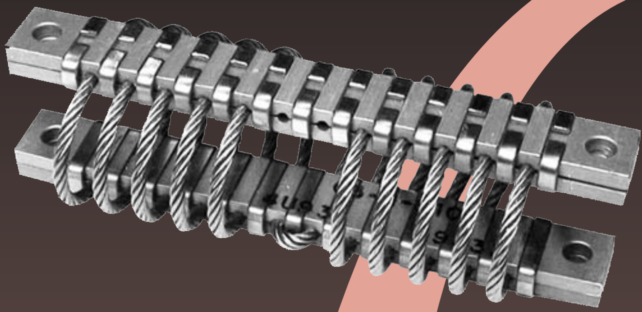
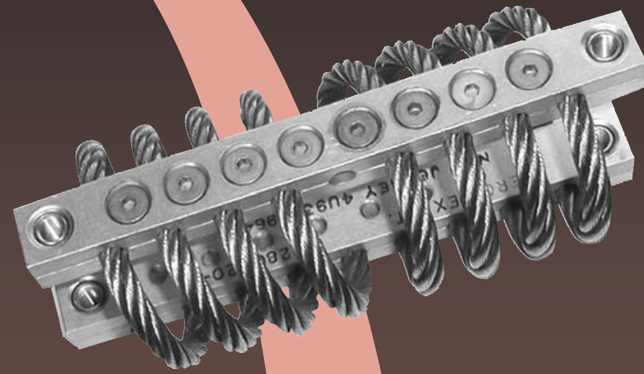
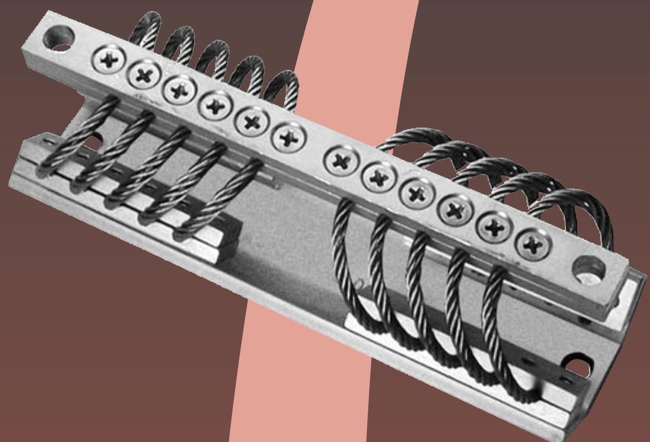






Aeroflex Isolators

for shock and vibration protection in all environments

Selection Guide

Aeroflex Wire Rope Isolators

Aeroflex isolators are stable mounting assemblies of high quality stranded wire rope held with rugged metal retainers. Each isolating element has specific response characteristics determined by the diameter of the wire rope, the number of strands, the cable length, the cable twist or lay, and the number of cables per section. Inherent damping is provided by flexure hysteresis, i.e, the rubbing and sliding friction between the strands of the wire rope.

The Helical Concept Aeroflex isolators provide higher levels of isolation than any other medium or design, with excellent vibration damping. These all-metal mounts are truly unique, adapted to a spectrum of physical and engineering requirements so broad that it includes almost every isolation need. They have put to rest the notion that a single mount cannot handle both shock and vibration.

Also contained in this catalog are data sheets for the Aeroflex Arch and Circular Arch series isolators. These designs were developed to provide unique performance characteristics and attachment features, thereby increasing the adaptability of the wire rope isolator concept. Special designs and modifications of standard isolator configurations are also available by contacting Aeroflex engineering.

Aeroflex Helical isolators combine a very wide load range with 3-plane all-axis isolation that permits their use in any attitude. Their large dynamic displacement attenuates heavy shocks, while their inherent damping enables them to store and dissipate large amounts of low and high frequency vibration.

This performance is measurable and predictable for each of the sizes and configurations in which Aeroflex isolators are offered. And because environmental conditions such as changing temperatures and corrosive media have almost no effect on them, they offer permanent solutions to the isolation problems they encounter. Once installed, they need no maintenance and usually will outlast the equipment they protect.

Aeroflex isolators meet every need.

Practically unlimited load range. These isolators can be attached to almost any machine or enclosure, no matter what its weight. The static load rating of the largest Aeroflex isolator regularly manufactured exceeds 15,000 pounds.

Compact, low-profile envelope. Ability to attenuate heavy shock loadings with minimum deflection permits use of Aeroflex isolators where space is at a premium, an advantage in new equipment and sometimes a necessity when replacing other isolating media that have failed in service.

3-plane, all-axis isolation. Equipment is free to move in any direction on Aeroflex isolators, vertically, horizontally, and laterally.

They work in any position. Aeroflex isolators can be loaded in compression, tension, shear or roll in base mount, CG mount or cantilevered mount. They can be positioned anywhere in an isolating system.

They resist destructive environments. Aeroflex isolators are made entirely of stainless steel and corrosion-resistant aluminum alloy. They function from -400°F to +700°F and resist ozone, oil, grease, sand, salt spray and organic solvents. This imperviousness to environmental attack means that Aeroflex isolators require little or no maintenance and usually will outlast the equipment they isolate. They can also be painted to match equipment.

Should you pick your own isolators...or ask Aeroflex?

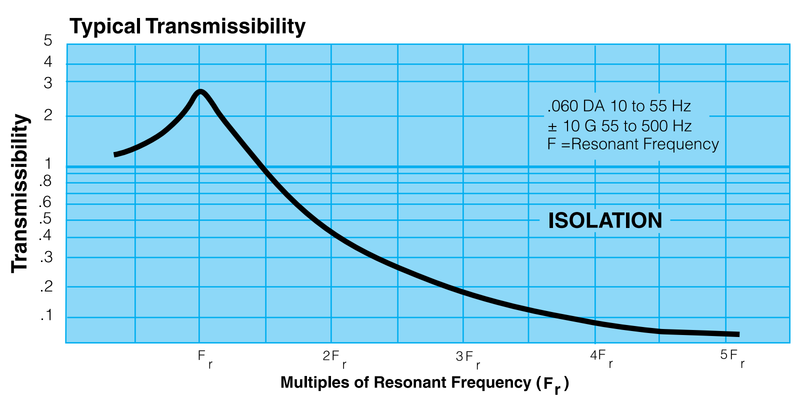
You yourself should be able to select the right Aerolex isolator for most of the shock and vibration problems you are likely to encounter. Let the information presented in this booklet guide you to your choice. It will be even easier than you may think... Aeroflex isolators are so “forgiving” that rough estimates of shock and static loadings, frequencies and amplitudes will usually be enough. In any case, we’ll be happy to confirm your choice by running tests and giving you our report and comments.

To help you solve more difficult isolation problems, Aeroflex offers you a complete shock and vibration engineering service. We will work with you cooperatively or shoulder the entire design responsibility.

For customers who want to predetermine their isolation requirements early in their design program, we can provide a computer analysis of shock and vibration to predict the type of mount or mounting system that will be needed to meet the predicted parameters. Using such inputs as packaged geometry, weight, center of gravity, fragility level and available sway space, we can calculate the spring rate, dynamic travel and natural frequency required to provide protection under specific ranges of dynamic conditions. A typical vibration transmissibility curve is shown below.

With the computer study as a guide, we select the specific isolators, or build a system, or even go so far as to design and build prototype mounts if no existing design appears to answer the requirements. This is followed by laboratory tests with the mounts installed in the load machine to simulate the mount orientation planned for the actual operating conditions.

The last step before production release is a full qualification test by the customer.



Isolator Selection and Use

Shock and vibration rank among the most destructive agents in our industrial society. They erode the life of mechanical and electronic equipment, driving it from service long before its time. Sometimes this premature deterioration stems from repeated overstress loadings, sometimes from fatigue failures of vital parts, and sometimes from a combination of both.

The Aeroflex isolation system is the most practical defense against these damaging effects. Resiliently mounted equipment is protected from these forces in its environment, or is itself prevented from harming its own surroundings. Ideally, a passive isolation system requires no maintenance, takes little space, and keeps functioning under varying temperatures and in corrosive environments. It also should have the strength to restrain its load under catastrophic conditions and to return it to its normal operating position after the deflections caused by repeated shock loadings.

The two essential properties of an effective isolator

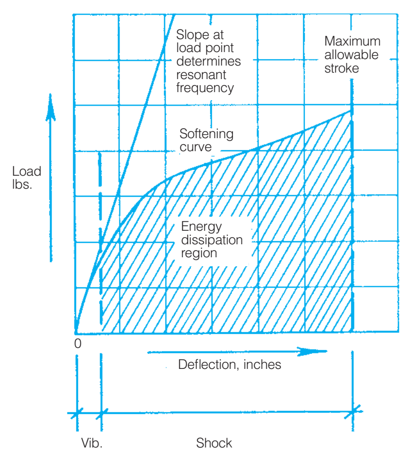
Shock and vibration so often occur together that an isolator must have two seemingly incompatible properties to counteract both forces effectively.

These are:

1. Low natural frequency to isolate the relatively high frequency vibrations that lead to fatigue-caused structural damage.

2. Ability to deflect in a controlled and repeatable way to absorb the impact loadings that would otherwise be transmitted into the isolated unit.

A non-linear isolator with a softening load profile and high damping meets these requirements. The helical wire rope isolating elements of Aeroflex mounts make them unique in this respect. By selecting wire rope of the proper diameter, number of loops and loop diameter, we can arrive at an isolator with a resonant frequency far less than half the critical frequencies of the isolated equipment, with a helix that will buckle under heavy shock loadings without bottoming or permanent deformation to provide the large deflections needed to bring the impacts within acceptable limits. The load/deflection graph shows these two distinct regions of isolator performance.



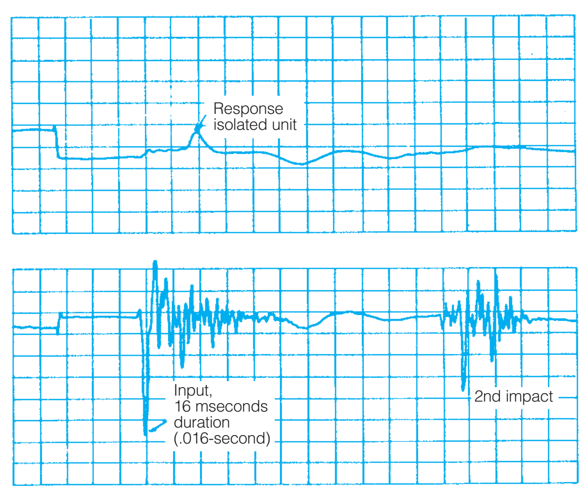
Load deflection, Aeroflex isolator in compression.

Vibration control: In the vibration region, the isolator is relatively stiff. Its resonant frequency is represented by the slope of the curve at the static load being supported. As the amplitude of vibration increases, the mount becomes progressively softer shifting the resonant frequency away from the input "driving" frequency and isolating the system.

Shock control: Further to the right in the graph, the non-linear Aeroflex mount softens as the shock load is applied. As it deforms, it stores energy. The displacement reduces the acceleration level, through the controlled buckling of the helical loops.

A hardening isolator would stiffen rapidly as the shock load is applied. The Aeroflex helical shows more nearly uniform energy storage over its entire deformation, keeping the maximum deceleration within acceptable limits. It is almost a constant force absorber over most of its stroke, regardless of how rapidly the load is applied. This characteristic means that its performance can be predicted and confirmed by actual results.

How well a helical isolation system does its job can be seen in these strip chart records of the shock input and response of a shipping container dropped from a 21" height onto the floor and rebounding to impact the floor a second time.



Response to shock, Aeroflex isolation system.

The primary shock to the equipment, mounted on an isolated platen within the container, is substantially reduced and shows none of the high frequency characteristics of the container. The well damped isolation system decays and smoothes out the induced vibrations before the second impact occurs, reducing the total shock to the unit by 70% with few or no secondary vibrations.

When Vibration is the dominant problem...

Rotating and reciprocating machinery is the most common source of vibration. To isolate a machine so that the transmitted amplitudes are reduced to acceptable levels, you should have a good idea of the forces involved and how they are measured.

The forcing frequency (F_f) is the major vibrational frequency of a machine, expressed in cycles per second, or Hertz (Hz). A diesel engine operating at 1200 RPM is generating a forcing frequency of 20 Hz (1200 revolutions divided by 60 seconds). A high-speed punch press running at 300 strokes per minute generates a forcing frequency of 5 Hz.

The frequency ratio is derived by dividing the machine's forcing frequency by the isolating system's natural frequency. The isolating efficiency of the system depends on this ratio, and is expressed as a percentage of the vibration force at the forcing frequency that is isolated.

The natural frequency of a system is the rate at which it oscillates as it returns freely to rest after having been displaced or agitated by an outside force. It can be calculated by the equation:

$$f_n = 3.13 \left(\frac{1}{\delta_{ST}}\right)^{1/2} \text{ or } f_n = 3.13 \left(\frac{K_{AVGVIB}}{W}\right)^{1/2}$$

where,
δ_{ST} = Static deflection, in.
K_{AVGVIB} = Vibration average spring rate, lb./in.
W = Weight, lb.

$$3.13 = \frac{\sqrt{G}}{2\pi}; \text{ where } G = 386^{IN}/_{s^2}$$

Resonance occurs when the natural frequency of the mounting system coincides with the forcing frequency. If it lasts for any length of time, it can be very dangerous because the amplitudes of the vibrations will become excessive.

Damping is the capacity of the isolating element to absorb part of the mechanical energy applied by the forcing frequency and convert it to heat. It reduces the vibration transmitted through the isolator when a machine's forcing frequency passes through the isolator's natural frequency during startup and shutdown. On the other hand, too much damping limits the isolator's ability to perform effectively at frequencies above resonance.

Effective vibration isolation needn't be 100%

The higher the percentage of the frequency ratio, the greater the degree of vibration isolation. However, total isolation requires large static deflections. This means large isolators with increased space requirements and higher costs. Isolation of about 80% is usually satisfactory.

Note that fatigue can be avoided by reducing the amplitude of response stress cycles. Thus, the isolator protects by reducing the actual level of vibration in the upper frequencies where the cumulative number of cycles would otherwise approach failure criteria.

The performance of an isolator in vibration control depends on the applied load and direction of force. Most helical isolation systems provide an amplification of 3 to 3.5 at resonance. Under random vibration, tests have shown amplification of 2 to 2.5 with better than 70% isolation of the critical higher structural frequencies in the vicinity of 60 to l00 Hz.

The non-linearity of the Aeroflex helical isolator shifts away from the resonant frequency as the load builds up, limiting force amplification. As resonance is approached, the effective mass carried by the isolator increases. This means that it is operating over a shallower slope of the projected load deflection curve. The result is an apparent softer unit and further decoupling of the resonant frequency from the exciting vibration frequency.

Attenuating vibration with Aeroflex isolators

1. Determine the static load each isolator in the mounting system will have to carry.

2. Determine the machine's lowest forcing frequency.

3. Determine how much isolation is needed. Except for special cases, 80% isolation will usually be enough. Using transmissibility curve on page 3, find required natural frequency, based on percent isolation required and forcing frequency.

4. Find the static deflection from the natural frequency. Use the following equation:

$$\delta_{ST} = \left(\frac{3.13}{f_n}\right)^2$$

5. Determine the required spring rate.

$$K_{AVGVIB} = \frac{\text{Load/mount}}{\delta_{ST}}$$

6. Select the isolator that has a stiffness value equal to or greater than above. Note that more than one series of isolators may have a suitable stiffness value.

7. The isolators that meet your requirements will have load/deflection curves that intersect the vertical coordinate for the minimum static deflection you have established.

More than one series of Aeroflex isolators may have suitable load/deflection curves. When this happens, you can choose the one that is lowest in cost, or offers a margin of performance for future changes, or provides a higher level of isolation. If shock is also to be considered, verify that the isolator selected can meet the shock criteria.

Chances are that your application will be covered by one of our selection guide tables for various kinds of isolation requirements (pages 8 through 10). They will help you make your best choice of the specific isolator you need - refer in particular to the tables for vehicular installations. The tables show the minimum loadings for 80% isolation in various operating frequency ranges.

When shock is the principal enemy...

The ability of Aeroflex isolators to attenuate shock with minimum dynamic travel approaches the ideal curve shape. This provides a level of shock protection unavailable from any other isolating medium. It makes possible very compact mounting systems in shipping containers carrying sensitive loads, for vehicle-carried electronic instruments, and for many other installations where the equipment must be protected from dynamic forces inherent in its environment.

Because shock may be much more severe than vibration, the isolator must have enough deflection capacity to store the shock energy without bottoming.

In practice, the non-linear response of an Aeroflex helical isolator stores far more energy in the same travel or stroke than a linear device.

The damping capacity of Aeroflex isolators also dissipates energy. An Aeroflex mounting system rapidly decays the response oscillations produced by the initial shock, bringing the system to rest often before the next shock occurs. Fatigue damage is related to the number of cycles experienced by the equipment. Thus, keeping the number of oscillations and their peak amplitude to a minimum has a beneficial effect on the protected equipment.

Selecting Aeroflex isolators for shock applications involves some of the same considerations that influence their choice for service as vibration isolators. It also introduces some other criteria.

For specific shock applications...

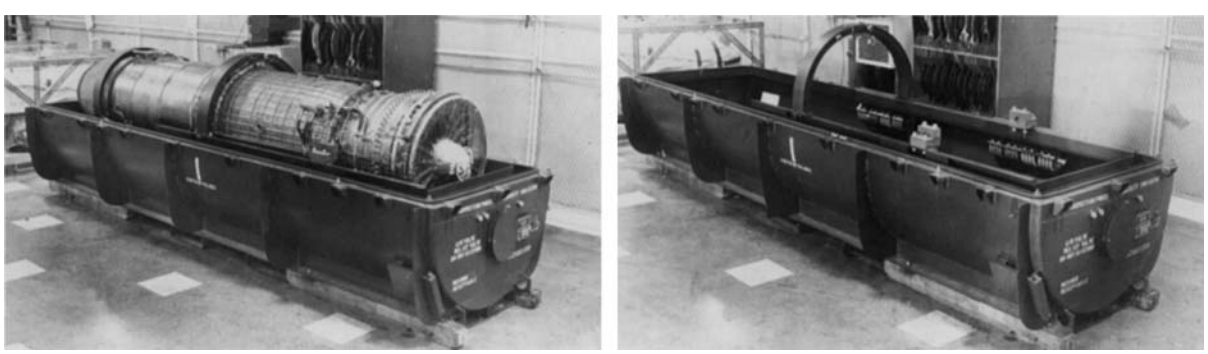
1. Determine the static load each mount will carry

2. Estimate the fragility of the load in terms of the number of g's you believe it can withstand without damage, or obtain the fragility level from the equipment manufacturer. Many years of designing isolating system of this sort have enabled Aeroflex to establish a maximum tolerable impact range of 15-25 g's for survival of a fragile load. Military equipment will usually withstand a 25g single-shock event, but commercial equipment should be protected to the lower end of the range.

3. Determine the nature of the input shock from MIL specifications such as 810E, 901D, etc.
A shock is completely defined by the type of pulse shape (half sine, sawtooth, triangle, etc.), the shock magnitude in g's and the pulse width in time.
For example, a common shock encountered in off-road vehicles is 15g, 11 milliseconds, Half sine.

Shock input can also be specified in terms of a velocity step, such as 120 inches/second, which is common to some Naval applications.

Shock is specified in terms of drop height for shipping container applications.



Shipping container for military jet engines carries its load on a support frame isolated on Aeroflex mounts

4. Next, determine the required system natural frequency (f_s). Note: $\mathbf{f_s}$ is the **average** shock natural frequency, across the isolator entire dynamic travel and should not be confused with f_n, the vibration natural frequency.

$$f_s = 3.13\left(\frac{K_{AVGSHK}}{W}\right)^{1/2}$$

where,

W = Weight, Lbs.

K_{AVGSHK} = Shock average spring rate, Lb./in.

$3.13 = \frac{\sqrt{G}}{2\pi}$; where $G = 386\,^{IN}/_{S^2}$

f_s can be approximated from the following equations:

A. For half sine shock inputs, solve this equation for f_s:

$$\text{Response (g's)} = 1.6 \times \text{Input (g's)} \times \frac{f_s}{f_P}$$

$$\text{where } f_P = \frac{1}{2\text{x pulse width (sec)}}$$

1.6 is a factor for half sine type shock pulses (use 1.4 as a factor for sawtooth or terminal peak) with approximately 15 percent damping ($C/C_C = 0.15$).

With the required f_s to provide the specified response, next calculate the average spring rate necessary from:

$$K_{AVGSHK} = (2\pi f_s)^2 \times \frac{W}{386}$$

Estimate the dynamic travel from:

$$\delta_{DYN} = \frac{\text{Response (g's)} \times 386}{(2\pi f_s)^2}$$

B. For velocity step inputs, the average shock natural frequency can be found by solving:

$$\text{Response (g's)} = \frac{f_s \times 2\pi \times \text{velocity step (in / sec)}}{386}$$

Next solve for K_{AVGSHK} (Total) required (using equation above), then estimate the dynamic travel from:

$$\delta_{DYN} = \frac{\text{velocity step (in / sec)}}{2\pi f_s}$$

5. Select isolator with required shock average K, and dynamic travel from isolator tables.

6. More than one Series of Aeroflex isolators may have the required characteristics. Then the choice can be dictated by secondary considerations such as size and price. A general rule in the absence of any overriding requirement is to select the mount with the minimum deflection at the required load.

As in vibration, chances are that your application will be covered by one of the tables on pages 8 through 10.

Shock response

1. Restrain and damp the pitching motion of a tall unit (one whose height is more than twice its narrower width) with stabilizing mounts near its top. Arrange the load with the heaviest components nearest the base to minimize rocking.

2. These stabilizers should provide lateral stiffness but should not limit vertical play. Too much lateral deflection at the top will change the characteristics of the entire system because the base mounts will then have to supply all the resistance to overturning moments.

3. Locate the base mounts so that they balance the static load vertically. The isolators should be under or in line with the unit's vertical structural members. In the case of cabinets or consoles fabricated of sheet metal, it may be necessary to attach a supplementary base plate to bring the shock load into the rigid columns and avoid using the panel enclosures to distribute the shock.

4. Spread the base mounts to provide the largest possible footprint for uniform support. Because shock may occur at an oblique angle, allow sufficient room to sway in all directions.

This all-terrain vehicle carries a 2-ton payload of sensitive geophysical instruments and self-contained power supply in a "doghouse" isolated from the chassis on twelve Aeroflex mounts.

Choosing the right Aeroflex Isolator for the job.

The tables and nomograph presented here will help you determine deflection and response for a variety of environments. They cover loads such as, aircraft landings, shipping containers, and Navy shock. Knowing the severity of the applied impact, the designer can preselect the characteristics of the isolation system. From these, he can evaluate the resulting deflection and response in g's. In the same way, knowing the space available for deflection, he can find the necessary stiffness of the isolation system.

Example 1. Shipping container

A unit weighing 88 Ibs. is suspended on four mountings oriented at 45° compression-roll. It must be protected to 15 g's for a 18" flat drop (h). Which isolators will provide the necessary rates and deflections?

Refer to the nomograph and the Shipping Container table.

On the nomograph, the intersection of h = 18 and g =15 gives values of K/W =8 and $\delta_{DYN.}$= 1.7" Using the stiffness equation, we have:

K=8 X 88/4
=176 Ibs./in. total for four isolators
in 45° compression-Roll.

Dividing by 4, we must find a specific isolator with an average K equal to 176 Ibs./inch and a dynamic travel of 1.7 inches. Referring to the columns for "Shock Average K" and "Maximum rated shock load and dynamic travel" in the Series tables that begin on page 11, we find the isolator we need, the Aeroflex CB-1280-30. Four of these will meet our requirements.

Example 2. Cabinet mounting

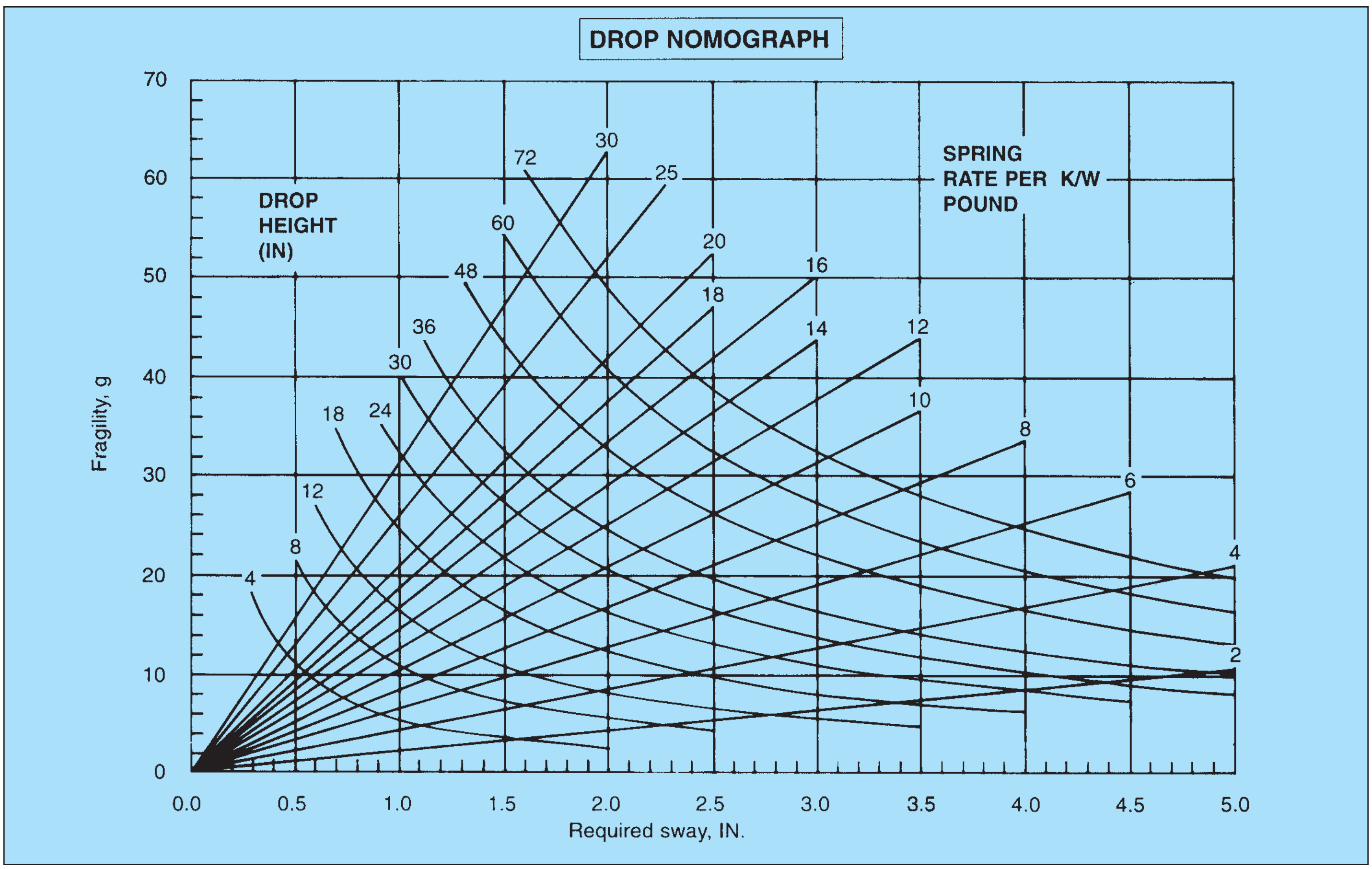
An electronic rack weighing 1100 pounds is installed on four base mounts loaded in compression, and two stabilizers in shear or roll. It must be protected to 25 g's during MIL-S-901C medium weight hammer tests. What isolators provide the necessary deflection under shock?

Assume that the center of gravity (CG) is at the geometric center of the cabinet, and that the load will be taken on four base mounts located at the corners of the cabinet and that the shocks will be experienced in the vertical axis. Neglect the stabilizing mounts. The load on each base mount will be 275 Ibs. (1100 divided by 4).

The maximum expected shock response is 15 g's.

Referring to the *Shipboard/MIL-S-901C table*, we select four CB1400-20 isolators as the base mounts, the stabilizers can be the same or the next softest in the same series.

The CB1400 Series table on page 15 shows an average K for the CB1400-20 of 1365 Ibs./in. in compression and maximum deflection of 2.00".

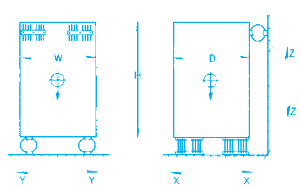


VEHICULAR INSTALLATIONS – TANKS, TRUCKS, TRACTORS, SHELTERS

Rated Load Per Isolator	Smooth Highway Isolator Sizes		Back Roads – Rough Travel Isolator Sizes	
	Base	Stabilizer	Base	Stabilizer
15- 20	CB1280-3806	CB1280-3806	CB1280-35	CB1280-38
20- 25	CB1280-38	CB1280-38	CB1280-30	CB1280-35
25- 35	CB1280-35	CB1280-38	CB1280-25	CB1280-30
35- 45	CB1280-30	CB1280-38	CB1280-20	CB1280-25
45- 60	CB1280-25	CB1280-35	CB1280-10	CB1280-20
60- 75	CB1380-35	CB1380-35	CB1380-30	CB1380-30
75- 90	CB1380-25	CB1380-35	CB1380-20	CB1380-30
90- 110	CB1380-30	CB1380-35	CB1380-15	CB1380-20
110- 140	CB1380-20	CB1380-30	CB1400-20	CB1400-20
140- 170	CB1380-15	CB1380-30	CB1400-17	CB1400-20
170- 210	CB1400-20	CB1400-20	CB1400-15	CB1400-17
210- 250	CB1400-17	CB1400-20	CB1500-20	CB1500-20
250- 300	CB1400-15	CB1400-17	CB1500-15	CB1500-20
300- 400	CB1500-20	CB1500-20	CB1500-12	CB1500-15
400- 500	CB1500-20	CB1500-20	CB1500-12	CB1500-15
500- 600	CB1500-15	CB1500-20	CB1500-12	CB1500-12
600- 700	CB1500-15	CB1500-15	CB1700-20	CB1700-30
700- 800	CB1700-20	CB1700-30	CB1700-17	CB1700-20
800- 900	CB1700-20	CB1700-20	CB1700-15	CB1700-17

	Smoth Highway	Rough Roads
System Natural Frequency	7-10 Hz	15 Hz
Maximum Dynamic Travel		
Z-Z	0.50 in.	1.00 in.
X-X	0.38 in.	0.75 in.
Y-Y	0.50 in.	1.00 in.

F_n = 7-10 Hz — Smooth Highway F_r = 15Hz — Rough Roads



Note: 1. Stabilizers recommended when H > 2D or 2W

Note: 2. Stabilizers rated at 2X base loads—function is to limit sway.

HEAVY MACHINERY, BASE MOUNTED

Rated Load (lbs.) Per Isolator	Operating Speed	
	1200-1800 RPM	Above 1800 RPM*
175- 200	CB1380-35	CB1380-30
200- 250	CB1380-25	CB1400-30
250- 300	CB1380-30	CB1400-20
300- 400	CB1380-20	CB1400-17
400- 500	CB1400-20	CB1400-15
500- 600	CB1400-17	CB1500-30
600- 700	CB1500-30	CB1500-20
700- 800	CB1500-20	CB1700-30
800- 900	CB1700-30	CB1700-20
900-1000	CB1700-20	CB1700-15
1000-1100	CB1700-15	CB1900-12

SHIPBOARD – MIL-S-901D SHOCK & VIBRATION MOUNRINGS

Load (lbs) Rating Per Base Isolator	15-25G Fragility Isolator Size		25-35*G Fragility Isolator Size	
	Base	Stabilizer	Base	Stabilizer
20- 25	CB1280-50	CB1280-50	CB1280-40	CB1280-40
25- 30	CB1280-40	CB1280-50	CB1280-38	CB1280-40
30- 40	CB1280-38	CB1280-40	CB1280-35	CB1280-38
40- 50	CB1280-35	CB1280-38	CB1280-25	CB1280-30
50- 60	CB1280-35	CB1280-38	CB1280-25	CB1280-30
60- 80	CB1380-40	CB1380-50	CB1380-25	CB1380-35
80- 100	CB1380-35	CB1380-40	CB1380-30	CB1380-25
100- 125	CB1380-25	CB1380-35	CB1380-20	CB1380-25
125- 150	CB1380-30	CB1380-35	VB1380-20	CB1380-30
150- 170	CB1380-20	CB1380-25	CB1400-20	CB1400-30
170- 200	CB1380-20	CB1380-30	CB1400-17	CB1400-20
200- 250	CB61400-20	CB61400-30	CB1400-15	CB1400-17
250- 300	CB1400-20	CB1400-30	CB1500-30	CB1500-30
300- 400	CB1500-30	CB1500-40	CB1500-20	CB1500-30
400- 500	CB1500-30	CB1500-40	CB1500-15	CB1500-20
500- 600	CB1500-20	CB1500-30	CB1500-12	CB1500-15
600- 700	CB1500-15	CB1500-12	CB1700-17	CB1700-20
700- 800	CB1500-12	CB1500-15	CB1700-15	CB1700-17
800- 900	CB1700-30	CB1700-40	CB1900-15	CB1900-15
900-1000	CB1700-20	CB1700-30	CB1900-12	CB1900-15

* Base isolators without stabilizers will result in 35G transmission. When stabilizers are used with base isolators figure 25G transmission.

System Natural Frequency	9-12 Hz	14-17 Hz
Shock Range	15-25G's	25-35G's
Displacement		
Z-Z	1.00-1.50 in.	0.75-1.25 in.
Y-Y	0.75-1.00 in.	0.50-0.75 in.
X-X	0.50-0.75 in.	0.40-0.63 in.

AIRCRAFT & LIGHT DUTY

Load (lbs.) Rating Per Isolator	Resonant Frequency		
	10Hz Compression	15 Hz Compression	20 Hz Compression
1	C2-H-806	C2-H-810	C2-H-610
2	C2-H-706	C2-H-710	C2-H-610
3	C2-H-608	C2-H-610	C2-H-410
4	C2-H-616	C2-H-410	C3-H-810
5	C2-H-508	C3-H-808	C3-H-710
6	C3-H-806	C3-H-810	C3-H-612
8	C3-H-808	C3-H-710	C3-H-510
10	C3-H-810	CS-H-610	C3-H-510
15	C3-H-710	C3-H-510	C3-H-410
20	C3-H-610	C3-H-410	C4-H-710
25	C4-H-808	C4-H-610	C4-H-610
30	C4-H-810	C4-H-610	C4-H-510
35	C4-H-810	C4-H-508	C4-H-410
40	C4-H-710	C4-H-510	C4-H-410
45	C4-H-610	C4-H-510	C4-H-310
50	C6-H-806	C6-H-808	C6-H-810
60	C6-H-808	C6-H-810	C6-H-610
80	C6-H-810	C6-H-610	C6-H-510
100	C6-H-710	C6-H-410	C6-H-310

Isolator Selection and Use

DIESEL ENGINE — GENERATOR SETS
Operating Speed — 1600-1800 RPM
System Natural Frequency — 10 Hz;

Rated Load (lbs.) Per Isolator	Base Mounted	45° C/R
45- 60	CB1280-35	CB1280-30
60- 75	CB1280-30	CB1280-25
75- 90	CB1280-25	CB1300-30
90- 110	CB1300-30	CB1300-30
110- 140	CB1300-30	CB1300-25
140- 170	CB1300-25	CB1300-20
170- 210	CB1300-20	CB61400-30
210- 250	CB61400-30	CB61400-25
250- 300	CB61400-25	CB61400-20
300- 400	CB61400-20	CB61400-17
400- 500	CB61400-17	CB1400-20
500- 600	CB1400-20	CB1500-20
600- 700	CB1500-20	CB1700-30
700- 800	CB1700-30	CB1700-20
800- 900	CB1700-20	CB1900-12
900- 1000	CB1900-12	CB1900-10

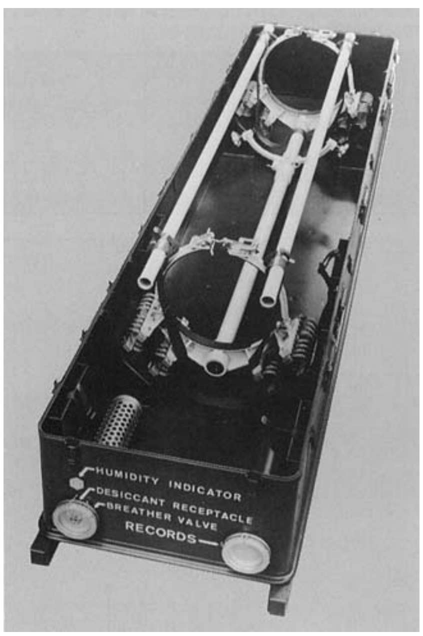
This selection guide is designed to allow you to determine which isolators are required to offer protection from the vibration inputs as specified in MIL-E-5400, MIL-E-5272, MIL-T-5422, MIL-STD-167, and MIL-C-172. Properly selected, the mountings will not bottom under shock inputs of 15G 11ms and will survive 30G 11ms crash safety tests. The guide is intended for those applications where vibration is your primary consideration. As a rule of thumb, applications in **fixed wing aircraft require 10 Hz f_n , mobile, 15 Hz; and helicopters, 7 Hz.**

Example:

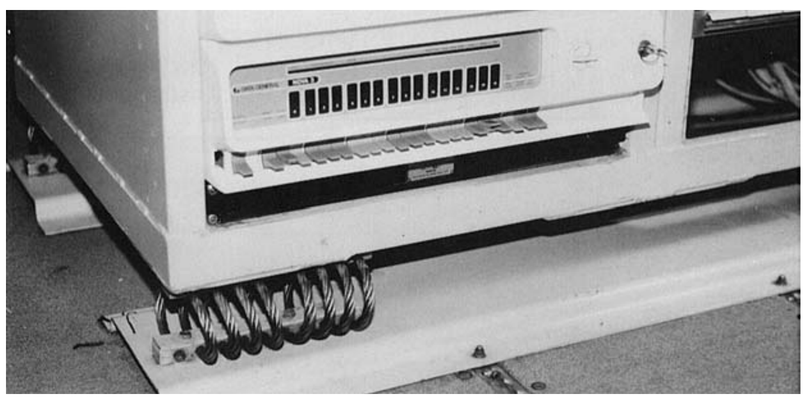
Select isolators for a package weighing 100 Ibs., in a base mounting arrangement with four support points. Assume that the package or one of its components has a resonant frequency of 50 Hz.

For a 10 Hz system, the transmissibility at 5 X the resonant frequency will be approximately .05...a 95% reduction of the impressed vibration (refer to the transmissibility curve on page 3.)

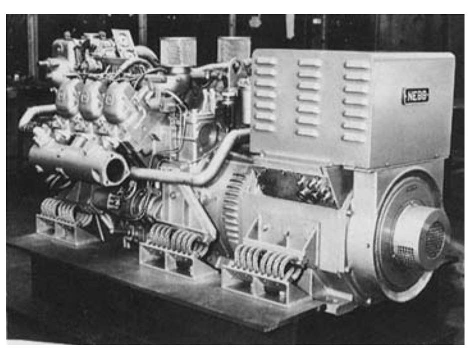
Refer to the 10 Hz column of recommended isolators. For a loading of 25 Ibs. (100 divided by 4), the correct isolator is the C4-H-808.



Shock-proof reusable container cradles missiles weighing between 160 and 260 pounds on eight Aeroflex CB 1380-20 isolators. Given 18" drop test on concrete, system transmitted only 22 G to the load. Better shock attenuations can be achieved with larger mounts.



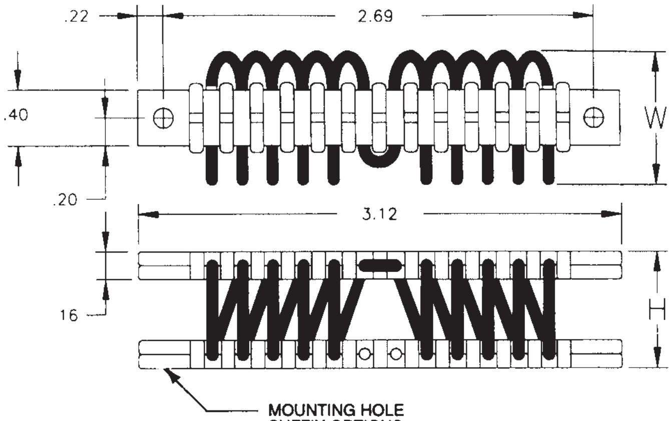
Electronics and computer system of weather research plane used to study hurricanes are mounted on Aeroflex mounts to attenuate high-amplitude vibrations.



Aeroflex CB1500 Series isolators damp the powerful vibrations generated by this 1400 Kg shipboard diesel-generator operating at 1800 RPM.

C2 SERIES

1/16" WIRE ROPE



MOUNTING HOLE
SUFFIX OPTIONS

-[ ] BLANK = Ø .177 THRU 4PL
-C2= Ø .177 THRU
C'SINK Ø .31 X 82° 4PL
-I2= #8-32 INSERTS 4PL
-CI= #8-32 INSERTS 2 PL
Ø .177 THRU
C'SINK Ø .31 X 82° 2PL

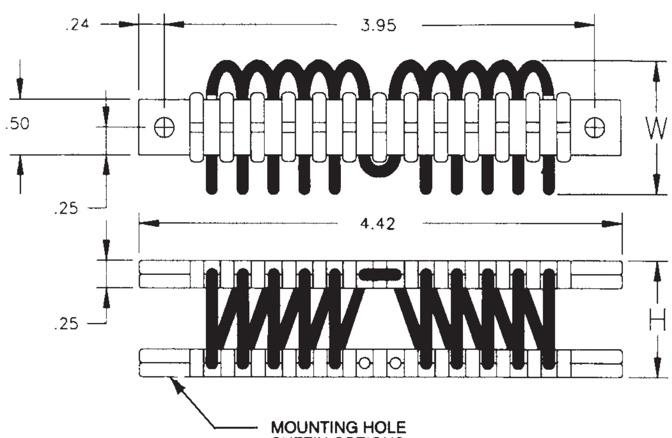
C2 SERIES - 1/16" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
C2-H-310-[ ]	.70	1.00	Compression Shear/Roll 45° C/R	165 100 50	225 80 95	.30 .35 .45
C2-H-410-[ ]	.80	1.10	Compression Shear/Roll 45° C/R	80 65 35	120 50 65	.45 .45 .50
C2-H-510-[ ]	1.00	1.20	Compression Shear/Roll 45° C/R	50 45 20	85 30 45	.50 .50 .70
C2-H-610-[ ]	1.10	1.30	Compression Shear/Roll 45° C/R	35 30 12	60 20 30	.60 .60 .75
C2-H-710-[ ]	1.20	1.40	Compression Shear/Roll 45° C/R	30 15 10	55 12 20	.70 .70 .80
C2-H-810-[ ]	1.30	1.50	Compression Shear/Roll 45° C/R	20 12 8	30 10 14	.80 .80 .85

ISOLATOR APPROXIMATE WEIGHT 1.1 oz.

C3 SERIES

3/32" WIRE ROPE



MOUNTING HOLE
SUFFIX OPTIONS

-[ ] BLANK = Ø .196 THRU 4PL
-C2= Ø .196 THRU
C'SINK Ø .39 X 82° 4PL
-I2= #10-32 INSERTS 4PL
-CI= #10-32 INSERTS 2 PL
Ø .196 THRU
C'SINK Ø .39 X 82° 2PL

C3 SERIES - 3/32" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
C3-H-310-[ ]	.90	1.10	Compression Shear/Roll 45° C/R	340 155 130	480 140 260	.30 .40 .60
C3-H-410-[ ]	1.00	1.20	Compression Shear/Roll 45° C/R	275 120 100	385 105 200	.35 .50 .70
C3-H-510-[ ]	1.10	1.30	Compression Shear/Roll 45° C/R	200 90 55	285 75 145	.40 .55 .80
C3-H-610-[ ]	1.30	1.50	Compression Shear/Roll 45° C/R	100 45 40	155 45 100	.60 .70 1.00
C3-H-710-[ ]	1.40	1.60	Compression Shear/Roll 45° C/R	55 35 30	85 35 65	.80 .80 1.20
C3-H-810-[ ]	1.50	1.70	Compression Shear/Roll 45° C/R	40 25 20	70 30 50	.90 .90 1.20

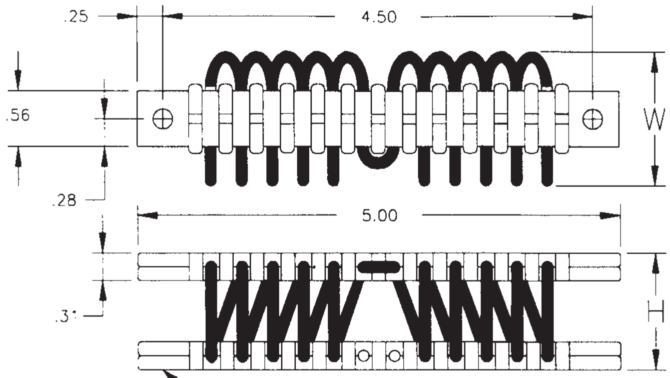
ISOLATOR APPROXIMATE WEIGHT 2.9 oz.

C4 SERIES

1/8" WIRE ROPE

For Design Purposes Only

Consult Aeroflex for Load-Deflection Curves



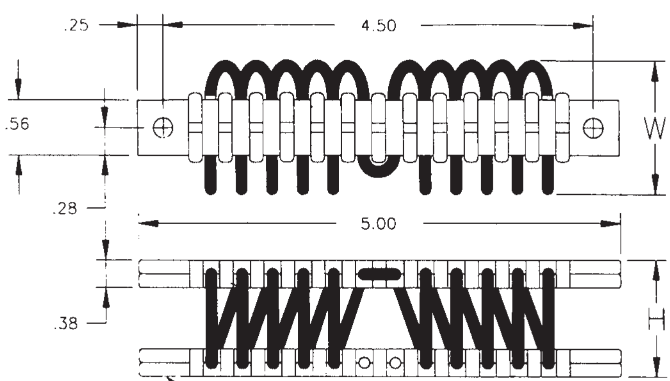
C4 SERIES - 1/8" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
C4-H-310-[ ]	1.10	1.40	Compression Shear/Roll 45° C/R	600 300 220	800 290 450	.40 .50 .70
C4-H-410-[ ]	1.20	1.50	Compression Shear/Roll 45° C/R	480 240 185	710 225 370	.50 .60 .80
C4-H-510-[ ]	1.30	1.60	Compression Shear/Roll 45° C/R	295 145 100	475 115 285	.60 .70 .90
C4-H-610-[ ]	1.40	1.70	Compression Shear/Roll 45° C/R	255 115 80	405 80 255	.70 .80 1.00
C4-H-710-[ ]	1.50	1.80	Compression Shear/Roll 45° C/R	200 90 65	340 75 190	.80 .90 1.10
C4-H-810-[ ]	1.60	1.90	Compression Shear/Roll 45° C/R	170 85 55	280 55 160	.90 1.00 1.20

ISOLATOR APPROXIMATE WEIGHT 5.1 oz.

C6 SERIES

3/16" WIRE ROPE



C6 SERIES - 3/16" WIRE ROPE

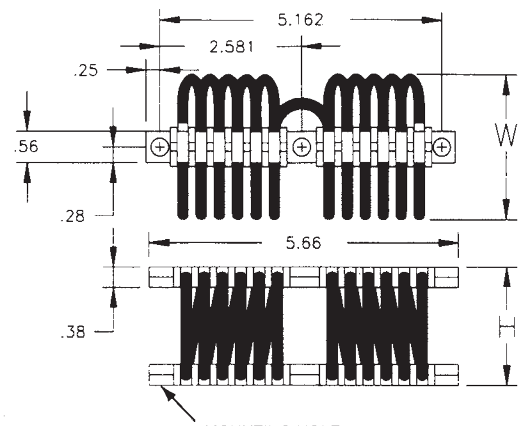
Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
C6-H-310-[ ]	1.20	1.40	Compression Shear/Roll 45° C/R	2845 1060 1420	5100 1280 3300	.35 .50 .50
C6-H-410-[ ]	1.30	1.50	Compression Shear/Roll 45° C/R	1835 800 815	3340 900 1930	.40 .55 .70
C6-H-510-[ ]	1.40	1.60	Compression Shear/Roll 45° C/R	1510 595 555	2820 620 1440	.45 .60 .90
C6-H-610-[ ]	1.50	1.70	Compression Shear/Roll 45° C/R	1285 425 440	2520 390 1200	.50 .60 1.00
C6-H-710-[ ]	1.60	1.80	Compression Shear/Roll 45° C/R	1015 290 335	1680 270 920	.60 .70 1.20
C6-H-810-[ ]	1.70	1.90	Compression Shear/Roll 45° C/R	790 175 275	1470 230 780	.70 .80 1.30

ISOLATOR APPROXIMATE WEIGHT 6.7 oz.

Consult Aeroflex for Load-Deflection Curves

C1260 SERIES

3/16" WIRE ROPE



MOUNTING HOLE
SUFFIX OPTIONS

-[ ] BLANK = Ø .28 THRU 6PL
-C2= Ø .28 THRU
C'SINK Ø .52 X 82° 6PL
-I2= #1/4-28 INSERTS 6PL
-CI= #1/4-28 INSERTS 3 PL
Ø .28 THRU
C'SINK Ø .52 X 82° 3PL

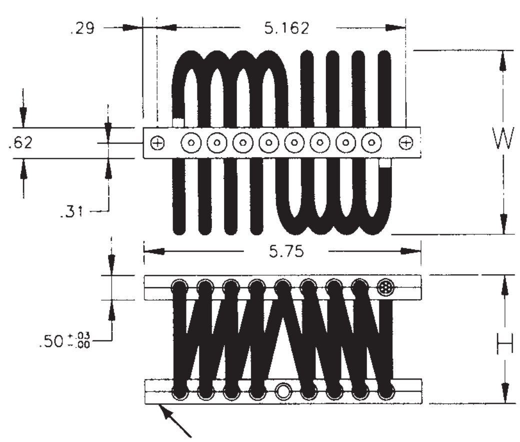
C1260 SERIES - 3/16" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
C1260-13-[ ]	2.00	2.28	Compression	340	555	1.00
			Shear/Roll	155	175	1.00
			45° C/R	155	365	1.80
C1260-16-[ ]	2.06	2.50	Compression	295	470	1.10
			Shear/Roll	125	140	1.10
			45° C/R	140	305	1.90
C1260-20-[ ]	2.13	2.94	Compression	185	305	1.30
			Shear/Roll	80	90	1.30
			45° C/R	100	220	2.10
C1260-39-[ ]	2.19	3.19	Compression	150	245	1.40
			Shear/Roll	70	80	1.40
			45° C/R	80	175	2.30
C1260-40-[ ]	2.45	3.45	Compression	100	170	1.60
			Shear/Roll	50	70	1.70
			45° C/R	60	125	2.50
C1260-50-[ ]	3.20	4.20	Compression	60	110	2.10
			Shear/Roll	20	20	2.10
			45° C/R	30	55	3.00

ISOLATOR APPROXIMATE WEIGHT 8 - 12 oz.

C1280 SERIES

1/4" WIRE ROPE



MOUNTING HOLE
SUFFIX OPTIONS

-[ ] BLANK = Ø .28 THRU 4PL
-C2= Ø .28 THRU
C'SINK Ø .52 X 82° 4PL
-I2= #1/4-28 INSERTS 4PL
-CI= #1/4-28 INSERTS 2 PL
Ø .28 THRU
C'SINK Ø .52 X 82° 2PL

CB 1280 SERIES - 1/4" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CB1280-10-[ ]	1.90	2.20	Compression	1180	1975	.60
			Shear/Roll	930	480	.80
			45° C/R	1120	1040	1.40
CB1280-20-[ ]	2.13	2.50	Compression	670	1240	.80
			Shear/Roll	310	315	1.00
			45° C/R	320	755	1.60
CB1280-25-[ ]	2.31	2.80	Compression	495	790	1.00
			Shear/Roll	215	220	1.20
			45° C/R	200	540	1.80
CB1280-30-[ ]	2.50	3.13	Compression	360	680	1.20
			Shear/Roll	145	160	1.40
			45° C/R	160	455	2.00
CB1280-35-[ ]	2.63	3.50	Compression	255	465	1.20
			Shear/Roll	125	130	1.60
			45° C/R	135	375	2.20
CB1280-38-[ ]	2.63	3.75	Compression	205	405	1.40
			Shear/Roll	110	115	1.80
			45° C/R	100	260	2.40
CB1280-40-[ ]	2.63	3.95	Compression	165	270	1.40
			Shear/Roll	85	80	2.00
			45° C/R	75	180	2.60
CB1280-50-[ ]	3.25	4.20	Compression	115	215	2.00
			Shear/Roll	60	60	2.20
			45° C/R	50	135	3.20

ISOLATOR APPROXIMATE WEIGHT 11 - 17 oz.

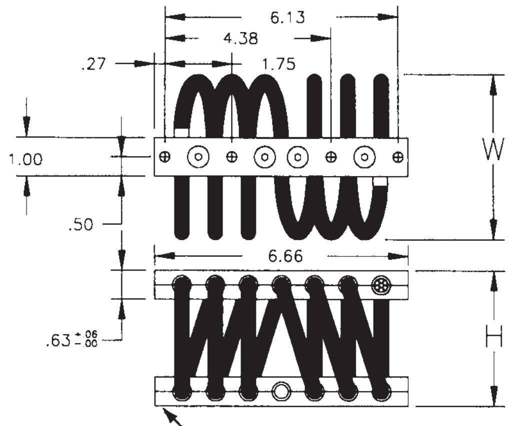
CB1300 SERIES

HELICAL

For Design Purposes Only

3/8" WIRE ROPE

Consult Aeroflex for Load-Deflection Curves



MOUNTING HOLE
SUFFIX OPTIONS

- -[ ] BLANK = Ø .28 THRU 8PL
- -C2= Ø .28 THRU C'SINK Ø .52 X 82° 8PL
- -I2= #1/4-28 INSERTS 8PL
- -CI= #1/4-28 INSERTS 4 PL Ø .28 THRU C'SINK Ø .52 X 82° 4PL

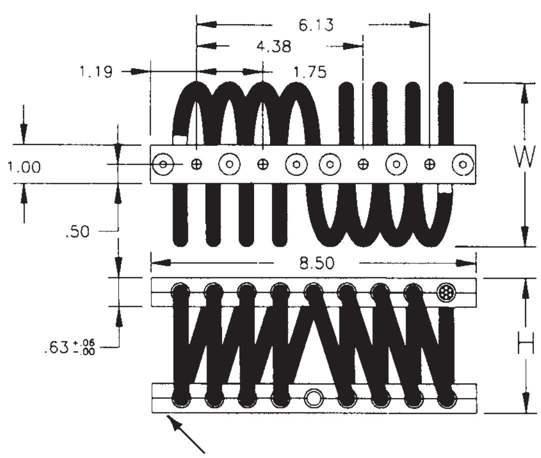
CB 1300 SERIES - 3/8" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CB1300-15-[ ]	2.80	3.31	Compression	1310	3395	1.00
			Shear/Roll	555	550	1.20
			45° C/R	625	1860	1.60
CB1300-20-[ ]	2.90	3.50	Compression	1005	2445	1.20
			Shear/Roll	420	445	1.40
			45° C/R	470	1555	2.00
CB1300-30-[ ]	3.00	4.13	Compression	655	1315	1.40
			Shear/Roll	300	345	1.60
			45° C/R	310	1010	2.40
CB1300-25-[ ]	3.25	4.25	Compression	520	1030	1.60
			Shear/Roll	235	270	1.80
			45° C/R	240	815	2.80
CB1300-35-[ ]	3.50	4.25	Compression	415	775	1.80
			Shear/Roll	175	215	2.00
			45° C/R	190	545	3.20
CB1300-40-[ ]	4.13	4.75	Compression	300	600	2.20
			Shear/Roll	130	140	2.40
			45° C/R	125	420	4.00
CB1300-50-[ ]	4.25	5.50	Compression	200	355	2.40
			Shear/Roll	100	110	2.60
			45° C/R	85	300	4.40

ISOLATOR APPROXIMATE WEIGHT 1.5 - 2.5 lbs.

CB1380 SERIES

3/8" WIRE ROPE



MOUNTING HOLE
SUFFIX OPTIONS

- -[ ] BLANK = Ø .28 THRU 8PL
- -C2= Ø .28 THRU C'SINK Ø .52 X 82° 8PL
- -I2= #1/4-28 INSERTS 8PL
- -CI= #1/4-28 INSERTS 4 PL Ø .28 THRU C'SINK Ø .52 X 82° 4PL

CB 1380 SERIES - 3/8" WIRE ROPE

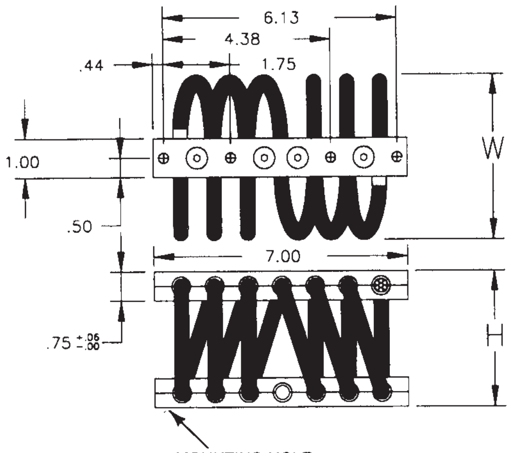
Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CB1380-15-[ ]	2.80	3.31	Compression	1745	4525	1.00
			Shear/Roll	740	735	1.20
			45° C/R	835	2480	1.60
CB1380-20-[ ]	2.90	3.50	Compression	1340	3260	1.20
			Shear/Roll	560	595	1.40
			45° C/R	625	2075	2.00
CB1380-30-[ ]	3.00	4.13	Compression	875	1750	1.40
			Shear/Roll	400	460	1.60
			45° C/R	410	1345	2.40
CB1380-25-[ ]	3.25	4.25	Compression	690	1370	1.60
			Shear/Roll	310	360	1.80
			45° C/R	315	1085	2.80
CB1380-35-[ ]	3.50	4.25	Compression	555	1030	1.80
			Shear/Roll	235	285	2.00
			45° C/R	250	725	3.20
CB1380-40-[ ]	4.13	4.75	Compression	400	800	2.20
			Shear/Roll	175	185	2.40
			45° C/R	165	560	4.00
CB1380-50-[ ]	4.25	5.50	Compression	265	475	2.40
			Shear/Roll	135	145	2.60
			45° C/R	115	400	4.40

ISOLATOR APPROXIMATE WEIGHT 2.2 - 3.2 lbs.

Consult Aeroflex for Load-Deflection Curves

CB6 1400 SERIES

1/2" WIRE ROPE



MOUNTING HOLE
SUFFIX OPTIONS

-[ ] BLANK = Ø .328 THRU 8PL
-C2= Ø .328 THRU
C'SINK Ø .66 X 82° 8PL
-I2= #1/4-28 INSERTS 8PL
-CI= #1/4-28 INSERTS 4PL
Ø .328 THRU
C'SINK Ø .66 X 82° 4PL

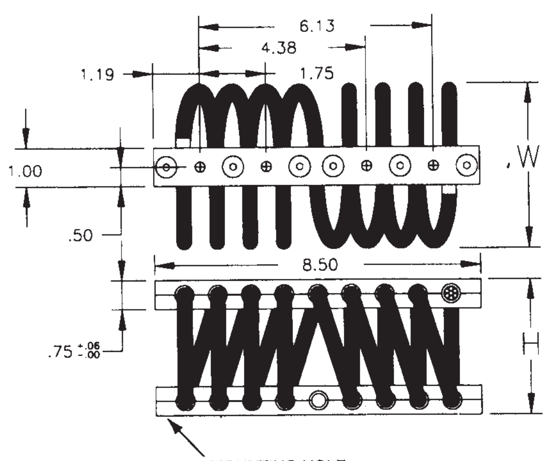
CB6 1400 SERIES - 1/2" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CB61400-15-[ ]	3.25	4.00	Compression Shear/Roll 45° C/R	1990 810 1075	4895 1105 3265	1.40 1.60 2.40
CB61400-17-[ ]	3.50	4.13	Compression Shear/Roll 45° C/R	1570 650 840	3750 805 2625	1.60 1.80 2.80
CB61400-20-[ ]	3.75	4.75	Compression Shear/Roll 45° C/R	1025 555 580	2740 555 1835	2.00 2.00 3.20
CB61400-30-[ ]	4.25	5.25	Compression Shear/Roll 45° C/R	680 315 395	1690 420 940	2.40 2.40 3.60
CB61400-40-[ ]	4.90	5.65	Compression Shear/Roll 45° C/R	500 240 300	1275 320 860	2.80 2.80 4.00
CB61400-50-[ ]	5.40	6.13	Compression Shear/Roll 45° C/R	375 195 185	940 285 125	3.20 3.20 4.40
CB61400-60-[ ]	6.10	7.10	Compression Shear/Roll 45° C/R	200 110 125	395 125 270	4.00 3.60 5.20

ISOLATOR APPROXIMATE WEIGHT 2.9 - 4.6 lbs.

CB 1400 SERIES

1/2" WIRE ROPE



MOUNTING HOLE
SUFFIX OPTIONS

-[ ] BLANK = Ø .328 THRU 8PL
-C2= Ø .328 THRU
C'SINK Ø .66 X 82° 8PL
-I2= #1/4-28 INSERTS 8PL
-CI= #1/4-28 INSERTS 4 PL
Ø .328 THRU
C'SINK Ø .66 X 82° 4PL

CB 1400 SERIES - 1/2" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CB1400-15-[ ]	3.25	4.00	Compression Shear/Roll 45° C/R	2650 1080 1435	6525 1475 4350	1.40 1.60 2.40
CB1400-17-[ ]	3.50	4.13	Compression Shear/Roll 45° C/R	2090 865 1120	5000 1075 3500	1.60 1.80 2.80
CB1400-20-[ ]	3.75	4.75	Compression Shear/Roll 45° C/R	1365 740 775	3650 740 2445	2.00 2.00 3.20
CB1400-30-[ ]	4.25	5.25	Compression Shear/Roll 45° C/R	905 420 525	2250 560 1250	2.40 2.40 3.60
CB1400-40-[ ]	4.90	5.65	Compression Shear/Roll 45° C/R	665 320 400	1700 425 1145	2.80 2.80 4.00
CB1400-50-[ ]	5.40	6.13	Compression Shear/Roll 45° C/R	500 260 245	1250 380 750	3.20 3.20 4.40
CB1400-60-[ ]	6.10	7.10	Compression Shear/Roll 45° C/R	265 145 165	525 165 360	4.00 3.60 5.20

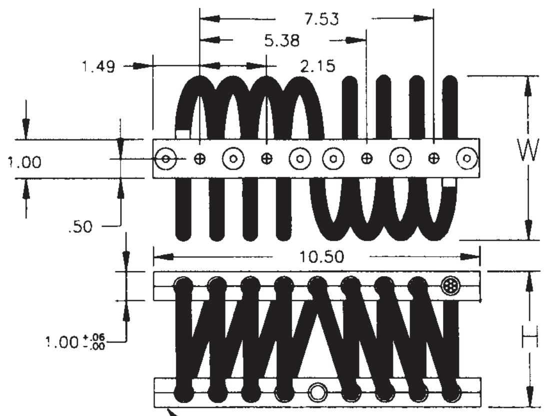
ISOLATOR APPROXIMATE WEIGHT 3.8 - 6.1 lbs.

CB1500 SERIES HELICAL

5/8" WIRE ROPE

For Design Purposes Only

Consult Aeroflex for Load-Deflection Curves



MOUNTING HOLE SUFFIX OPTIONS

-[ ] BLANK = Ø .41 THRU 8PL
-C2= Ø .41 THRU
C'SINK Ø .81 X 82° 8PL
-I2= #3/8-24 INSERTS 8PL
-CI= #3/8-24 INSERTS 4 PL
Ø .41 THRU
C'SINK Ø .81 X 82° 4PL

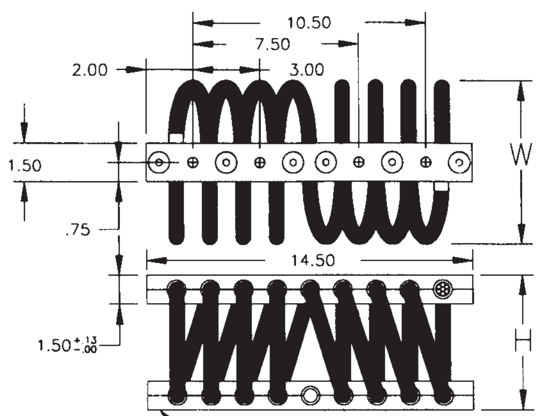
CB 1500 SERIES - 5/8" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CB1500-12-[ ]	3.50	4.00	Compression Shear/Roll 45° C/R	5375 2735 3290	12625 2950 9100	1.20 1.20 1.80
CB1500-15-[ ]	3.90	4.40	Compression Shear/Roll 45° C/R	3655 1870 2265	8095 2100 5525	1.40 1.40 2.20
CB1500-20-[ ]	4.30	5.30	Compression Shear/Roll 45° C/R	2585 1250 1595	5525 1350 3775	1.80 1.80 2.80
CB1500-30-[ ]	4.70	6.00	Compression Shear/Roll 45° C/R	1610 800 995	3425 1060 2425	2.20 2.20 3.20
CB1500-40-[ ]	5.00	6.50	Compression Shear/Roll 45° C/R	1155 560 620	2450 750 1675	2.40 2.40 3.60
CB1500-50-[ ]	5.30	7.00	Compression Shear/Roll 45° C/R	795 410 440	1700 550 1275	3.20 3.20 4.40

ISOLATOR APPROXIMATE WEIGHT 5.9 - 10.6 lbs.

CB1700 SERIES

7/8" WIRE ROPE



MOUNTING HOLE SUFFIX OPTIONS

-[ ] BLANK = Ø .53 THRU 8PL
-C2= Ø .53 THRU
C'SINK Ø .99 X 82° 8PL
-T2= #1/2-13 TAPS 8PL
-CT= #1/2-13 TAPS 4 PL
Ø .53 THRU
C'SINK Ø .99 X 82° 4PL

*INSERTS ARE NOT AVAILABLE FOR THE LARGER SERIES ISOLATORS

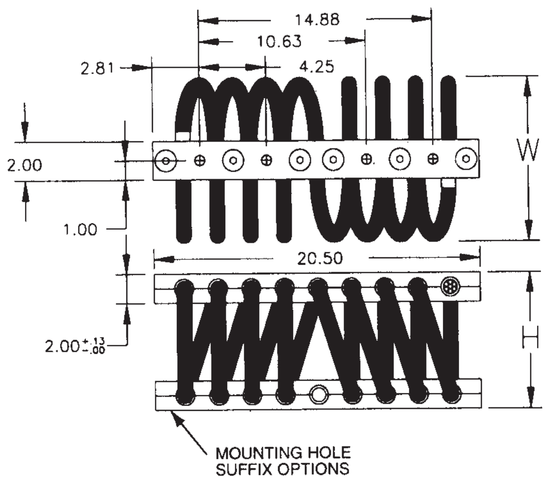
CB 1700 SERIES - 7/8" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CB1700-15-[ ]	5.25	5.50	Compression Shear/Roll 45° C/R	7565 3890 4495	20000 3750 14250	2.00 2.00 2.40
CB1700-17-[ ]	6.00	6.50	Compression Shear/Roll 45° C/R	5815 2795 3140	14000 2675 8750	2.40 2.40 3.20
CB1700-20-[ ]	6.25	7.00	Compression Shear/Roll 45° C/R	3695 1775 2035	8500 1550 5500	2.80 2.80 3.60
CB1700-30-[ ]	7.50	8.25	Compression Shear/Roll 45° C/R	1925 900 1140	4750 815 3250	3.60 3.60 4.80
CB1700-40-[ ]	8.50	9.25	Compression Shear/Roll 45° C/R	1285 545 675	3650 600 1900	4.00 4.00 6.40

ISOLATOR APPROXIMATE WEIGHT 18 - 30 lbs.

CB1900 SERIES

1-1/8" WIRE ROPE



-[ ] BLANK = Ø .78 THRU 8PL
-C2= Ø .78 THRU
C'SINK Ø 1.44 X 82° 8PL
-T2= #3/4-10 TAP 8PL
-CT= #3/4-10 TAP 4PL
Ø .78 THRU
C'SINK Ø 1.44 X 82° 4PL

*INSERTS ARE NOT AVAILABLE FOR THE LARGER SERIES ISOLATORS

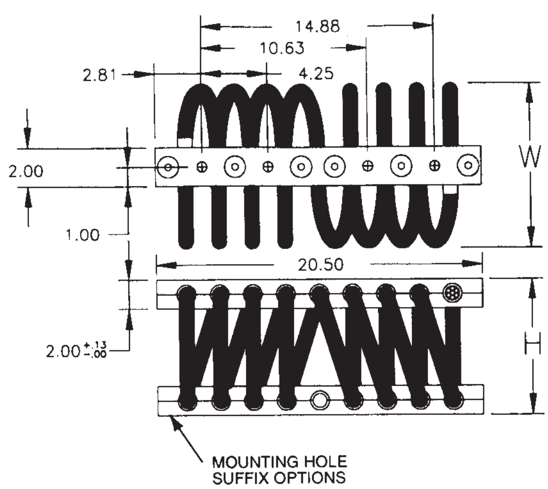
CB 1900 SERIES - 1-1/8" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CB1900-10-[ ]	7.00	8.00	Compression	5565	10500	2.00
			Shear/Roll	2620	2375	2.00
			45° C/R	3545	7250	2.40
CB1900-12-[ ]	8.50	9.50	Compression	3180	7250	3.20
			Shear/Roll	1650	1785	3.20
			45° C/R	1840	4625	4.00
CB1900-15-[ ]	9.25	10.25	Compression	2190	5000	4.00
			Shear/Roll	1125	1375	4.00
			45° C/R	1130	3375	6.40

ISOLATOR APPROXIMATE WEIGHT 32 - 50 lbs.

CB2000 SERIES

1-1/4" WIRE ROPE



-[ ] BLANK = Ø .78 THRU 8PL
-C2= Ø .78 THRU
C'SINK Ø 1.44 X 82° 8PL
-I2= #3/4-10 TAP 8PL
-CT= #3/4-10 TAP 4PL
Ø .788 THRU
C'SINK Ø 1.44 X 82° 4PL

*INSERTS ARE NOT AVAILABLE FOR THE LARGER SERIES ISOLATORS

CB 2000 SERIES - 1-1/4" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CB2000-10-[ ]	7.00	8.25	Compression	10000	18600	2.00
			Shear/Roll	5100	5000	2.20
			45° C/R	4500	12000	3.20
CB2000-12[ ]	8.50	9.75	Compression	5900	12000	3.20
			Shear/Roll	2900	3000	3.20
			45° C/R	3200	8000	4.00

ISOLATOR APPROXIMATE WEIGHT 48 - 57 lbs.

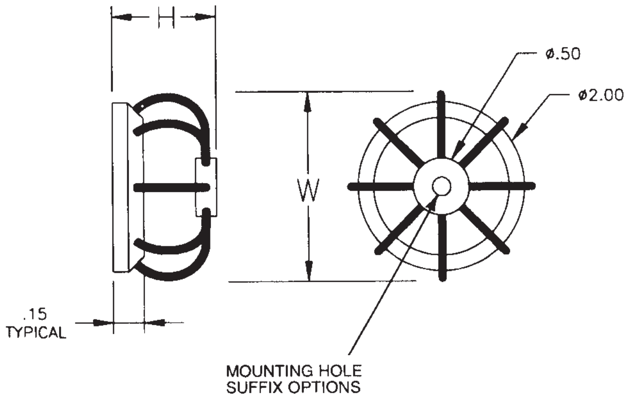
CA2L SERIES

1/16" WIRE ROPE

CIRCULAR ARCH

For Design Purposes Only

Consult Aeroflex for Load-Deflection Curves



-T2= #8-32 TAP TOP/BASE
-X2= Ø .170 THRU TOP/BASE
-TX= #8-32 TOP/Ø .170 THRU BASE
-XT= Ø .170 THRU TOP/#8-32 BASE

*CROSSED CABLE NOT PICTURED

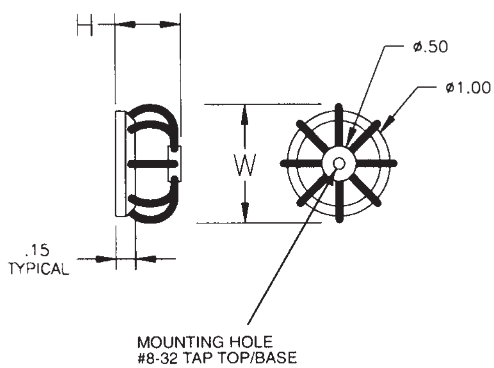
CA2L SERIES - 1/16" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CA2L-150-08-[ ]	.95	2.13	Compression Shear 45° C/R	26 18 18	80 20 60	.20 .20 .30
CA2L-200-08-[ ]	1.35	2.38	Compression Shear 45° C/R	10 5 5	30 6 20	.30 .40 .50
CA2L-250-08-[ ]	1.75	2.63	Compression Shear 45° C/R	5 2 2	14 4 8	.40 .60 .80
CAX2L-[ ] (Crossed Cable)	1.15	2.65	Compression Shear 45° C/R	6 7 4	20 10 14	.36 .32 .60

ISOLATOR APPROXIMATE WEIGHT .8 oz.

CA2 SERIES

1/16" WIRE ROPE



CA2 SERIES - 1/16" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CA2-075-08-T2	.50	1.10	Compression Shear 45° C/R	300 100 190	640 75 460	.12 .14 .20
CA2-100-08-T2	.65	1.30	Compression Shear 45° C/R	110 40 65	235 40 180	.20 .22 .34
CA2-125-08-T2	.95	1.35	Compression Shear 45° C/R	55 15 30	150 25 100	.28 .30 .48
CAX2-T2 (Crossed Cable)	.74	1.40	Compression Shear 45° C/R	65 55 35	185 35 130	.24 .22 .40

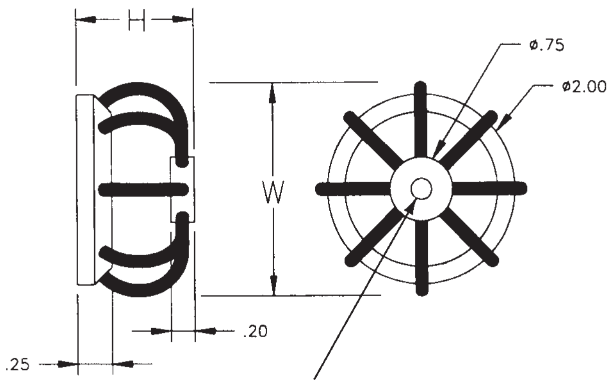
ISOLATOR APPROXIMATE WEIGHT .5 oz.

CIRCULAR ARCH

Consult Aeroflex for Load-Deflection Curves

CA3 SERIES

3/32" WIRE ROPE



-T2= #10-32 TAP TOP/BASE
-X2= Ø .196 THRU TOP/BASE
-TX= #10-32 TOP/Ø .196 THRU BASE
-XT= #Ø .196 THRU TOP/#10-32 BASE

*CROSSED CABLE NOT PICTURED

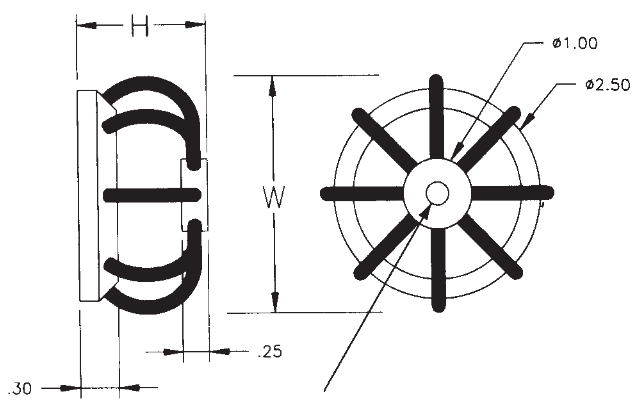
CA3 SERIES - 3/32" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CA3-200-08-[ ]	1.35	2.45	Compression	42	85	.40
			Shear	30	25	.35
			45° C/R	25	60	.65
CA3-250-08-[ ]	1.80	2.70	Compression	20	45	.50
			Shear	8	8	.60
			45° C/R	10	30	.85
CA3-300-08-[ ]	2.15	2.90	Compression	12	25	.60
			Shear	4	4	.75
			45° C/R	5	20	1.20
CAX3-[ ] (Crossed Cable)	1.70	3.00	Compression	15	35	.55
			Shear	10	10	.60
			45° C/R	6	24	1.00

ISOLATOR APPROXIMATE WEIGHT 1.9 oz.

CA4 SERIES

1/8" WIRE ROPE



-T2= 1/4-28 TAP TOP/BASE
-X2= Ø .256 THRU TOP/BASE
-TX= 1/4-28 TOP/Ø .256 THRU BASE
-XT= Ø .256 THRU TOP/1/4-28 BASE

*CROSSED CABLE NOT PICTURED

CA4 SERIES - 1/8" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CA4-200-08-[ ]	1.25	2.75	Compression	175	340	.30
			Shear	105	95	.30
			45° C/R	80	175	.50
CA4-250-08-[ ]	1.70	3.00	Compression	70	140	.45
			Shear	40	35	.50
			45° C/R	30	85	.80
CA4-300-08-[ ]	2.00	3.25	Compression	40	85	.60
			Shear	10	20	.75
			45° C/R	15	50	.72
CAX4-[ ] (Crossed Cable)	1.70	3.25	Compression	45	110	.55
			Shear	45	35	.45
			45° C/R	20	70	.90

ISOLATOR APPROXIMATE WEIGHT 3.4 oz.

CA6 SERIES
3/16" WIRE ROPE

For Design Purposes Only

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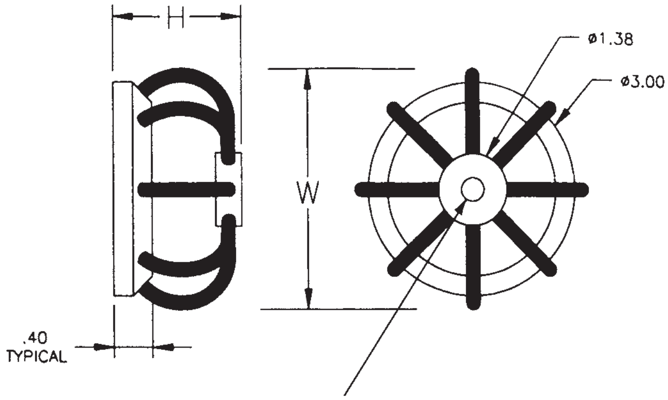


MOUNTING HOLE
SUFFIX OPTIONS

-T2= 5/16-24 TAP TOP/BASE
-X2= Ø .319 THRU TOP/BASE
-TX= 5/16-24 TOP/Ø .319 THRU BASE
-XT= Ø .319 THRU TOP/5/16-24 BASE

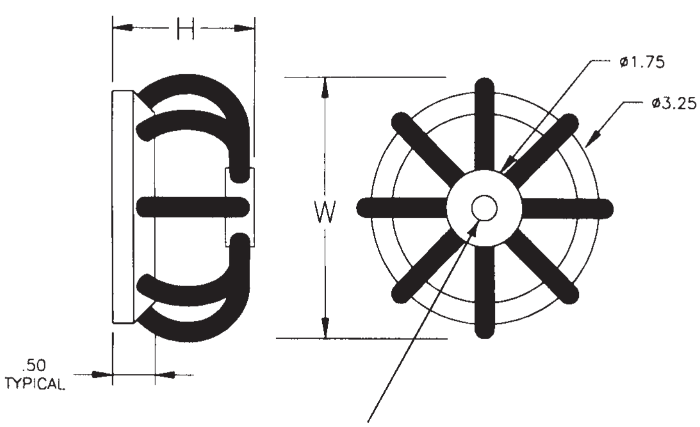
*CROSSED CABLE NOT PICTURED

CA6 SERIES - 3/16" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CA6-250-08-[ ]	1.75	3.38	Compression Shear 45° C/R	400 260 250	990 230 790	.45 .40 .75
CA6-300-08-[ ]	2.13	3.63	Compression Shear 45° C/R	210 95 100	480 75 305	.60 .65 1.10
CA6-350-08-[ ]	2.50	4.00	Compression Shear 45° C/R	120 35 55	325 45 190	.70 .95 1.35
CAX6-[ ] (Crossed Cable)	2.00	3.90	Compression Shear 45° C/R	140 145 80	410 115 245	.65 .50 1.20

ISOLATOR APPROXIMATE WEIGHT 7 oz.

CA8 SERIES
1/4" WIRE ROPE



MOUNTING HOLE
SUFFIX OPTIONS

-T2= 3/8-24 TAP TOP/BASE
-X2= Ø .381 THRU TOP/BASE
-TX= 3/8-24 TOP/Ø .381 THRU BASE
-XT= Ø .381 THRU TOP/3/8-24 BASE

*CROSSED CABLE NOT PICTURED

CA8 SERIES - 1/4" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
CA8-250-08-[ ]	1.65	3.50	Compression Shear 45° C/R	1785 790 885	3680 730 2370	.35 .40 .65
CA8-300-08-[ ]	2.13	3.75	Compression Shear 45° C/R	1060 460 440	2260 430 1450	.45 .60 .95
CA8-350-08-[ ]	2.50	4.25	Compression Shear 45° C/R	405 150 205	840 190 570	.60 .90 1.20
CAX8-[ ] (Crossed Cable)	2.00	4.40	Compression Shear 45° C/R	470 280 240	1490 310 800	.55 .80 1.10

ISOLATOR APPROXIMATE WEIGHT 11.2 oz.

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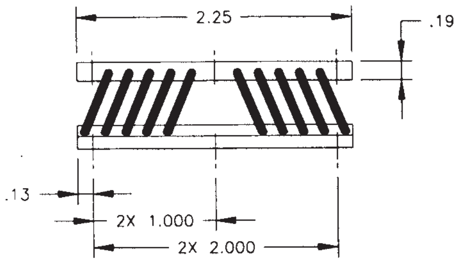
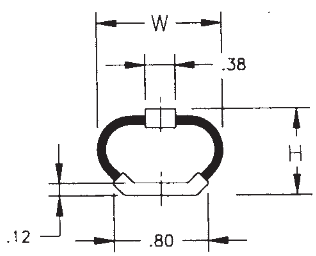
A2 SERIES
1/16" WIRE ROPE





MOUNTING HOLES

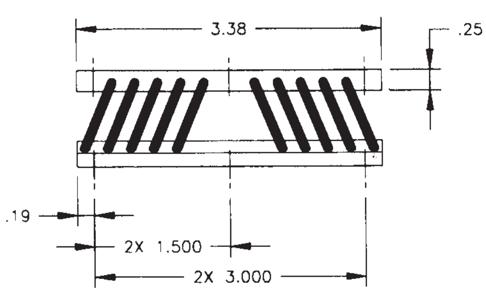
-T2= #4-40 TAP 6PL

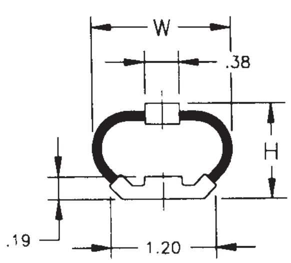
A2 SERIES - 1/16" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
A2-175-10-T2	.57	.92	Compression	455	1125	.12
			Shear	1050	1090	.05
			Roll	640	815	.08
			45° C/R	395	885	.12
A2-200-10-T2	.68	1.00	Compression	270	720	.18
			Shear	285	405	.15
			Roll	195	275	.20
			45° C/R	125	405	.30
A2-225-10-T2	.77	1.08	Compression	165	400	.26
			Shear	125	230	.26
			Roll	100	180	.30
			45° C/R	65	240	.40

ISOLATOR APPROXIMATE WEIGHT .8 oz.

A3 SERIES
3/32" WIRE ROPE





MOUNTING HOLE
SUFFIX OPTIONS

-T2= #6-32 TAP 6PL
-X2= Ø .156 THRU 6PL
-TX= #6-32 TAP TOP 3PL
Ø .156 THRU BASE 3PL
-XT= Ø .156 THRU TOP 3PL
#6-32 TAP BASE 3PL

A3 SERIES - 3/32" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
A3-263-10-[ ]	.90	1.38	Compression	305	725	.30
			Shear	440	460	.20
			Roll	365	310	.25
			45° C/R	255	670	.40
A3-300-10-[ ]	1.10	1.50	Compression	200	450	.40
			Shear	210	250	.30
			Roll	165	190	.35
			45° C/R	120	330	.60
A3-338-10-[ ]	1.25	1.63	Compression	120	290	.50
			Shear	130	145	.40
			Roll	105	110	.45
			45° C/R	60	200	.85

ISOLATOR APPROXIMATE WEIGHT 2.1 oz.

A4 SERIES

1/8" WIRE ROPE

ARCH

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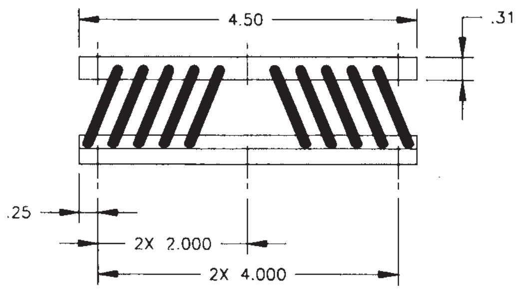
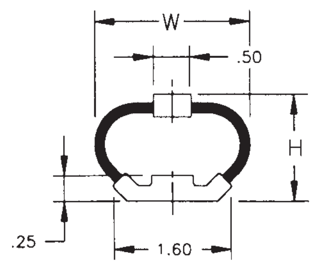


A4 SERIES - 1/8" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
A4-350-10-[ ]	1.13	1.80	Compression	510	1260	.35
			Shear	645	700	.30
			Roll	615	670	.30
			45° C/R	345	820	.50
A4-400-10-[ ]	1.38	1.95	Compression	310	790	.45
			Shear	305	335	.45
			Roll	320	350	.45
			45° C/R	205	610	.80
A4-450-10-[ ]	1.50	2.10	Compression	180	410	.60
			Shear	165	220	.60
			Roll	170	190	.60
			45° C/R	85	240	1.10

ISOLATOR APPROXIMATE WEIGHT 4.8 oz.

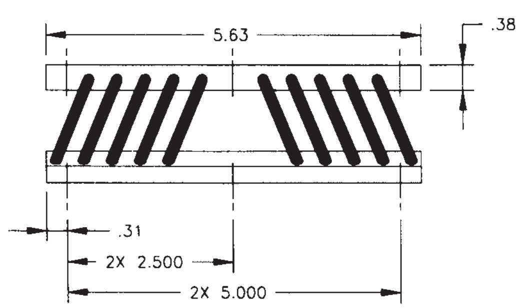


MOUNTING HOLE
SUFFIX OPTIONS

-T2= #8-32 TAP 6PL
-X2= Ø .188 THRU 6PL
-TX= #8-32 TAP TOP 3PL
Ø .188 THRU BASE 3PL
-XT= Ø .188 THRU TOP 3PL
#8-32 TAP BASE 3PL

A5 SERIES

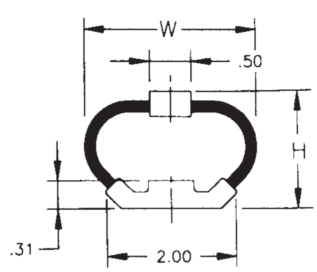
5/32" WIRE ROPE



A5 SERIES - 5/32" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
A5-438-10-[ ]	1.50	2.25	Compression	455	1080	.45
			Shear	575	710	.45
			Roll	750	840	.35
			45° C/R	380	1080	.70
A5-500-10-[ ]	1.70	2.38	Compression	300	630	.55
			Shear	260	270	.65
			Roll	300	300	.60
			45° C/R	175	485	1.15
A5-563-10-[ ]	2.00	2.50	Compression	220	450	.70
			Shear	170	185	.75
			Roll	165	150	.80
			45° C/R	100	250	1.50

ISOLATOR APPROXIMATE WEIGHT 8.8 oz.



MOUNTING HOLE
SUFFIX OPTIONS

-T2= #10-32 TAP 6PL
-X2= Ø .218 THRU 6PL
-TX= #10-32 TAP TOP 3PL
Ø .218 THRU BASE 3PL
-XT= Ø .218 THRU TOP 3PL
#10-32 TAP BASE 3PL

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A6 SERIES
3/16" WIRE ROPE

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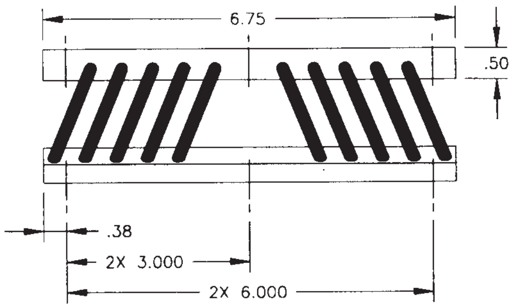
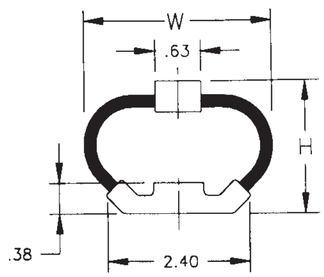




MOUNTING HOLE
SUFFIX OPTIONS

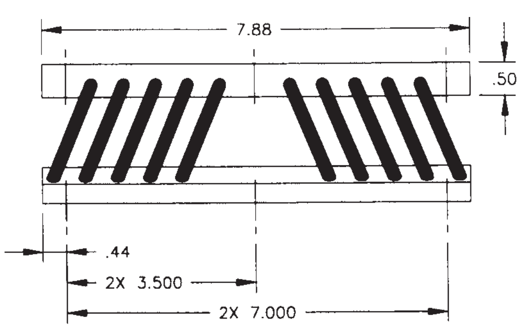
-T2= 1/4-28 TAP 6PL
-X2= Ø .281 THRU 6PL
-TX= 1/4-28 TAP TOP 3PL
Ø .281 THRU BASE 3PL
-XT= Ø .281 THRU TOP 3PL
1/4-28 TAP BASE 3PL

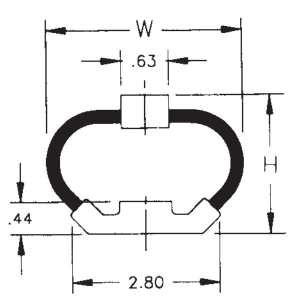
A6 SERIES - 3/16" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
A6-525-10-[ ]	1.75	2.63	Compression	595	1270	.50
			Shear	820	910	.50
			Roll	950	1015	.40
			45° C/R	505	1190	.70
A6-600-10-[ ]	2.13	2.75	Compression	400	900	.70
			Shear	400	360	.70
			Roll	415	390	.70
			45° C/R	270	795	1.10
A6-675-10-[ ]	2.45	3.00	Compression	265	575	.90
			Shear	195	210	1.00
			Roll	205	230	1.00
			45° C/R	155	500	1.50

ISOLATOR APPROXIMATE WEIGHT 15.7 oz.

A7 SERIES
7/32" WIRE ROPE





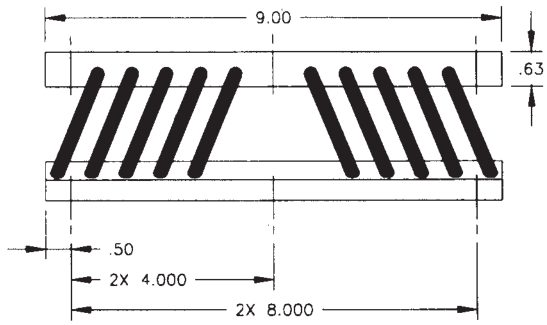
MOUNTING HOLE
SUFFIX OPTIONS

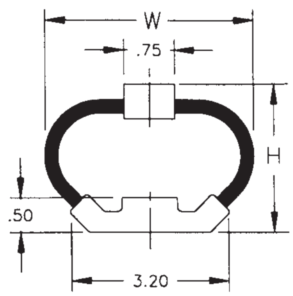
-T2= 1/4-28 TAP 6PL
-X2= Ø .281 THRU 6PL
-TX= 1/4-28 TAP TOP 3PL
Ø .281 THRU BASE 3PL
-XT= Ø .281 THRU TOP 3PL
1/4-28 TAP BASE 3PL

A7 SERIES - 7/32" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
A7-613-10-[ ]	2.10	3.13	Compression	585	1385	.60
			Shear	770	1000	.60
			Roll	600	615	.60
			45° C/R	355	835	1.00
A7-700-10-[ ]	2.50	3.38	Compression	355	805	.80
			Shear	330	450	.90
			Roll	310	430	.90
			45° C/R	185	510	1.40
A7-788-10-[ ]	2.80	3.63	Compression	240	460	.90
			Shear	220	310	1.00
			Roll	185	260	1.10
			45° C/R	120	330	1.80

ISOLATOR APPROXIMATE WEIGHT 1 lb. 7 oz.





MOUNTING HOLE
SUFFIX OPTIONS

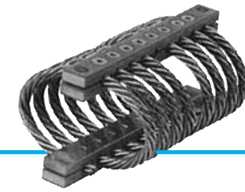
-T2= 5/16-24 TAP 6PL
-X2= Ø .344 THRU 6PL
-TX= 5/16-24 TAP TOP 3PL
Ø .344 THRU BASE 3PL
-XT= Ø .344 THRU TOP 3PL
5/16-24 TAP BASE 3PL

A8 SERIES - 1/4" WIRE ROPE

Isolator Part No.	Nominal Dimensions (in) H±.06	W (REF)	Load Mode	Shock Average K (lb/in)	Vibration Average K (lb/in)	Max.Rated Dynamic Travel (in)
A8-700-10-[ ]	2.38	3.63	Compression	620	1420	.70
			Shear	820	1100	.70
			Roll	970	1400	.70
			45° C/R	470	1400	1.20
A8-800-10-[ ]	2.80	3.85	Compression	430	935	.90
			Shear	470	670	1.00
			Roll	495	710	1.00
			45° C/R	250	680	1.60
A8-900-10-[ ]	3.25	4.15	Compression	305	650	1.10
			Shear	230	230	1.30
			Roll	245	255	1.30
			45° C/R	165	420	2.00

ISOLATOR APPROXIMATE WEIGHT 2 lbs. 4 oz.

Isolator Specifications



Painting

Because they are all-metal and corrosion resistant, Aeroflex isolators can be left as is or painted any color to harmonize with the equipment.

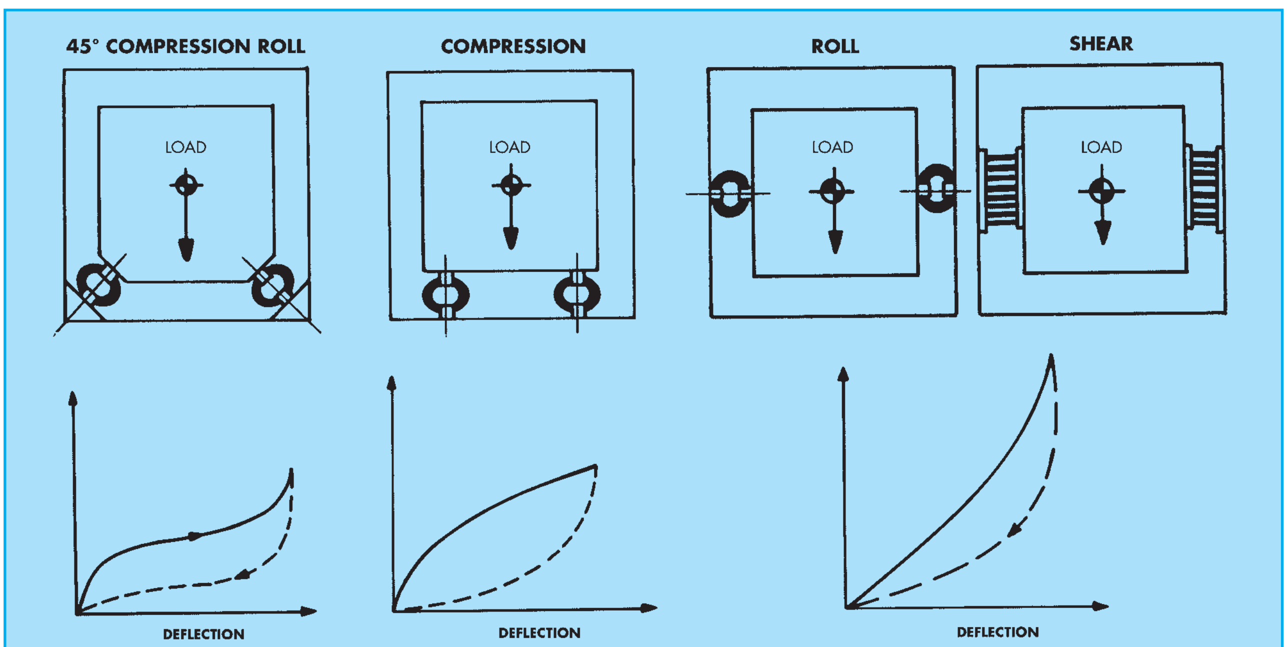
Materials & Finishes

MATERIAL	**Cable:**	Stainless Steel per MIL-W-83420, or RR-W-410
	Retainer Clips:	Stainless Steel
	Attachment Screws:	Alloy Steel
	Cable Retainer Bars:	Aluminum Alloy: 6061-T6
FINISH	**Cable:**	Per MIL-W-83420 or RR-W-410
	Retainer Clips:	Passivated, per MIL-S-5002
	Attachment Screws:	Cadium Plate, per QQ-P-416 or Zinc Plate, per ASTM B633
	Cable Retainer Bars:	Iridited, per MIL-C-5541

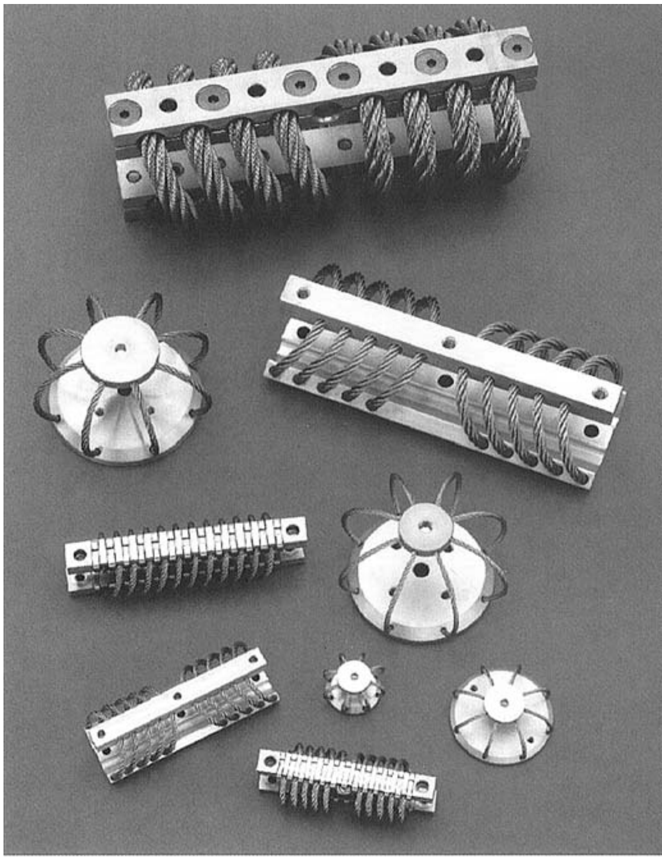
Typical Specifications for Shock and Vibration

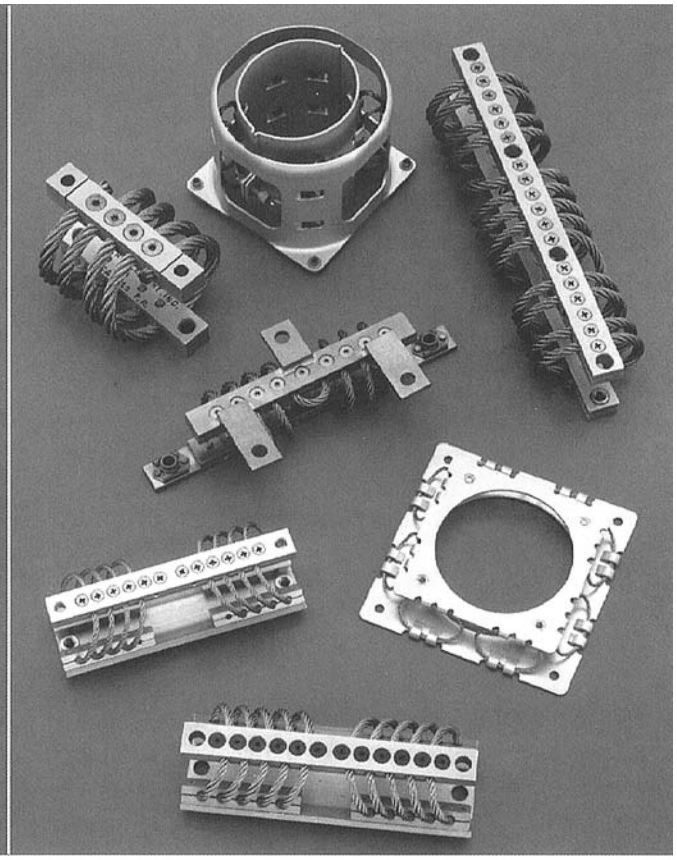
MIL-STD-167
MIL-S-901
MIL-STD-740B
MIL-E-5400
Munson Road Test
MIL-STD-810
MIL-E-5272
MIL-C-172
MIL-T-5422
MIL-C-5584
Road Humping Test

Load Modes



Aeroflex All-Environment Shock and Vibration Isolators





Shock

The non-linear, highly-damped load vs. deflection characteristics and the rapid decay pulse typical of Aeroflex's helical isolators offers excellent shock attenuation. The unique combination of materials and construction (using wire rope as a resilient element) permits the large excursions necessary for good attenuation at a reduced profile height, compared to conventional elastomeric devices.

Aircraft. 15 g 11 ms - operating, 30 g 11 ms - crash safety. Aeroflex helical isolators are currently used to protect avionics, navigation, fire control systems and engines aboard the latest jet attack, turboprop, piston and helicopter aircraft, and can effectively reduce 30g, 11 ms shocks below 10 g's.

Shipboard. Helical isolators are approved for all MIL-S-SO1D Tests, including Light and Medium Weight Hammer and Barge testing. Shock attenuation to 20 g's across the isolators is recorded under maximum blows.

Transit cases, ground support and mobile equipment. Helical isolators provide optimum protection from the high g loads experienced under rough handling, corner drops, rotation drops, and flat drops. Built-in overload capability also offers protection from those field conditions that exceed the specification requirements. Aeroflex shock isolators reduce the input of a 20-inch rotational drop to below 15 g's and from a 51-inch corner drop to below 45 g's. Standard helical isolators are also incorporated in structural support members or skids to protect an entire shelter.

VIBRATION

Damping. The helically-wound cables of Aeroflex isolators are inherently damped through internal wire flexure hysteresis, classically described as elastically connected coulomb damping. Average percent of critical damping, (C/Cc is 15% - 17%). Large resonant motions are highly damped, whereas small motions are essentially undamped, providing excellent isolation.

Fatigue Life. Testing has demonstrated the helical isolators provide exceptional service life. For example, a 25 Ib. mass mounted on four Type C3 helical isolators was vibrated at resonance – 13 Hz – with .060 inch DA input 150 hours, T_R = 3.0 Inspection after testing revealed no physical deformation...no change in F_n...no change in loaded height. Test time was equal to l0 million cycles.

High-frequency isolation. With a dummy load mounted on four type C2 helical isolators and .25 g input out to 10 KHz, isolation efficiency equaled 95%, thus proving that helical isolators provide excellent isolation against small input, high-frequency vibration such as structure-borne noise.

They resist destructive environments. Aeroflex isolators are made entirely of stainless steel and corrosion-resistant aluminum alloy. They function from -400°F to +700°F and resist ozone, grease, sand, salt spray and organic solvents. Their imperviousness to environmental attack means that Aeroflex isolators require no maintenance and will outlast the equipment they isolate. They can also be painted to match equipment.

Aeroflex All-Environment Shock and Vibration Control

■ For sensitive mobile equipment ■ For reuseable shipping containers
■ For shipboard electronics and navigational equipment
■ For avionics and other airborne gear ■ For nuclear and seismic applications
■ For heavy rotating and recipropcating machines

A) A spectacular test is concealed behind the unglamorous designation MIL-S-SO1C. This is the U.S. Navy's High Impact Shock specification. To meet it, isolators must protect equipment mounted inside a covered barge floating in water while explosive charges are detonated 24 feet below the surface at distances of 60 feet to 20 feet from the hull. This is one of the many qualifying tests to which Aeroflex isolators are routinely subjected by military contractors.

B) In this unusual test, an Aeroflex all-stainless steel isolator was soaked in liquid nitrogen to cool it to -3000F. Measured static loadings were then applied. The stiffness of the isolator hardly increased at all over its room temperature characteristics, establishing the usefulness of Aeroflex systems for applications in outer space and the polar regions.

C) All degrees of deflection, even extreme overloads, can be simulated in the load machine used by Aeroflex's engineering department to test isolating mount designs for special customer applications.

D) The IR navigation beacon isolators were designed with a shock frequency less than 3 Hz, to mitigate low frequency shock inputs on the mast yardarm.

AEROFLEX
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