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ENERGY ABSORBING PRODUCTS

Within the family of antivibration products, we are introducing a line of ENERGY-ABSORBING PRODUCTS.

GENERAL

In order to lend full understanding of the importance and capabilities of this product line, we will deal with the concept of ENERGY as well as present some practical examples of several applications. The examples will also include calculations of the forces involved.

Energy-absorbing components are often used as parts of a system or a device itself or, alternatively, they might be used as a safety measure to absorb runaway energy in case of failure of a component or a system. Some numerical examples are addressing both types of these applications.

ENERGY

A body is said to possess energy if it has the ability to perform work. This ability can be the result of its position or its condition. The position of the body produces POTENTIAL ENERGY, whereas if the body is moving with some velocity it possesses energy of motion or KINETIC ENERGY.

The formulas governing energy are as follows:

Kinetic Energy of a body in translation

$\mathbf{E} = \frac{mV^2}{2}$ ....lb. in. or lb. ft.

where m is mass: $\mathbf{m} = \frac{W}{g}$ ....lb. sec²/in. or lb. sec²/ft.

V is velocity in in./sec or ft./sec
W is weight in lb.
g is acceleration of gravity 32.16 ft./sec^2 or 386 in./sec^2

Kinetic Energy of a body in rotation

$\mathbf{E} = I_o \cdot \omega^2$ ....lb. in. or lb. ft.
where I_o is the mass moment of inertia about the axis of rotation in lb. in.sec^2 or lb. ft.sec^2
ω is angular velocity in rad/sec or 1/sec

Potential Energy

$\mathbf{E} = W \cdot h$ ....lb. in. or lb. ft.
where **W** is weight in lb.
h is height of free fall in in. or ft.
If the velocity at the end of the free fall is needed, it can be found from:

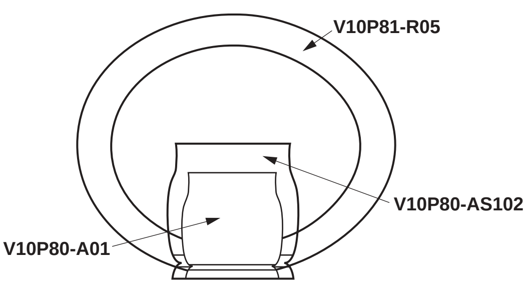
$\mathbf{V} = \sqrt{2gh}$ ....in./sec or ft./sec

The total energy is considered the sum total of all energies involved, and this is the amount which is available to perform work.

In the examples which follow, **simplified** formulas have been developed and used to provide a very close approximation. This enables the application of units which are most commonly used. The nomenclature used in these examples are as follows:

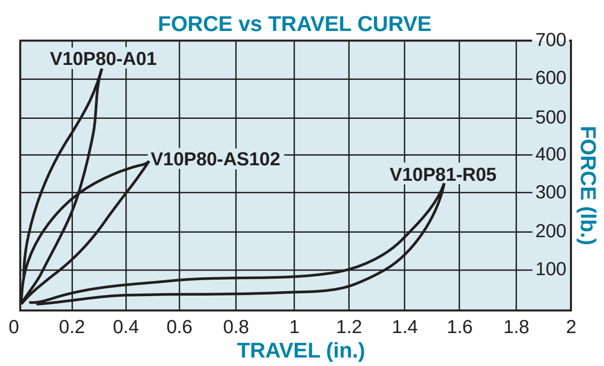
E_1	Kinetic energy (lb. in.)	F	Propelling force (lb.)	t	Deceleration time (sec)
E_2	Work (propelling force) Energy (lb. in.)	C	Cycles per hour	a	Decelertaion (ft./sec^2)
E_3	Total energy ($E_1 + E_2$ lb. in.)	HP	Motor energy (horsepower)	u	Friction (coefficient)
E_4	Total energy ($E_1 + E_2$) Per Hour (lb. in.)	T	Torque (lb. in.)	R_S	Shock absorber mounting radius (in.)
W_E	Effective weight (lb.)	g	Acceleration due to gravity (ft./sec^2)	K	Distance from pivot to center of gravity (in.)
W	Weight of object (lb.)	H	Falling height including stroke of shock absorber (in.)	V_S	Velocity at the shock absorber (ft./sec)
V	Velocity (ft./sec)	S	Shock absorber stroke (in.)	q	Reaction force (lb.)

The actual nature of the application and the availability of space will determine which type of Bumper will be used. In order to facilitate the choice, the following graph is given which compares the Force vs. Travel characteristics of the different types.



This drawing shows size comparison of identical capacity bumpers from each product group. The graph at the right shows comparable performance characteristics.

FORCE vs TRAVEL CURVE



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Bumper Technical Information

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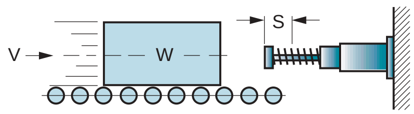
EXAMPLES

1. Weight with no propelling force



Formulas

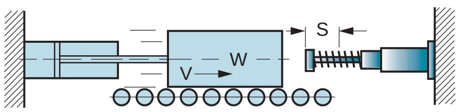
$E_1 = (0.2)\cdot(W)\cdot(V^2)$
$E_4 = (E_1)\cdot(C)$
$W_E = W$

Example

W = 500 lb.
V = 6 fps
C = 500/hour

$E_1 = (0.2)\cdot(500)\cdot(6^2) = 3600$ lb. in.
$E_4 = (3600)\cdot(500) = 1{,}800{,}000$ lb. in./hour

2. Weight with propelling force



Formulas

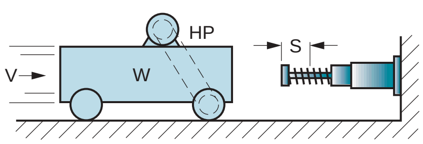
$E_1 = (0.2)\cdot(W)\cdot(V^2)$
$E_2 = (F)\cdot(S)$
$E_3 = E_1 + E_2$
$E_4 = (E_3)\cdot(C)$
$W_E = \dfrac{E_1 + E_2}{(0.2)\cdot(V^2)}$

Example

W = 800 lb.
V = 5 fps
F = 300 lb.
C = 250/hour
S = 3 in.

$E_1 = (0.2)\cdot(800)\cdot(5^2) = 4000$ lb. in.
$E_2 = (300)\cdot(3) = 900$ lb. in.
$E_3 = 4000 + 900 = 4900$ lb. in.
$E_4 = (4900)\cdot(250) = 1{,}225{,}000$ lb. in./hour
$W_E = \dfrac{4000 + 900}{(0.2)\cdot(5^2)} = 980$ lb.

3. Motor driven weight



Formulas

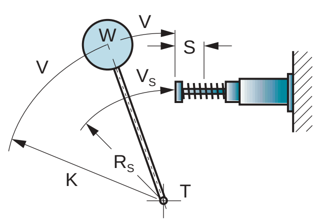
$E_1 = (0.2)\cdot(W)\cdot(V^2)$
$E_2 = \dfrac{(1375)\cdot(HP)\cdot(S)}{V}$
$E_3 = E_1 + E_2$
$E_4 = (E_3)\cdot(C)$
$W_E = \dfrac{E_1 + E_2}{(0.2)\cdot(V^2)}$

Example

W = 1700 lb.
V = 4 fps
HP = 8
C = 100/hour
S = 4 in.

$E_1 = (0.2)\cdot(1700)\cdot(4^2) = 5440$ lb. in.
$E_2 = \dfrac{(1375)\cdot(8)\cdot(4)}{4} = 11{,}000$ lb. in.
$E_3 = 5440 + 11{,}000 = 16{,}440$ lb. in.
$E_4 = (16{,}440)\cdot(100) = 1{,}644{,}000$ lb. in./hour
$W_E = \dfrac{5440 + 11{,}000}{(0.2)\cdot(4^2)} = 5138$ lb.

4. Swinging weight with torque



Formulas

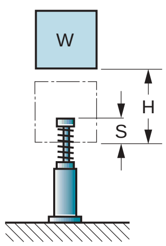
$E_1 = (0.2)\cdot(W)\cdot(V^2)$
$E_2 = \dfrac{(T)\cdot(S)}{R_S}$
$E_3 = E_1 + E_2$
$E_4 = (E_3)\cdot(C)$
$V_S = \dfrac{(V)\cdot(R_S)}{K}$
$W_E = \dfrac{E_1 + E_2}{(0.2)\cdot(V_S^2)}$

Example

W = 350 lb.
V = 3 fps
T = 1500 lb. in.
R_S = 20 in.
K = 30 in.
C = 250/hour
S = 1 in.

$E_1 = (0.2)\cdot(350)\cdot(3^2) = 630$ lb. in.
$E_2 = \dfrac{(1500)\cdot(1)}{20} = 75$ lb. in.
$E_3 = 630 + 75 = 705$ lb. in.
$E_4 = (705)\cdot(250) = 176{,}250$ lb. in./hour
$V_S = \dfrac{(3)\cdot(20)}{30} = 2$ fps
$W_E = \dfrac{630 + 75}{(0.2)\cdot(2^2)} = 881$ lb.

5. Free-falling weight



Formulas

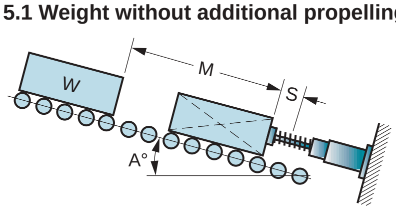
$E_1 = (W)\cdot(H\text{-}S)$
$E_2 = (W)\cdot(S)$
$E_3 = (W)\cdot(H)$
$E_4 = (E_3)\cdot(C)$
$V = \sqrt{5}\cdot(H\text{-}S)$
$W_E = \dfrac{(W)\cdot(H)}{H\text{-}S}$

Example

W = 900 lb.
H = 20 in.
C = 100/hour
S = 4 in.

$E_1 = (900)\cdot(20\text{-}4) = 14{,}400$ lb. in.
$E_2 = (900)\cdot(4) = 3600$ lb. in.
$E_3 = (900)\cdot(20) = 18{,}000$ lb. in.
$E_4 = (18{,}000)\cdot(100) = 1{,}800{,}000$ lb. in.
$V = \sqrt{(5)\cdot(20\text{-}4)} = 8.9$ fps
$W_E = \dfrac{(900)\cdot(20)}{20\text{-}4} = 1125$ lb.

5.1 Weight without additional propelling force



Formulas

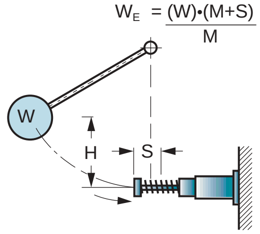
$E_1 = (W)\cdot(M)\cdot(\sin A)$
$E_2 = (W)\cdot(S)\cdot(\sin A)$
$E_3 = (M{+}S)\cdot(W)\cdot\text{SIN}\,(A)$
$E_4 = (E_3)\cdot(C)$
$W_E = \dfrac{(W)\cdot(M{+}S)}{M}$

Example

W = 900 lb.
M = 75 in.
S = 4 in.
C = 100/hour
A = 15°

$E_1 = (900)\cdot(75)\cdot(\sin A) = 17{,}470$ lb. in.
$E_2 = (900)\cdot(4)\cdot(\sin A) = 932$ lb. in.
$E_3 = 17{,}470 + 932 = 18{,}402$ lb. in.
$E_4 = (18{,}402)\cdot 100 = 1{,}840{,}200$ lb. in.
$W_E = \dfrac{(900)\cdot(75 + 4)}{75} = 948$ lb.

5.2 (Calculate as in Ex. 5) Free-swinging weight



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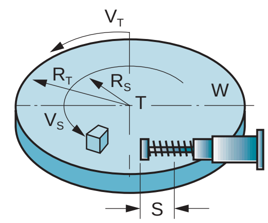
EXAMPLES

6. Turntable with propelling force (horizontal or vertical)



Formulas

$E_1 = (0.1)\cdot(W)\cdot(V_T)^2$

$E_2 = \dfrac{(T)\cdot(S)}{R_S}$

$E_3 = E_1 + E_2$

$E_4 = (E_3)\cdot(C)$

$V_S = \dfrac{(R_S)\cdot(V_T)}{R_T}$

$W_E = \dfrac{E_1 + E_2}{0.2\ V_S^2}$

Example

W = 2000 lb.
R_T = 50 in.
R_S = 32 in.
V_T = 3.5 fps
T = 15,000 lb. in.
C = 100/hour
S = 2 in.

$E_1 = (0.1)\cdot(2000)\cdot(3.5)^2 = 2450$ lb. in.

$E_2 = \dfrac{(15{,}000)\cdot(2)}{32} = 938$ lb. in.

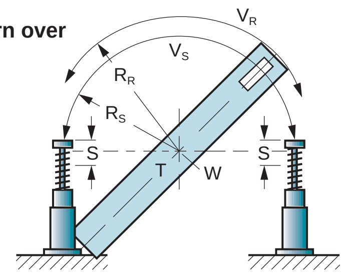
$E_3 = 2450 + 938 = 3388$ lb. in.

$E_4 = (3388)\cdot(100) = 338{,}800$ lb. in./hour

$V_S = \dfrac{(32)\cdot(3.5)}{50} = 2.24$ fps

$W_E = \dfrac{2450 + 938}{0.2\cdot 2.24^2} = 3376$ lb.

7. Turn over



Formulas

$E_1 = \dfrac{(W)\cdot(V_R)^2}{15}$

$E_2 = \dfrac{(T)\cdot(S)}{R_S}$

$E_3 = E_1 + E_2$

$E_4 = (E_3)\cdot(C)$

$V_S = \dfrac{(R_S)\cdot(V_R)}{R_R}$

$W_E = \dfrac{E_1 + E_2}{0.2\cdot(V_S^2)}$

Example

W = 700 lb.
R_R = 60 in.
R_S = 30 in.
V_R = 5 fps
T = 25,000 lb. in.
C = 700/hour
S = 1 in.

$E_1 = \dfrac{(700)\cdot(5^2)}{15} = 1167$ lb. in.

$E_2 = \dfrac{(25{,}000)\cdot(1)}{30} = 833$ lb. in.

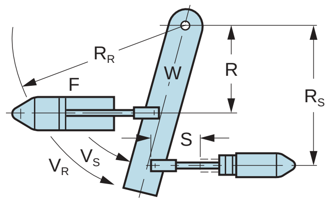
$E_3 = 1167 + 833 = 2000$ lb. in.

$E_4 = (2000)\cdot(700) = 1{,}400{,}000$ lb. in./hour

$V_S = \dfrac{(30)\cdot(5)}{60} = 2.5$ fps

$W_E = \dfrac{1167 + 833}{(0.2)\cdot(2.5^2)} = 1600$ lb.

8. Swinging weight with propelling force



Formulas

$E_1 = \dfrac{(W)\cdot(V_R)^2}{15}$

$E_2 = \dfrac{(T)\cdot(S)}{R_S} = \dfrac{(F)\cdot(R)\cdot(S)}{R_S}$

$E_3 = E_1 + E_2$

$E_4 = (E_3)\cdot(C)$

$V_S = \dfrac{(R_S)\cdot(V_R)}{R_R}$

$W_E = \dfrac{E_1 + E_2}{0.2\cdot(V_S^2)}$

Example

W = 90 lb.
V_R = 6.5 fps
F = 150 lb.
R_R = 50 in.
R = 24 in.
R_S = 30 in.
C = 1800/hour
S = 1 in.

$E_1 = \dfrac{(90)\cdot(6.5)^2}{15} = 254$ lb. in.

$E_2 = \dfrac{(150)\cdot(24)\cdot(1)}{30} = 120$ lb. in.

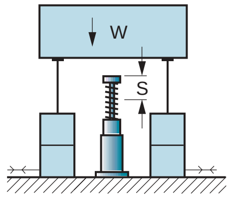
$E_3 = 254 + 120 = 374$ lb. in.

$E_4 = (374)\cdot(1800) = 673{,}000$ lb. in./hour

$V_S = \dfrac{(30)\cdot(6.5)}{50} = 3.9$ fps

$W_E = \dfrac{254 + 120}{(0.2)\cdot(3.9^2)} = 123$ lb.

9. Descending weight at controlled speed



Formulas

$E_1 = (0.2)\cdot(W)\cdot(V^2)$

$E_2 = (W)\cdot(S)$

$E_3 = E_1 + E_2$

$E_4 = (E_3)\cdot(C)$

$W_E = \dfrac{E_1 + E_2}{(0.2)\cdot(V^2)}$

Example

W = 40,000 lb.
V = 2.5 fps
C = 5 hour
S = 5 in.

$E_1 = (0.2)\cdot(40{,}000)\cdot(2.5^2) = 50{,}000$ lb. in.

$E_2 = (40{,}000)\cdot(5) = 200{,}000$ lb. in.

$E_3 = 50{,}000 + 200{,}000 = 250{,}000$ lb. in.

$E_4 = (250{,}000)\cdot(5) = 1{,}250{,}000$ lb. in./hour

$W_E = \dfrac{50{,}000 + 200{,}000}{(0.2)\cdot(2.5^2)} = 200{,}000$ lb.

Reaction force (pounds) q
For all examples

$q = \dfrac{(1.5)(E_3)}{S}$

Stopping time (seconds) ***For all examples***

$t = \dfrac{S}{(6)\cdot(V_S)}$

Deceleration (feet per second²) ***For all examples***

$a = \dfrac{(6)\cdot(V_S)^2}{S}$

NOTE: V_S = Velocity at impact with shock absorber

ADVANCED ANTIVIBRATION COMPONENTS

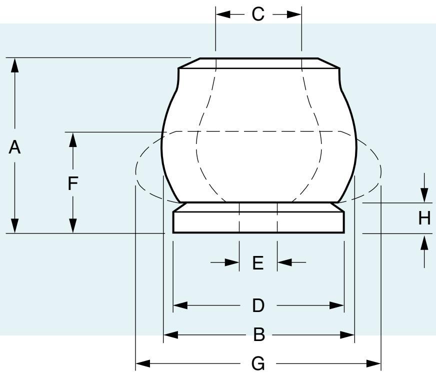
Bumpers – Axial Type – High-Load

www.vibrationmounts.com Phone: 516.328.3662 Fax: 516.328.3365

- **MATERIAL:** High-Performance Elastomer-Polyester

- **OUTDOOR ENVIRONMENTS** • **HIGH-PERFORMANCE**
- **HIGHLY INERT TO MOST CHEMICALS AND LUBRICANTS**

New



OPERATING TEMPERATURE RANGE: -40°F to +120°F (-40°C to +48.9°C)

Catalog Number	Energy Capacity lb. in. (kgf. m.)	Max. Force lb. (kgf)	A Free Height in. (mm)	B Free Bulge in. (mm)	C Wrench Hole in. (mm)
V10P80-A01	100 (1.15)	700 (318)	.76 (19.3)	.85 (21.6)	.41 (10.4)
V10P80-A02	250 (2.88)	1200 (544)	1.01 (25.7)	1.11 (28.2)	.56 (14.2)
V10P80-A03	400 (4.61)	2000 (907)	1.18 (30)	1.35 (34.3)	.66 (16.8)
V10P80-A05	700 (8.06)	2500 (1134)	1.37 (34.8)	1.55 (39.4)	.80 (20.3)
V10P80-A07	1100 (12.67)	3300 (1497)	1.62 (41.1)	1.83 (46.5)	.93 (23.6)
V10P80-A08	1400 (16.13)	3800 (1724)	1.77 (45)	1.96 (49.8)	1.02 (25.9)
V10P80-A10	2000 (23.04)	5000 (2268)	2.02 (51.3)	2.25 (57.2)	1.16 (29.5)
V10P80-A11	2500 (28.8)	5300 (2404)	2.11 (53.6)	2.43 (61.7)	1.23 (31.2)
V10P80-A12	3000 (34.56)	6100 (2767)	2.26 (57.4)	2.54 (64.5)	1.30 (33)
V10P80-A14	4000 (46.08)	7500 (3402)	2.54 (64.5)	2.81 (71.4)	1.41 (35.8)

Catalog Number	D Base Diameter in. (mm)	E Mounting Hole in. (mm)	F Loaded Height in. (mm)	G Loaded Bulge in. (mm)	H Base Thickness in. (mm)	Weight oz. (g)
V10P80-A01	.75 (19.1)		.40 (10.2)	1.07 (27.2)	.13 (3.3)	.16 (4.5)
V10P80-A02	.98 (24.9)	.31 (7.9)	.53 (13.5)	1.43 (36.3)	.16 (4.1)	.37 (10.5)
V10P80-A03	1.16 (29.5)		.63 (16)	1.70 (43.2)	.19 (4.8)	.62 (17.6)
V10P80-A05	1.35 (34.3)	.42 (10.7)	.73 (18.5)	2.00 (50.8)	.22 (5.6)	1.00 (28.3)
V10P80-A07	1.61 (40.9)		.86 (21.8)	2.33 (59.2)	.26 (6.6)	1.70 (48.2)
V10P80-A08	1.71 (43.4)		.92 (23.4)	2.51 (63.8)	.28 (7.1)	2.00 (56.7)
V10P80-A10	1.97 (50)	.55 (14)	1.06 (26.9)	2.86 (72.6)	.32 (8.1)	3.10 (87.9)
V10P80-A11	2.08 (52.8)		1.12 (28.4)	3.05 (77.5)	.34 (8.6)	3.70 (104.9)
V10P80-A12	2.23 (56.6)		1.19 (30.2)	3.22 (81.8)	.36 (9.1)	4.60 (130.4)
V10P80-A14	2.46 (62.5)	.81 (20.6)	1.32 (33.5)	3.58 (90.9)	.40 (10.2)	6.10 (172.9)

See page **6-2** for technical information.

Bumpers – Radial Type

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• **MATERIAL:** High-Performance Elastomer-Polyester

• **OUTDOOR ENVIRONMENTS • HIGH-PERFORMANCE**
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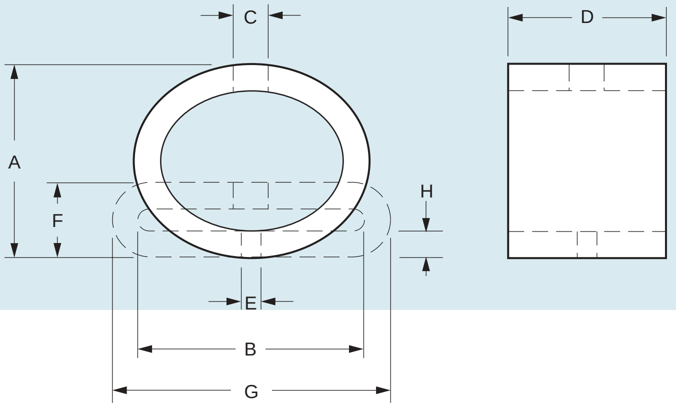
New



TEMPERATURE RANGE: -40°F to +120°F (-40°C to +48.9°C)

Catalog Number	Energy Capacity lb. in. (kgf. m.)	Max. Force lb. (kgf)	A Free Height in. (mm)	B Free Bulge in. (mm)	C Wrench Hole in. (mm)
V10P81-R01	10 (0.12)	75 (34)	.97 (24.6)	1.12 (28.4)	.38 (9.5)
V10P81-R02	20 (0.23)	100 (45)	1.25 (31.8)	1.44 (36.6)	
V10P81-R03	30 (0.35)	150 (68)	1.47 (37.3)	1.67 (42.4)	
V10P81-R04	50 (0.58)	200 (91)	1.72 (43.7)	1.95 (49.5)	
V10P81-R05	100 (1.15)	300 (136)	2.17 (55.1)	2.48 (63)	
V10P81-R06	200 (2.30)	475 (215)	2.31 (58.7)	2.61 (66.3)	
V10P81-R07	300 (3.46)	600 (272)	2.65 (67.3)	3.00 (76.2)	.44 (11.1)

Catalog Number	D Width in. (mm)	E Mounting Hole in. (mm)	F Loaded Height in. (mm)	G Loaded Bulge in. (mm)	H Base Thickness in. (mm)	Weight oz. (g)
V10P81-R01	.52 (13.2)	.22 (5.6)	.32 (8.1)	1.51 (38.4)	.15 (3.8)	.24 (6.8)
V10P81-R02	.76 (19.3)		.41 (10.4)	1.96 (49.8)	.20 (5.1)	.48 (13.6)
V10P81-R03	.79 (20.1)		.48 (12.2)	2.27 (57.7)	.23 (5.8)	.60 (17)
V10P81-R04	1.36 (34.5)		.37 (9.4)	2.68 (68.1)	.16 (4.1)	.90 (25.5)
V10P81-R05	1.70 (43.2)		.47 (11.9)	3.43 (87.1)	.26 (6.6)	1.80 (51)
V10P81-R06	1.82 (46.2)		.74 (18.8)	3.47 (88.1)	.35 (8.9)	2.80 (79.4)
V10P81-R07	1.80 (45.7)	.28 (7.1)	.85 (21.6)	4.03 (102.4)	.40 (10.2)	3.60 (102.1)

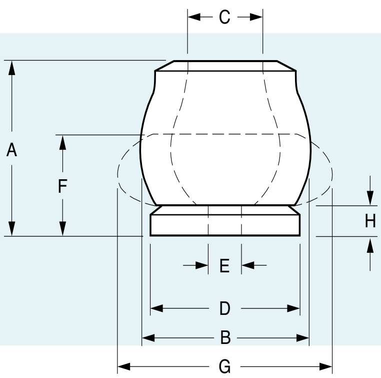
See page 6-2 for technical information.

Bumpers – Axial Type – Low-Load

• **MATERIAL:** High-Performance Elastomer-Polyester

• OUTDOOR ENVIRONMENTS • HIGH-PERFORMANCE
• HIGHLY INERT TO MOST CHEMICALS AND LUBRICANTS

New



OPERATING TEMPERATURE RANGE: -40°F to +120°F (-40°C to +48.9°C)

Catalog Number	Energy Capacity lb. in. (kgf. m.)	Max. Force lb. (kgf)	A Free Height in. (mm)	B Free Bulge in. (mm)	C Wrench Hole in. (mm)
V10P80-AS101	50 (0.58)	300 (136)	.81 (20.6)	.79 (20.1)	.48 (12.2)
V10P80-AS102	100 (1.15)	400 (181)	1.09 (27.7)	1.02 (25.9)	.63 (16)
V10P80-AS103	200 (2.3)	600 (272)	1.27 (32.3)	1.24 (31.5)	.77 (19.6)
V10P80-AS105	300 (3.46)	900 (408)	1.48 (37.6)	1.46 (37.1)	.82 (20.8)
V10P80-AS107	550 (6.34)	1300 (590)	1.75 (44.5)	1.68 (42.7)	.98 (24.9)
V10P80-AS108	700 (8.06)	1600 (726)	1.91 (48.5)	1.88 (47.8)	1.09 (27.7)
V10P80-AS109	800 (9.22)	1900 (862)	2.03 (51.6)	1.99 (50.5)	1.12 (28.4)
V10P80-AS111	1200 (13.82)	2200 (998)	2.33 (59.2)	2.28 (57.9)	1.30 (33)

Catalog Number	D Base Diameter in. (mm)	E Mounting Hole in. (mm)	F Loaded Height in. (mm)	G Loaded Bulge in. (mm)	H Base Thickness in. (mm)	Weight oz. (g)
V10P80-AS101	.73 (18.5)		.40 (10.2)	1.08 (27.4)	.12 (3)	.14 (4)
V10P80-AS102	.98 (24.9)	.31 (7.9)	.53 (13.5)	1.45 (36.8)	.16 (4.1)	.32 (9.1)
V10P80-AS103	1.18 (30)		.63 (16)	1.72 (43.7)	.19 (4.8)	.56 (15.9)
V10P80-AS105	1.35 (34.3)		.73 (18.5)	1.99 (50.5)	.22 (5.6)	1.00 (28.3)
V10P80-AS107	1.58 (40.1)		.86 (21.8)	2.35 (59.7)	.26 (6.6)	1.50 (42.5)
V10P80-AS108	1.73 (43.9)	.56 (14.2)	.92 (23.4)	2.53 (64.3)	.28 (7.1)	2.10 (59.5)
V10P80-AS109	1.85 (47)		.99 (25.1)	2.71 (68.8)	.30 (7.6)	2.50 (70.9)
V10P80-AS111	2.09 (53.1)		1.12 (28.4)	3.07 (78)	.35 (8.9)	3.50 (99.2)

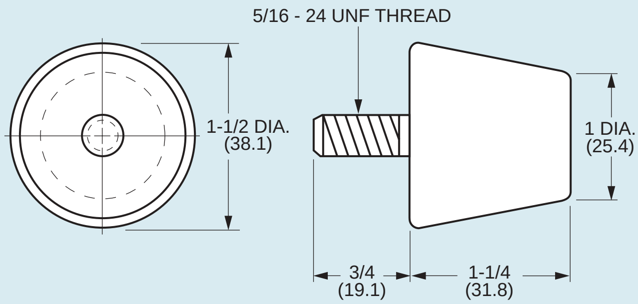
See page **6-**2 for technical information.

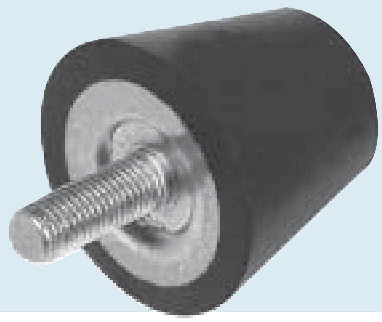
Rev: 8-24-10 SS

Bumpers – Conical

www.vibrationmounts.com Phone: 516.328.3662 Fax: 516.328.3365

- **MATERIAL: Fasteners –** Steel, Zinc Plated
  Isolator – Natural Rubber
- **FOR LOADS OF 44 TO 62 POUNDS (20 to 28.1 kgf)**





NOTE: Dimensions in ( ) are mm.

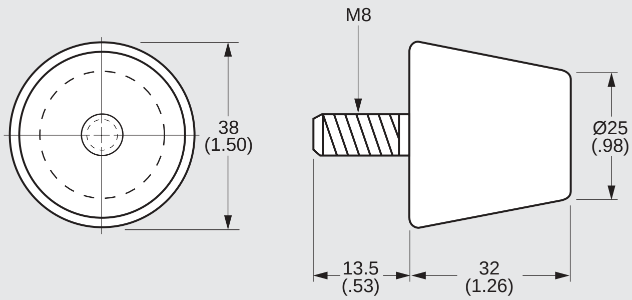
Catalog Number	Recommended Maximum Load	
	Static lb. (kgf)	Occasional Dynamic lb. (kgf)
V10Z 7-1020A	44 (20)	80 (36.3)
V10Z 7-1020B	49 (22.2)	100 (45.4)
V10Z 7-1020C	56 (25.4)	122 (55.3)
V10Z 7-1020D	62 (28.1)	145 (65.8)

Bumpers – Conical

www.vibrationmounts.com Phone: 516.328.3662 Fax: 516.328.3365

- **MATERIAL: Fasteners –** Steel, Zinc Plated
  Isolator – Natural Rubber
- **FOR LOADS OF 20 TO 28 kgf (44 TO 62 lb.)**

New



NOTE: Dimensions in ( ) are inch.

Metric

Catalog Number	Recommended Maximum Load	
	Static kgf (lb.)	Occasional Dynamic kgf (lb.)
V10Z 7M1020AM	20 (44)	36.3 (80)
V10Z 7M1020BM	22.2 (49)	45.4 (100)
V10Z 7M1020CM	25.4 (56)	55.3 (122)
V10Z 7M1020DM	28.1 (62)	65.8 (145)

Did You Know?

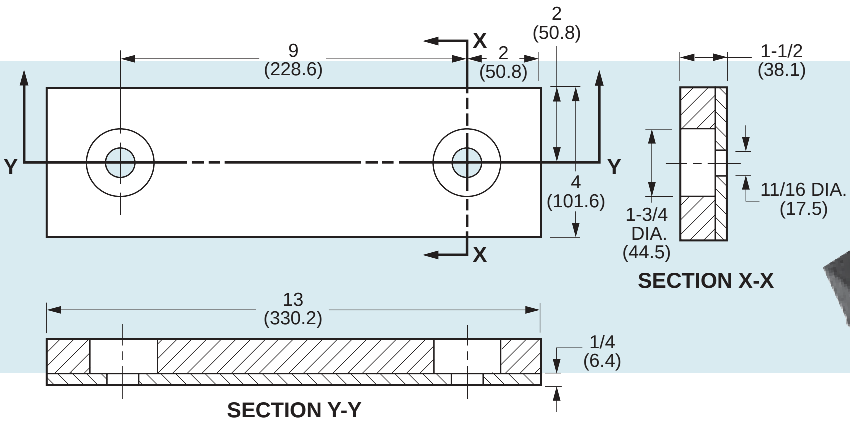
...That substantial quantity discounts are available for all products?

Bumpers – Rectangular

www.vibrationmounts.com Phone: 516.328.3662 Fax: 516.328.3365

• **MATERIAL: Isolator –** Natural Rubber
Base – Steel

• **FOR LOADS TO 4700 POUNDS (2132 kgf)**



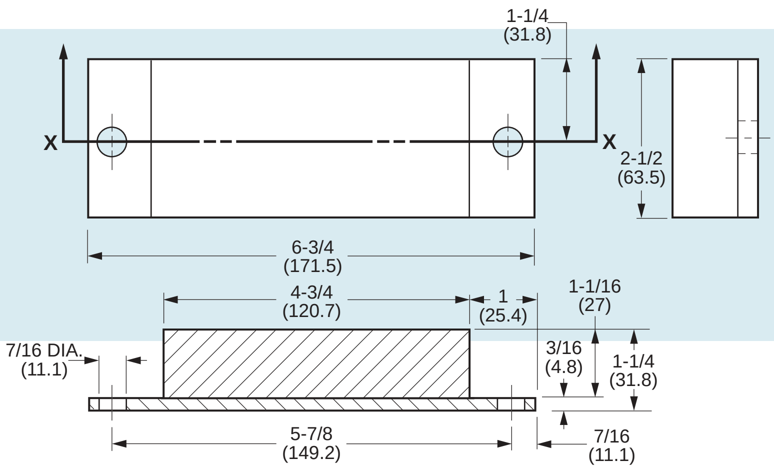
NOTE: Dimensions in ( ) are mm.

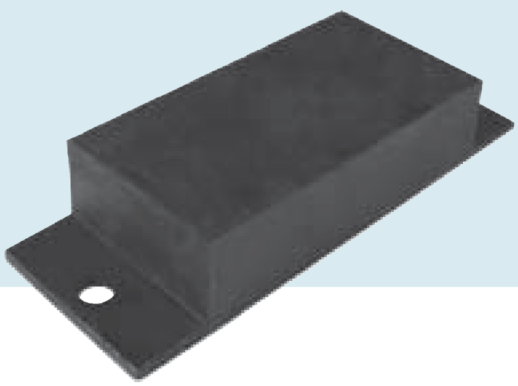
Catalog Number*	Recommended Maximum Loads lb. (kgf)	
	Static	Occasional Dynamic
V10Z 7-1001	4700 (2132)	11000 (4990)

*To be discontinued when present stock is depleted.

• **MATERIAL: Isolator –** Natural Rubber
Base – Steel

• **FOR LOADS TO 1200 POUNDS (544 kgf)**





NOTE: Dimensions in ( ) are mm.

Catalog Number*	Recommended Maximum Loads lb. (kgf)	
	Static	Occasional Dynamic
V10Z 7-1011	1200 (544)	2150 (975)

*To be discontinued when present stock is depleted.