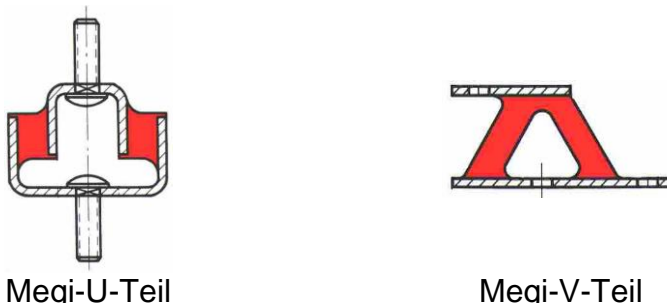
Megi-ring

**MEGI - casing**

Megi-HL-Buchsen

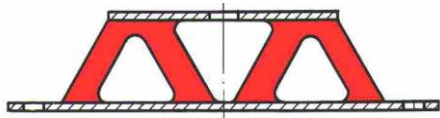
Megi-AS-Buchsen

Megi-Ring

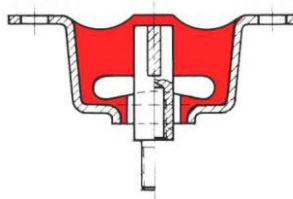
**U-V-W-components and ceiling element**

Megi-U-Teil

Megi-V-Teil



Megi-W-Teil



Megi-cover element