



A Brief Description of Constant Natural Frequency Mounts

Machinery, in general as designed and manufactured, results in uneven weight distribution as far as the footprint of the machine itself is concerned. (see Fig. 1)

Some machines may also have heavy horizontally moving parts and, as a result of this, the weight distribution varies as the machine operates.

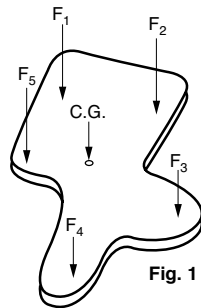


FIG. 1
FOOTPRINT OF A MACHINE
C.G. IS CENTER OF GRAVITY

Conventional vibration isolators are of "constant stiffness" i.e., the force vs. deflection curve is a straight line. It was proven both analytically and by numerous installations of vibration sensitive objects that if stiffness of each isolating mount is not proportional to the weight load on this mount, then intense vertical floor vibrations are transformed into intense horizontal vibrations of the object (machine), thus degrading the vibration isolation and requiring more expensive isolation mounts. This problem can be eliminated if vibration isolators are used, which have the characteristic that the stiffness increases proportionally with the load. Such vibration isolators are called the CONSTANT NATURAL FREQUENCY isolators.

The designation of CNF type mounts is derived from the fact that the natural frequency of a system, by definition, is proportional to the square root of the ratio of its stiffness to its mass. Mass m is equal to weight W divided by acceleration of gravity g , or $m=w/g$. Thus, while use of conventional constant stiffness isolating mounts requires determining position of the center of gravity, complex calculations and use of different mounts for the same machine, the isolation quality can be rather poor. CNF mounts can be used without any calculations for a wide range of loads. Thus they are called UNILOAD.

$$f_z = \frac{1}{2\pi} \sqrt{\frac{k \cdot g}{W}} = \frac{1}{2\pi} \sqrt{\frac{k}{m}}$$

Where k is the stiffness of the flexible element (constant stiffness) and m is the mass of the load.

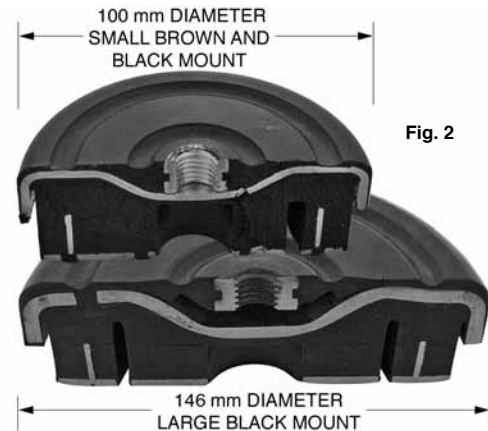


Fig. 2

The intricate designs of CNF type mounts are such that the embedded internal gaps and supports will govern the behavior of the elastic media in such a way that the stiffness will increase proportionally with the load. Therefore, the natural frequency of such a mount remains constant irrespective of the change of the load. Cross sections of a smaller and a larger CNF mount are shown in Fig. 2

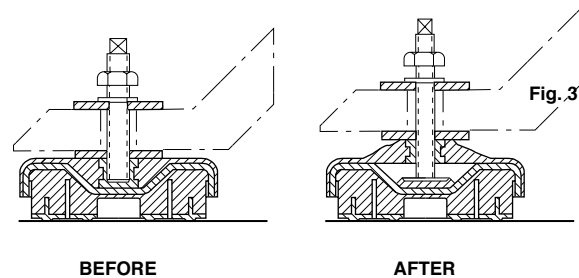


Fig. 3

The design of these CNF mounts is such that they enable the leveling of the machinery itself. Fig. 3 shows a CNF isolator before and after leveling.

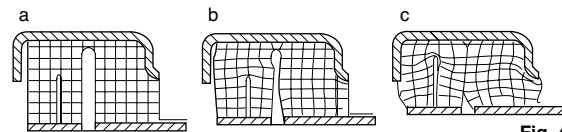


Fig. 4

In Fig. 4, the shape "a" shows the mount structure prior to application of the load; however, it changes to "b" and "c" as the load increases.

Continued on the next page

A Brief Description of Constant Natural Frequency Mounts

Fig. 5 shows Load to Natural Frequency characteristics of two (brown for range 400-1000 lbs., black for range 700-1900 lbs.) mounts which qualify to be used as CNF type mounts. The graph on **Fig. 5** shows the relationship between natural frequency and the weight of the load. These graphs have been derived from actual tests of the mounts by obtaining load vs. deflection measurements and subjecting these values to subsequent calculations. All mounts have the same natural frequency and can be used interchangeably

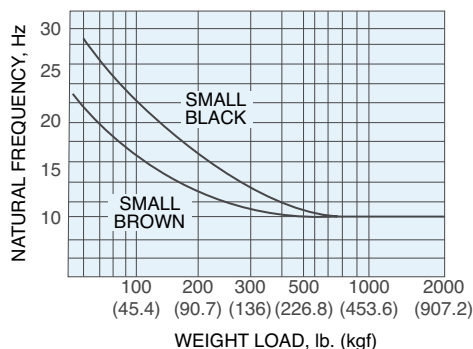


Fig. 5

The graph on **Fig. 6** represents the characteristics of the large mount which can bear loads up to 8000 lbs.

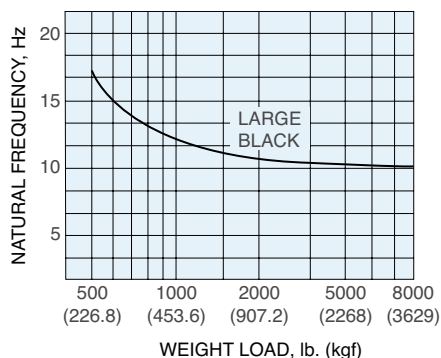


Fig. 6

As previously indicated for conventional isolators, the user must determine the position of the Center of Gravity, calculate weight distribution between the mounting points of the machine, use different isolators whose stiffness is proportional to weight on each mount. All these actions are time consuming, messy (it is easy to misplace mounts), and inaccurate, especially when a heavy component (e.g., table) is moving inside the machine. CNF isolators are identical (cannot be misplaced) and do not require any calculations, and can be used in all places within their specified range. It was proven that the performance of CNF mounts is superior to conventional; i.e., constant stiffness, type isolators.

For additional technical information please consult July 2006 issue of "Sound and Vibration" magazine which contains an article written by Prof. Eugene I. Rivin of Wayne State University, Detroit, Michigan.

The AAC part numbers for these CNF mounts are:

Type	Inch Size of the Leveling Bolt	Metric Size of the Leveling Bolt
Small Black Range 700-1900 lbs. (317.5 - 861.8 kgf)	—	V10Z24M10040HDA
Small Brown Range 400-1000 lbs. (181.4 - 453.6 kgf)	—	V10Z24M10040LDA
Large Black Range 2000-8000 lbs. (907.2 - 3629 kgf)	V10Z24 - 575175A	V10Z24M14545A

For additional technical information go to:
<http://www.vibrationmounts.com/NewProducts/vibrationisolation.pdf>

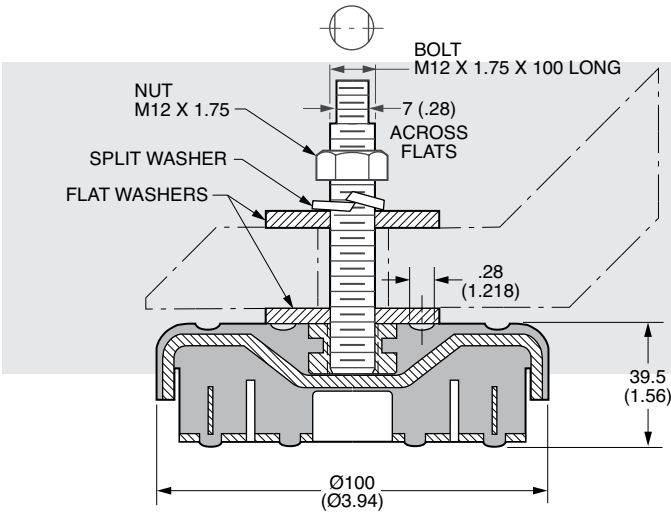


UNILOAD® Constant Natural Frequency Mounts

www.vibrationmounts.com Phone: 516.328.3662 Fax: 516.328.3365

- **MATERIAL:** Housing – Carbon Steel, Zinc Plated
Isolator – Nitrile Rubber

- **FOR LOADS UP TO 861.8 kgf (1900 lb.)**



NOTE: Dimensions in () are inch



Metric

FEATURES:

- Leveling mount
- Stiffness of mount increases with applied load
- Most durable and corrosion-resistant
- Adjustable up to 13 mm (1/2") in height. For larger adjustments, use the spacer plates shown on page 3-8.

APPLICATIONS

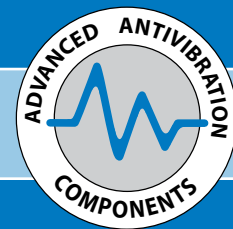
- LATHES
- PRINTING MACHINES
- GRINDING MACHINES



Catalog Number	Hardness Durometer	Color	Max. Load kgf (lb.)	
			Impact	Steady
V10Z24M10040LDA	40	Brown	181.4 (400)	453.6 (1000)
V10Z24M10040HDA	60	Black	317.5 (700)	861.8 (1900)

Leveling Mounts

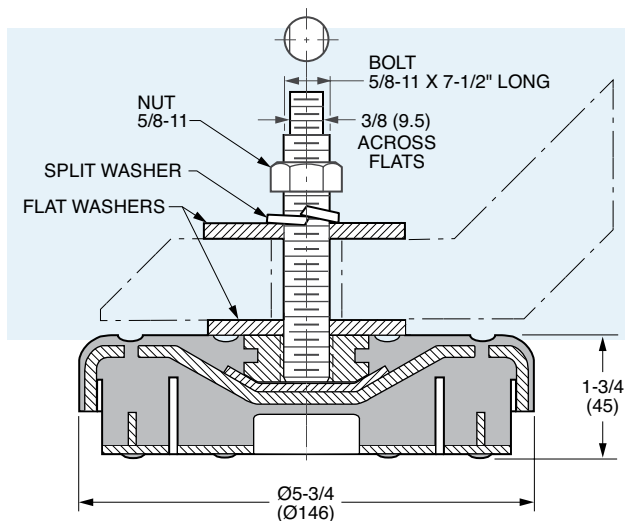
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- **MATERIAL:** Housing – Carbon Steel, Zinc Plated
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- **FOR LOADS UP TO 8000 POUNDS (3629 kgf)**



NOTE: Dimensions in () are mm.

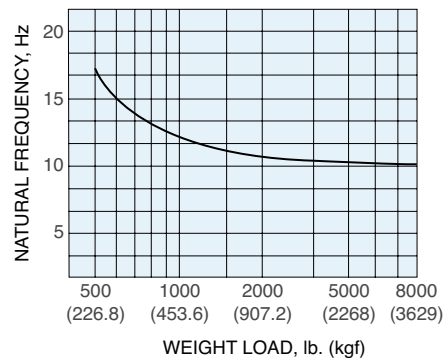


FEATURES:

- Leveling mount
- Stiffness is proportional to load
- Most durable and corrosion-resistant
- Adjustable up to 1/2" (13) in height. For larger adjustments, use the spacer plates shown on page 3-8.

APPLICATIONS

- GRINDING MACHINES
- LATHES
- MILLING MACHINES
- PRINTING MACHINES
- PRINTING PRESSES



Leveling Mounts

Catalog Number	Color	Max. Load lb. (kgf)	
		Impact	Steady
V10Z24-575175A	Black	5000 (2268)	8000 (3629)

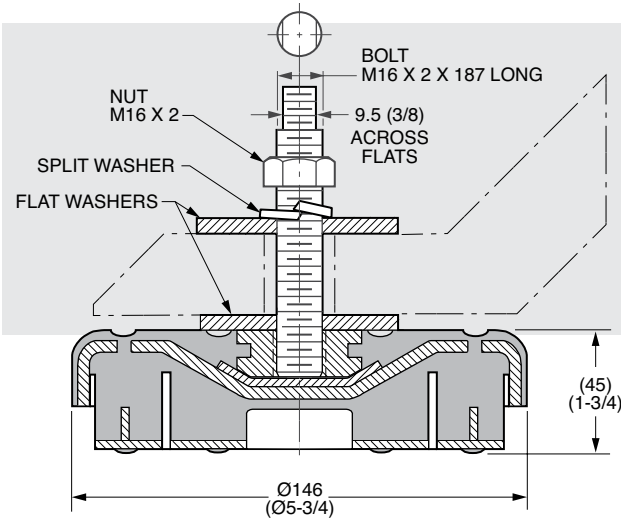


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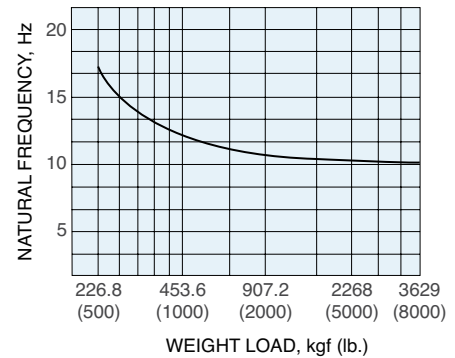
Metric

FEATURES:

- Leveling mount
 - Stiffness is proportional to load
 - Most durable and corrosion-resistant
 - Adjustable up to 13 (1/2") in height.
- For larger adjustments, use the spacer plates shown on page 3-8.

APPLICATIONS

- GRINDING MACHINES
- LATHES
- MILLING MACHINES
- PRINTING MACHINES
- PRINTING PRESSES



Catalog Number	Color	Max. Load kgf (lb.)	
		Impact	Steady
V10Z24M14545A	Black	2268 (5000)	3629 (8000)

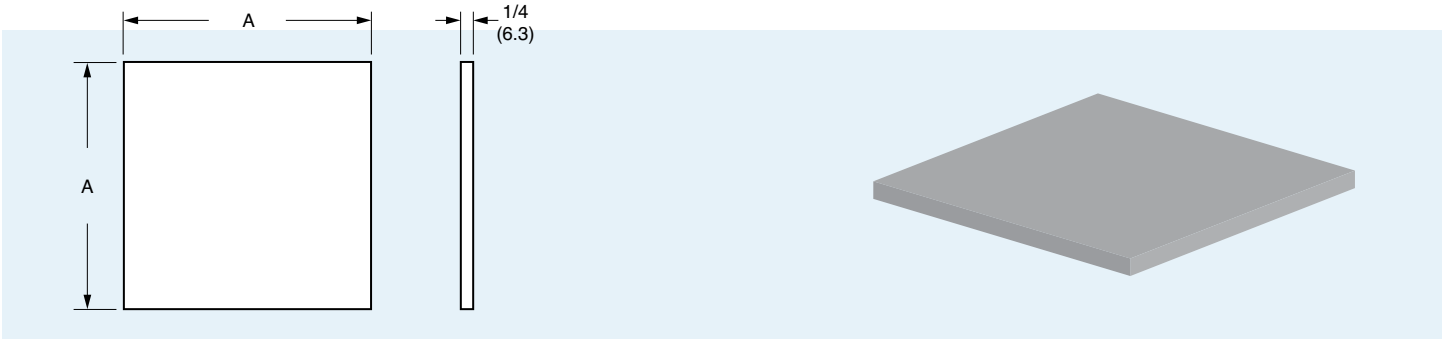
Leveling Mounts

UNILOAD® Constant Natural Frequency Mounts



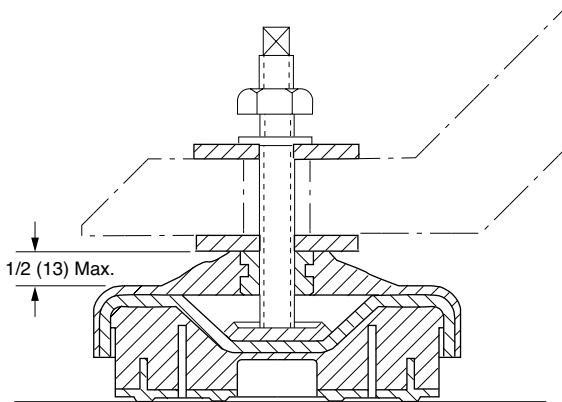
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- MATERIAL:** Spacer Plate – Sheared Hot Rolled Low Carbon Steel



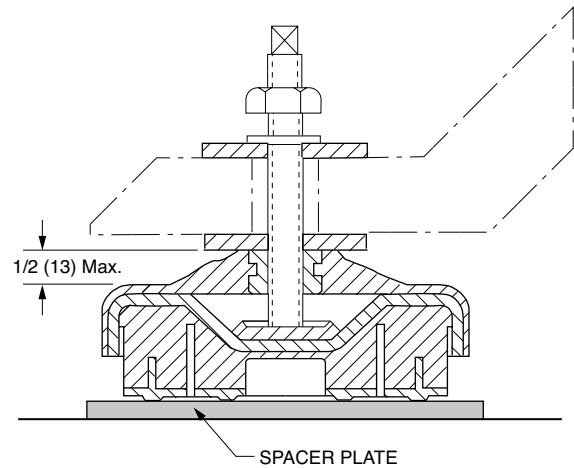
NOTE: Dimensions in () are mm

Height adjustment without spacer plate



NOTE: Spacer plates may be required under certain floor conditions.

Height adjustment with spacer plate



Leveling Mounts

Catalog Number	A ± 1/8 (3.2)
V10Z24-PLATE-5	5 (127)
V10Z24-PLATE-7	7 (178)