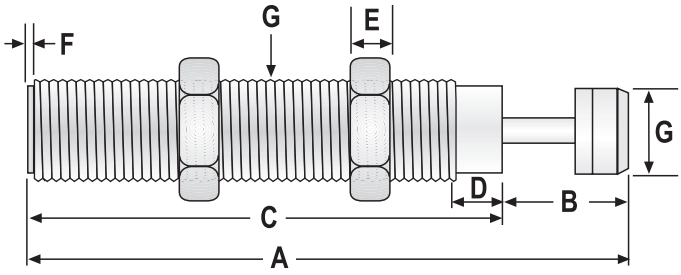
Self Compensating Minibuffers

EFM Series

- **Operating Temperature: 14° to 176°F (-10° to 80°C)**
- **Two locknuts provided with each minibuffer**
- **Flange and Footlug mounts available**



SPECIFICATIONS: EFM MINIBUFFERS

DIMENSIONS IN INCHES (MM)

MODEL	STROKE	A	B	C	D	E	F	G	H
EFM 08-06-6C, 7C, 8C	.24 (6)	2.17 (55)	.57 (14.5)	1.60 (40.5)	-	.12 (3)	.19 (5)	.26 (6.5)	M8 X 1.0
EFM 10-08-6C, 7C, 8C	.31 (8)	2.44 (62)	.65 (16.5)	1.79 (45.5)	-	.12 (3)	.19 (5)	.33 (8.5)	M10 X 1.0
EFM 12-10-6C, 7C, 8C	.39 (10)	2.83 (72)	.77 (19.5)	2.11 (53.5)	-	.16 (4)	.18 (4.5)	.41 (10.5)	M12 X 1.0
EFM 10-20-1C, 2C	.80	4.90	1.36	3.54	.12	.31	.43	.71	7/8-14 UNF (-1,-2)
EFM 10-20-6C, 7C	(20)	(125)	(35)	(90)	(3)	(8)	(11)	(18)	M20 X 1.5 (-6,-7)
EFM 11-25-1C, 2C	1.0	5.06	1.71	3.35	.55	.39	.12	.87	1-12 UNF (-1, -2)
EFM 11-25-6C, 7C	(25)	(128)	(43)	(85)	(14)	(10)	(3)	(22)	M25 X 2.0 (-6, -7)
EFM 27-25-7C, 8C	1.0 (25)	5.93 (151)	1.56 (40)	4.4 (111)	-	.39 (10)	.39 (10)	.89 (23)	M27 X 3.0
EFM 11-40-1C	1.6	8.31	3.25	5.06	.55	.39	.12	.87	1-12 UNF (-1)
EFM 11-40-6C	(40)	(211)	(83)	(129)	(14)	(10)	(3)	(22)	M25 X 2.0 (-6)
EFM 20-50-2C	2.0 (50)	9.57 (243)	3.47 (88)	6.10 (155)	.71 (18)	.59 (15)	.55 (14)	1.18 (30)	M36 X 1.5

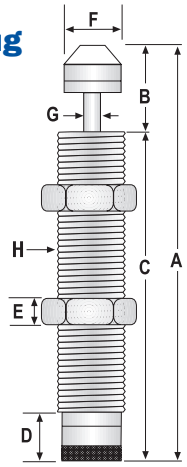
SIZE SELECTION

MODEL	EFFECTIVE WEIGHT lbs (kg)	ENERGY PER CYCLE In lbs (Nm)	ENERGY PER HOUR In lbs (Nm)	MAX IMPACT SPEED In/Sec (m/sec)	SPRING FORCE lbs (kgf) Ext.	SPRING FORCE lbs (kgf) Comp.	MAX CYCLES PER MINUTE	WEIGHT lbs. (g)
EFM 08-06-6C	12 (5.6)	16 (1.8)	21,000 (2,400)	78 (2.0)	.4 (.18)	.9 (.41)	22	.2 (.01)
EFM 08-06-7C	22 (10)	16 (1.8)	21,000 (2,400)	47 (1.2)	.4 (.18)	.9 (.41)	22	.2 (.01)
EFM 08-06-8C	50 (23)	16 (1.8)	21,000 (2,400)	31 (.8)	.4 (.18)	.9 (.41)	22	.2 (.01)
EFM 10-08-6C	9.7 (4.4)	28 (3.2)	50,400 (5,760)	101 (2.6)	.5 (.23)	1.0 (.45)	30	.3 (.01)
EFM 10-08-7C	22 (10)	28 (3.2)	50,400 (5,760)	59 (1.5)	.5 (.23)	1.0 (.45)	30	.3 (.01)
EFM 10-08-8C	88 (40)	28 (3.2)	50,400 (5,760)	31 (.8)	.5 (.23)	1.0 (.45)	30	.3 (.01)
EFM 12-10-6C	26.4 (12)	53 (6)	95,500 (10,800)	101 (2.6)	.8 (1.8)	3.7 (1.7)	30	.4 (.02)
EFM 12-10-7C	41 (19)	53 (6)	95,500 (10,800)	59 (1.5)	.8 (1.8)	3.7 (1.7)	30	.4 (.02)
EFM 12-10-8C	165 (75)	53 (6)	95,500 (10,800)	31 (.8)	.8 (1.8)	3.7 (1.7)	30	.4 (.02)
EFM 10-20-1C EFM 10-20-6C	66 (30)	260 (29)	468,000 (52,800)	55 (1.4)	2.0 (0.9)	5.1 (2.3)	30	.4 (.02)
EFM 10-20-2C EFM 10-20-7C	33 (15)	260 (29)	468,000 (52,800)	79 (2.0)	2.0 (0.9)	5.1 (2.3)	30	.4 (.02)
EFM 11-25-1C EFM 11-25-6C	242 (110)	712 (80)	640,800 (72,300)	47 (1.2)	4.4 (2.0)	7.1 (3.2)	15	.64 (.03)
EFM 11-25-2C EFM 11-25-7C	75 (34)	712 (80)	640,800 (72,300)	87 (2.2)	4.4 (2.0)	7.1 (3.2)	15	.64 (.03)
EFM 27-25-7C	952 (433)	690 (78)	621,400 (70,200)	79 (2.0)	4.4 (2.0)	7.1 (3.2)	15	.79 (.04)
EFM 27-25-8C	3812 (1733)	690 (78)	621,400 (70,200)	47 (1.2)	4.4 (2.0)	7.1 (3.2)	15	.79 (.04)
EFM 11-40-1C EFM 11-40-6C	662 (300)	1042 (118)	750,240 (84,700)	118 (3.0)	4.4 (2.0)	12.6 (5.7)	12	1.32 (.06)
EFM 20-50-2C	2205 (1002)	3472 (392)	1,666,560 (188,100)	118 (3.0)	6.6 (3.0)	18.3 (8.3)	8	2.21 (.10)

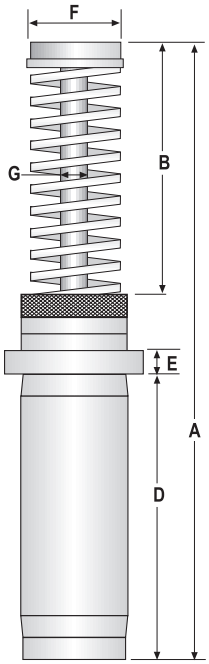
Adjustable Minibuffers

EFMA & EFA Series

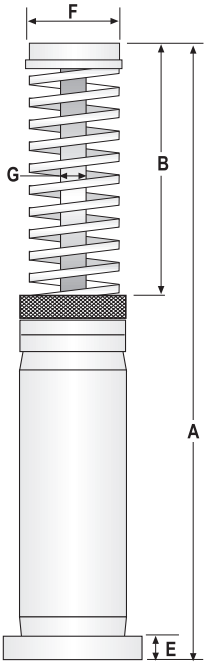
- **Operating Temperature: 14° to 176°F (-10° to 80°C)**
- **Two locknuts provided with each minibuffer**
- **Flange and Footlug mounts available**



EFMA

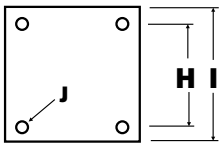


EFA 20-50-FC



EFA 20-50-RC

EFA Mounting Dimensions



H - 38 (1.50)
I- 50 (1.97)
J - 5.5 (0.22) dia.

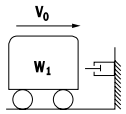
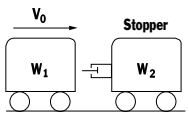
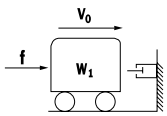
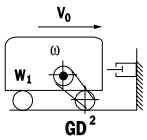
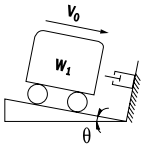
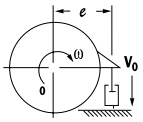
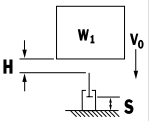
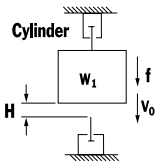
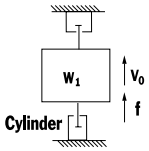
SPECIFICATIONS: EFA & EFMA MINIBUFFERS

DIMENSIONS IN INCHES (MM)

MODEL	STROKE	A	B	C	D	E	F	G	H
EFMA 7-15-1C EFMA 7-15-6C	.60 (15)	4.33 (110)	1.01 (26)	3.32 (84)	.49 (12)	.24 (6)	.47 (12)	.14 (4)	5/8-18 UNF (-1) M14 X 1.0 (-6)
EFMA 20-16-1C	.63 (16)	5.12 (130)	1.18 (30)	3.9 (100)	.6 (15)	.31 (8)	.71 (18)	.20 (5)	3/4-16 UNF
EFMA 10-20-1C EFMA 10-20-6C	.80 (20)	5.08 (129)	1.37 (35)	3.71 (94)	.49 (12)	.31 (8)	.71 (18)	.20 (5)	7/8-14 UNF (-1) M20 X 1.5 (-6)
EFMA 11-25-1C EFMA 11-25-6C	1.0 (25)	6.02 (153)	1.73 (44)	4.29 (109)	.47 (12)	.39 (10)	.87 (22)	.35 (9)	1-12 UNF (-1) M25 X 2.0 (-6)
EFMA 27-25-6C	1.0 (25)	6.14 (156)	1.56 (40)	4.6 (117)	.63 (16)	.39 (10)	.90 (23)	.31 (8)	M27 X 3.0
EFA 20-50-FC	2.0 (50)	9.06 (230)	3.54 (90)	-	3.92 (100)	.39 (10)	1.10 (28)	.39 (10)	-
EFA 20-50-RC	2.0 (50)	9.06 (230)	3.54 (90)	-	-	.39 (10)	1.10 (28)	.39 (10)	-

SIZE SELECTION

MODEL	MAX EFFECTIVE WEIGHT lbs (kg)				ENERGY PER CYCLE In lbs (Nm)	ENERGY PER HOUR In lbs (Nm)	MAX IMPACT SPEED In/Sec (m/sec)				SPRING FORCE lbs (kgf) EXT.	SPRING FORCE lbs (kgf) COMP	MAX CYCLES PER MINUTE	WEIGHT lbs. (g)
EFMA 7-15-1C EFMA 7-15-6C	STEP 1 7.5 (3.4)	STEP 2 18 (8)	STEP 3 44 (20)	STEP 4 75 (34)	87 (10)	313,200 (35,900)	STEP 1 95 (2.4)	STEP 2 63 (1.6)	STEP 3 39 (1.0)	STEP 4 31 (.8)	0.9 (0.4)	2.4 (1.1)	60	.26 (.01)
EFMA 20-16-1C	500 (227)				250 (29)	450,000 (50,800)	125 (3.2)				2.0 (0.9)	5.1 (2.3)	30	.48 (.02)
EFMA 10-20-1C EFMA 10-20-6C	STEP 1 18 (8)	STEP 2 33 (15)	STEP 3 66 (30)	STEP 4 161 (73)	260 (30)	468,000 (52,800)	STEP 1 106 (2.7)	STEP 2 79 (2.0)	STEP 3 55 (1.4)	STEP 4 35 (.9)	2.0 (0.9)	5.1 (2.3)	30	.40 (.02)
EFMA 11-25-1C EFMA 11-25-6C	STEP 1 42 (19)	STEP 2 75 (34)	STEP 3 242 (110)	STEP 4 728 (330)	712 (82)	640,800 (72,300)	STEP 1 114 (2.9)	STEP 2 87 (2.2)	STEP 3 47 (1.2)	STEP 4 28 (.7)	4.4 (2.0)	7.1 (3.2)	15	.64 (.03)
EFMA 27-25-6C	1375 (625)				690 (78)	621,400 (70,200)	79 (2.0)				4.4 (2.0)	7.1 (3.2)	15	.83 (.04)
EFA 20-50-FC EFA 20-50-RC	2200 (1000)				3472 (392)	1,666,560 (188,100)	118 (3.0)				6.6 (3.0)	18.3 (8.3)	8	2.21 (.1)

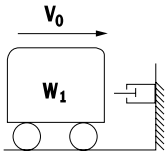
	Horizontal Impact (Stationary)	Horizontal Impact (Movable)	Horizontal Impact With Pushing Porce	Horizontal Impact With Rotation	Impact with Some Incline	Rotary
Applications						
Effective Impact Weight kgf (lbs.)	$We = \frac{W_1}{n}$	$We = \frac{W_1 \times W_2}{(W_1+W_2)\,n}$	$We = \frac{W_1 + \frac{2gfS}{V_0^2}}{n}$	$We = \frac{W_1 + {}^1/_4\,GD^2\left(\frac{W^2}{V_0^2}\right)}{n}$	$We = \frac{W_1 + \left(1+\frac{2g\sin\theta S}{V_0^2}\right)}{n}$	$We = \frac{I g}{\ell^2 \cdot n}$ $\left(V_0 = \ell \cdot \omega\right)$
Absorption Energy	$E = \frac{W_1 \cdot V_0^2}{2g \cdot n}$	$E = \frac{W_1 \cdot W_2 \cdot V_0^2}{2g(W_1+W_2)\,n}$	$E = \frac{W_1 \cdot V_0^2}{2gn} + \frac{f \cdot S}{n}$	$E = \frac{W_1 \cdot V_0^2}{2gn} + \frac{GD^2\,\omega^2}{8gn}$	$E = \frac{W_1 \cdot V_0^2}{2gn} + WS\sin\theta$	$E = \frac{I\omega^2}{2n}$ $\left(\omega = \frac{2\pi n}{60}\right)$
	Free Fall Impact	Cylinder Bottoming	Cylinder Topping			
Applications						
Effective Impact Weight kgf (lbs.)	$We = \frac{W_1\left(1+\frac{2gS}{V_0^2}\right)}{n}$ $(V_0 = \sqrt{2gH})$	$We = \frac{W_1 + \frac{2gS(f+W_1)}{V_0^2}}{n}$	$We = \frac{W_1 + \frac{2gS(f-W_1)}{V_0^2}}{n}$			
Absorption Energy	$E = \frac{W_1 \cdot V_0^2}{2gn} + \frac{W_1 S}{n}$	$E = \frac{W_1 \cdot V_0^2}{2gn} + \frac{(f+W_1)S}{n}$	$E = \frac{W_1 \cdot V_0^2}{2gn} + \frac{(f-W_1)S}{n}$			

E = Absorption Energy [kgf m (in. lbs.)]
We = Effective Impact Weight [kgf (lbs.)]
W_1, W_2 = Impact Weight [kgf (lbs.)]
V_0 = Impact Speed [m/s (in./s)]
S = Stroke [m (in]
f = Pushing Force [kgf (lbs.)]
n = No. of Buffers
g = Acceleration of Gravity [= 9.8 m/s² (= 386 in/s²)]
ω = Angular Velocity [rad/s (rad/s)]
ℓ = Distance [m (in.)]
H = Fall Height [m (in.)]
I = Moment of Inertia [kgf m s² (in. lbs. - sec²)]
N = Rotation Speed [rpm]
θ = Inclined Angle [rad]
GD^2 = Rotational Inertia [kgf m² (lbs. in²)]

EXAMPLES:

Application: Factory Conveyor

Example A - Speed and weight of conveyed object is constant, needing only a fixed setting Minibuffer.



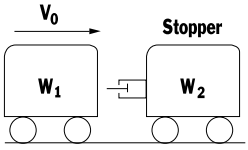
Weight W_1 : 200 lbs.
Speed V_0 : 45 in/sec

$$We = \frac{W_1}{n} = \frac{200}{1} = 200$$

$$E = \frac{W_1 \cdot V_0^2}{2g \cdot n} = \frac{200 \times (45)^2}{2 \times 386 \times 1} = 525$$

Select EFM 11-25-1 from specification chart on page 26.

Example B - Two different object are conveyed, requiring an adjustable Minibuffer.



Weight W_1 : 150 lbs.
W_2 : 30 lbs.
Speed V_0 : 35 in/sec

Object W1

$$We_1 = \frac{W_1}{n} = \frac{150}{1} = 150$$

$$E_1 = \frac{W_1 \cdot V_0^2}{2g \cdot n} = \frac{150 \times (35)^2}{2 \times 386 \times 1} = 238$$

Object W2

$$We_2 = \frac{W_2}{n} = \frac{30}{1} = 30$$

$$E_2 = \frac{W_2 \cdot V_0^2}{2g \cdot n} = \frac{30 \times (35)^2}{2 \times 386 \times 1} = 47.6$$

Select EFMA 10-20-1 from specification chart on page 27.