

Shock Absorbers and Rate Controls



ENIDINE





The design of Jarret Series Industrial Shock Absorber utilizes the unique compression and shear characteristics of specially formulated silicone elastomers.

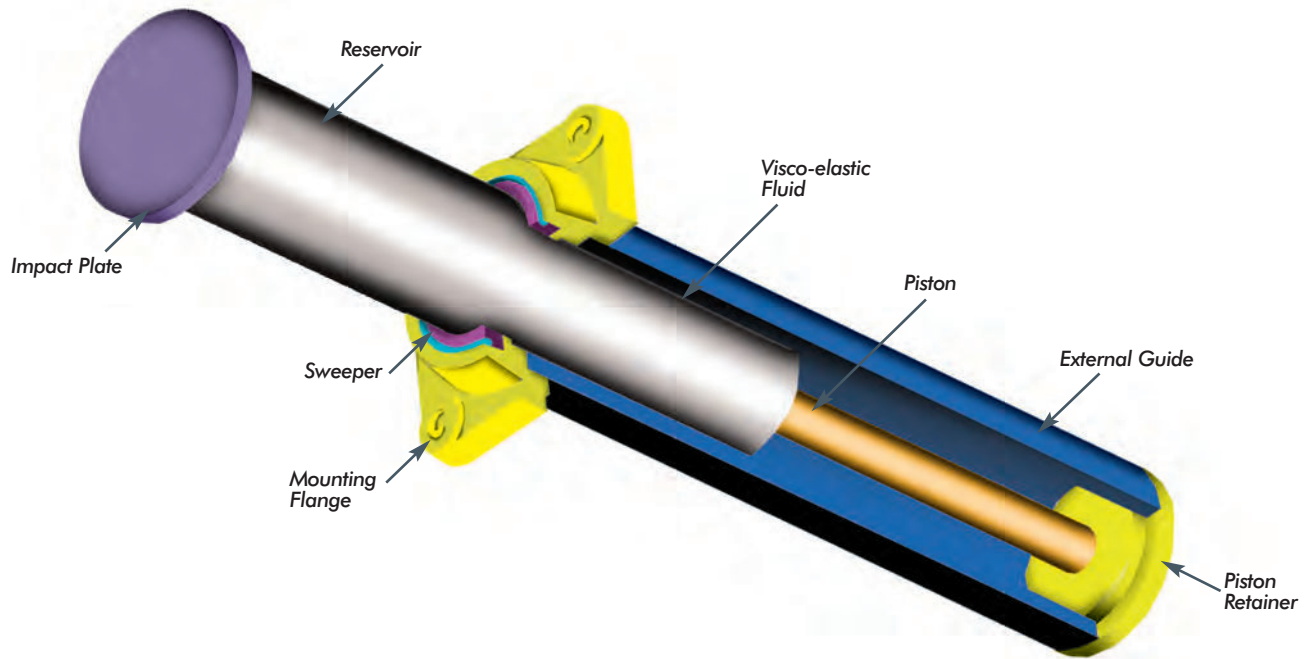
These characteristics allow the energy absorption and return spring functions to be combined into a single unit **without the need for an additional gas or mechanical spring stroke return mechanism.**

Applications

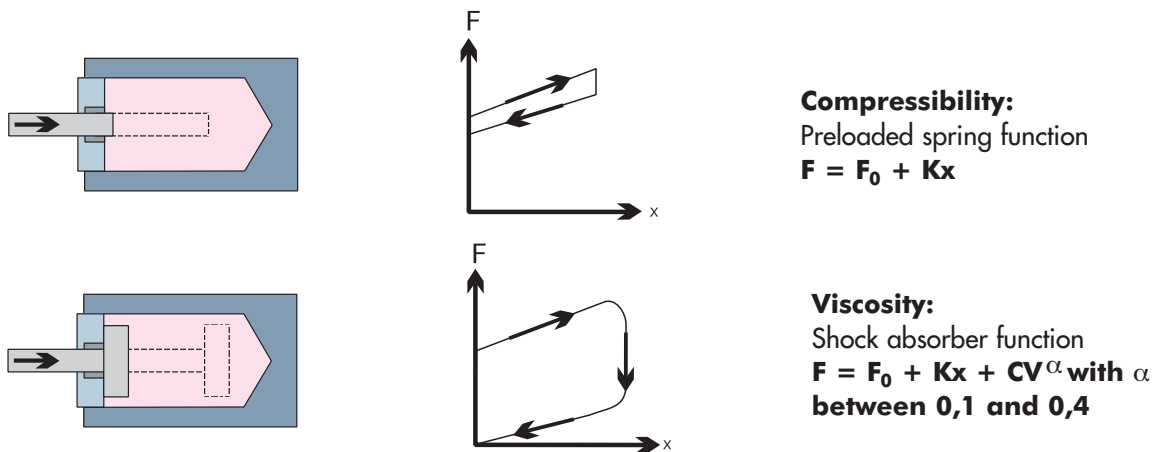
Shock protection for all types of industries including:
**Defense, Automotive, Railroad, Materials Handling,
 Marine, Pulp/Paper, Metal Production and Processing.**

Advantages:

- Simple design
- High reliability
- High damping coefficient
- Low sensitivity to temperature variances



Visco-elastic technology makes use of the fundamental properties of specially formulated Jarret visco-elastic medium.



The two functions can be used separately or in combination, in the same product:

**Preloaded Spring:
Spring Function Only**

- Hysteresis of between 5% and 10%
- Reduced weight and space requirement
- Force/stroke characteristic is independent of actuation speed

**Shock Absorber Without Spring Return:
Shock Absorbing Function Only**

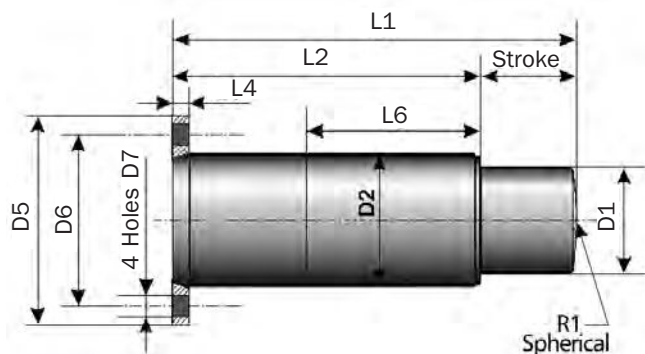
- Dampening devices
- Blocking devices

**Preloaded Spring Shock Absorbers:
Combine Spring and Shock Absorber Functions**

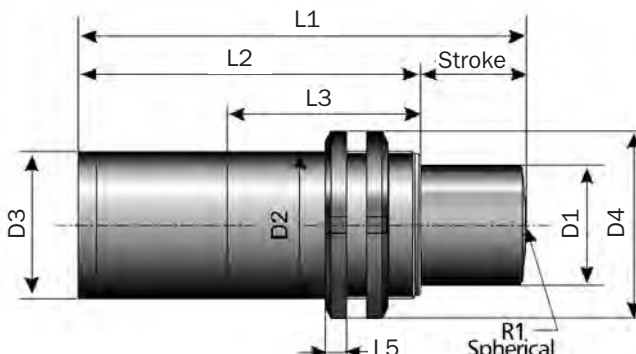
- Dissipate between 30% and 100% of energy
- Force/stroke characteristics remain relatively unchanged between 15°F and 160°F (-10°C and + 70°C)

* Spring and shock absorber products are capable of functioning between 15°F and 160°F (-10°C and + 70°C). However, standard products are not intended for use over the full rated temperature range. Consult factory for special product considerations required to accommodate operation over a wide temperature range.

BC1ZN → BC1GN Series



Rear Flange Mounting - Fa



Threaded Body Mounting - Fc

Catalog No./ Model	Max Energy Capacity in-lbs. (kJ)	Stroke in. (mm)	Return Force		Rdy ₀ lbs. (kN)	Rdymax Max Shock Force lbs. (kN)
			Extension lbs. (kN)	Compression lbs. (kN)		
BC1ZN	885 (0,1)	0.47 (12)	211 (0,94)	1,213 (5,4)	1,349 (6)	2,473 (11)
BC1BN	3,806 (0,43)	0.87 (22)	562 (2,5)	3,147 (14,0)	3,147 (14)	6,070 (27)
BC1DN	13,276 (1,5)	1.4 (35)	1,169 (5,2)	6474 (28,8)	6,295 (28)	13,489 (60)
BC1EN	30,093 (3,4)	1.8 (45)	1,753 (7,8)	9,666 (43,0)	10,116 (45)	22,481 (100)
BC1FN	61,955 (7)	2.4 (60)	3,057 (13,6)	17,220 (76,6)	20,233 (90)	33,721 (150)
BC1GN	123,910 (14)	3.1 (80)	4,271 (19,0)	29,225 (130,0)	29,225 (130)	51,706 (230)

Catalog No./ Model	L1 in. (mm)	L2 in. (mm)	L3 in. (mm)	L4 in. (mm)	L5 in. (mm)	L6 in. (mm)	R1 in. (mm)	D1 in. (mm)	D2 in. (mm)	D3 in. (mm)	D4 in. (mm)	D5 in. (mm)	D6 in. (mm)	D7 in. (mm)	Weight lbs. (kg.)
BC1ZN	2.95 (75)	2.1 (53)	2.1 (52)	0.39 (10)	0.28 (7)	1.7 (43)	—	0.75 (19)	M25 x 1,5	0.79 (20)	1.5 (38)	2.2 (57)	1.6 (41)	0.28 (7)	0.7 (0,3)
BC1BN	4.7 (120)	3.9 (98)	3.8 (96)	0.47 (12)	0.31 (8)	3.4 (86)	—	1.0 (25)	M35 x 1,5	1.3 (32)	2.0 (52)	3.1 (80)	2.4 (60)	0.35 (9)	1.5 (0,7)
BC1BN-M	4.7 (120)	3.9 (98)	3.8 (96)	0.47 (12)	0.35 (9)	—	—	1.0 (25)	M40 x 1,5	1.3 (32)	2.3 (58)	—	—	—	1.8 (0,8)
BC1DN-70	6.9 (175)	5.5 (140)	5.4 (138)	0.47 (12)	0.43 (11)	5.0 (128)	—	1.5 (38)	M50 x 1,5	1.8 (45)	2.8 (70)	3.5 (90)	2.8 (70)	0.35 (9)	4.2 (1,9)
BC1DN-85	6.9 (175)	5.5 (140)	5.4 (138)	0.47 (12)	0.43 (11)	5.0 (128)	—	1.5 (38)	M50 x 1,5	1.8 (45)	2.8 (70)	4.2 (106)	3.3 (85)	0.43 (11)	4.4 (2)
BC1DN-M	6.9 (175)	5.5 (140)	5.4 (138)	0.47 (12)	0.43 (11)	—	—	1.5 (38)	M60 x 2	1.8 (45)	2.8 (70)	—	—	—	4.4 (2)
BC1EN	8.4 (213)	6.6 (168)	6.2 (158)	0.39 (10)	0.51 (13)	6.2 (158)	5.1 (130)	2.4 (60)	M75 x 2	2.8 (72)	3.9 (98)	4.8 (122)	4.0 (100)	0.43 (11)	11 (5)
BC1FN	10.6 (270)	8.3 (210)	5.1 (130)	0.47 (12)	0.63 (16)	5.1 (130)	5.9 (150)	2.9 (74,5)	M90 x 2	3.5 (90)	4.7 (120)	5.9 (150)	4.7 (120)	0.51 (13)	23.1 (10,5)
BC1GN	13.3 (337)	10.1 (257)	5.7 (145)	0.55 (14)	0.75 (19)	5.7 (145)	13.8 (350)	3.5 (90)	M110 x 2	4.3 (110)	5.7 (145)	6.9 (175)	5.6 (143)	0.70 (18)	37.5 (17)

Notes: Spring and shock absorber products are capable of functioning between 15°F and 160°F (-10°C and +70°C). However, standard products are not intended for use over the full rated temperature range. Consult factory for special product considerations required to accommodate operation over a wide temperature range.

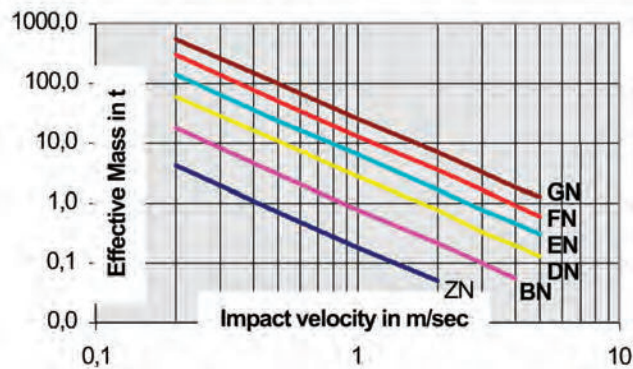
Jarret Shock Absorbers

BC1N Series

Sizing Example

BC1ZN → BC1GN Series

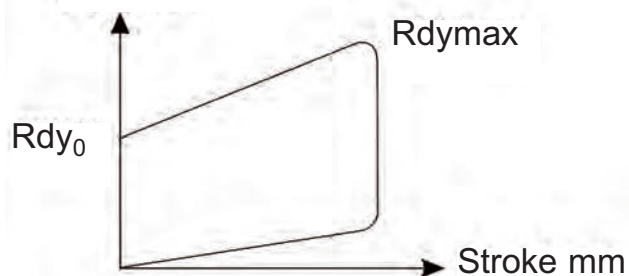
1 - Selection Chart



Based On

- Impact velocity (V) : 2 m/s
- Operating temperature : 20° to + 40°C
- Surface protection : Electrolytic zinc
- Dynamic performance diagram

Force kN



Symbols:

- En = Energy Capacity (kJ)
- C = Maximum Stroke (mm)
- Rdy = Dynamic Reaction Force (kN)

2 - Energy Calculation

$$E = \frac{1}{2} M_e V_e^2$$

3 - Allowable Impact Velocity

$$IF < 20 \times \frac{E_n}{E} \text{ Impacts/hour}$$

4 - Effective (Actual) Stroke Calculation

$$C_e = C \left(\sqrt{\frac{E}{E_n (0,03 V + 0,24) + 1,36 - 1,17}} \right)$$

5 - Calculation of Effective Reaction Force Rdy_e

$$Rdy_e = \left[\left(\frac{Rdy_{max} - Rdy_0}{C} \right) \times C_e + Rdy_0 \right] (0,1V + 0,8)$$

6 - Application Example

Given data: Effective mass = 15 t
 Effective velocity = 0,8 m/s
 Impact frequency: 25 impacts/hour

1. Energy dissipated per impact: $E = \frac{1}{2} (15)(0,8) = 4,8 \text{ kJ}$

2. BC1FN Selected

3. Allowable impact frequency $IF < 20 \times 7 / 4.8 = 29$
 $25 < 29$

4. Effective (Actual) Stroke:

$$C_e = 60 \left(\sqrt{\frac{4,8}{7 (0,03 \times 0,8 + 0,24) + 1,36 - 1,17}} \right)$$

$C_e = 49 \text{ mm}$

5. Effective Reaction Force:

$$Rdy_e = \left[\frac{(150 - 90) \times 49 + 90}{60} \right] (0,1 \times 0,8 + 0,8)$$

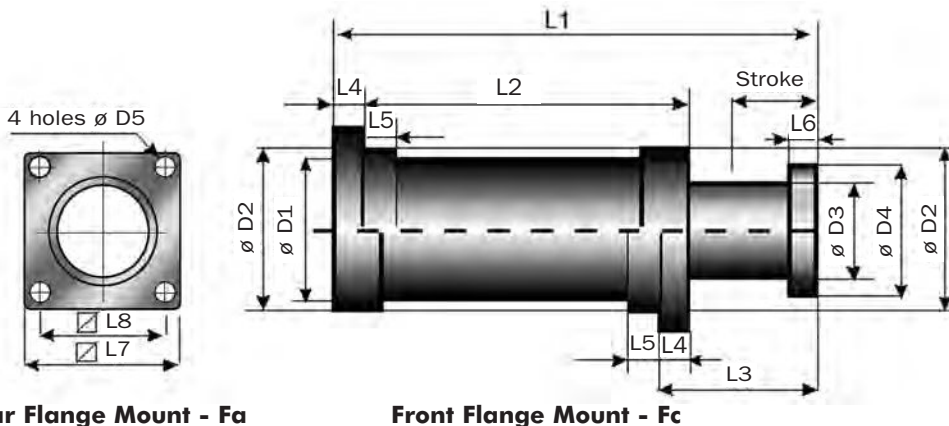
$Rdy_e = 122 \text{ kN}$

6. Compare standards to results:

	BC1FN		APPLICATION
E (kJ) =	7	>	4,8
C (mm) =	60	>	49
Rdy _{max} (kN)	150	>	122

All performance characteristics can be modified. Please advise us of your specific requirements.

BC5A → BC5E Series



Catalog No./ Model	Max Energy Capacity in-lbs. (kJ)	Stroke in. (mm)	Return Force		Rdy ₀ lbs. (kN)	Rdymax Max Shock Force lbs. (kN)
			Extension lbs. (kN)	Compression lbs. (kN)		
BC5A-105	221,268 (25)	4.1 (105)	4,159 (18,5)	31,630 (140,7)	37,543 (167)	69,691 (310)
BC5B-130	442,537 (50)	4.7 (130)	13,039 (58,0)	58,416 (259,9)	69,691 (310)	121,397 (540)
BC5C-140	663,806 (75)	5.5 (140)	11,015 (49,0)	73,827 (328,4)	89,924 (400)	157,366 (700)
BC5D-160	885,075 (100)	6.3 (160)	13,376 (59,5)	85,427 (380,0)	105,660 (470)	184,343 (820)
BC5E-180	1,327,612 (150)	7.1 (180)	26,269 (117,0)	122,656 (546)	143,878 (640)	247,290 (1 100)

Catalog No./ Model	L1 in. (mm)	L2 in. (mm)	L3 in. (mm)	L4 in. (mm)	L5 in. (mm)	L6 in. (mm)	L7 in. (mm)	L8 in. (mm)	D1 in. (mm)	D2 in. (mm)	D3 in. (mm)	D4 in. (mm)	D5 in. (mm)	Weight lbs. (kg)
BC5A-105	16.3 (415)	10.8 (275)	5.5 (140)	0.79 (20)	1.2 (30)	0.59 (15)	5.3 (135)	4.1 (105)	4.6 (116)	4.6 (116)	3.4 (87)	4.7 (120)	0.55 (14)	55 (25)
BC5B-130	19.7 (500)	12.8 (325)	6.9 (175)	1.0 (25)	1.3 (33)	1.2 (30)	6.1 (155)	4.9 (125)	5.6 (142)	5.6 (142)	4.5 (115)	5.4 (138)	0.55 (14)	88 (40)
BC5C-140	20.5 (520)	12.4 (315)	8.1 (205)	1.2 (30)	1.4 (36)	1.4 (35)	6.9 (175)	5.5 (140)	6.3 (160)	6.3 (160)	5.2 (132)	6.2 (158)	0.70 (18)	99 (45)
BC5D-160	23 (585)	13.8 (350)	9.3 (235)	1.4 (35)	1.6 (40)	1.6 (40)	8.5 (215)	6.7 (170)	7.1 (180)	7.1 (180)	6.0 (153)	7.3 (185)	0.87 (22)	161 (73)
BC5E-180	26.4 (670)	15.9 (405)	10.4 (265)	1.6 (40)	1.8 (45)	1.8 (45)	9.8 (250)	7.7 (195)	8.5 (215)	8.5 (215)	7.2 (182)	8.7 (220)	1.0 (26)	258 (117)

Impact Speed: BC5 Series shock absorbers are designed for impact velocities of up to 4 m/sec. Higher impact velocities require custom modification.
Spring and shock absorber products are capable of functioning between 15°F and 160°F (-10°C and + 70°C). However, standard products are not intended for use over the full rated temperature range. Consult factory for special product considerations required to accommodate operation over a wide temperature range.

Jarret Shock Absorbers

BC5 Series

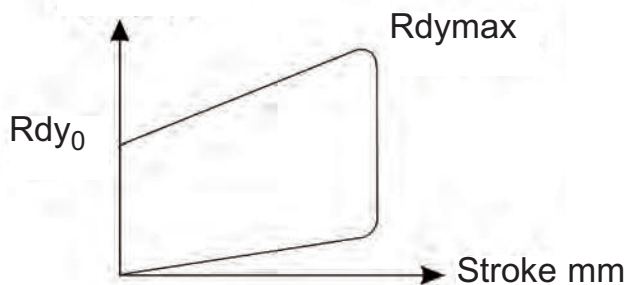
BC5A → BC5E Series

Sizing Example

Based On

- Impact velocity (V) : 2 m/s
- Operating temperature : 20° to + 40°C
- Surface protection : Electrolytic zinc
- Dynamic performance diagram

Force kN



Symbols:

- En = Energy Capacity (kJ)
- C = Maximum Stroke (mm)
- Rdy = Dynamic Reaction Force (kN)

1 - Energy Calculation

$$E = \frac{1}{2} M_e V_e^2$$

2 - Allowable Impact Frequency (IF)

$$IF < 15 \times \frac{E_n}{E} \text{ Impacts/hour}$$

3 - Effective Stroke Calculation

$$C_e = C \left(\sqrt{\frac{E}{E_n (0,03 V + 0,24)}} + 1,36 - 1,17 \right)$$

4 - Calculation of Effective Reaction Rdy_e

$$Rdy_e = \left[\left(\frac{Rdy_{max} - Rdy_0}{C} \right) \times C_e + Rdy_0 \right] (0,1V + 0,8)$$

5 - Application Example

Data: Two shock absorbers in series, Effective mass m=300 t, Impact speed v = 1,2 m/s (which is an impact of 0,6 m/s on each shock absorber), Impact frequency = 15 impacts/hour, Maximum allowable structural load 1000 kN

$$1: E = \frac{1}{2} \left(\frac{1}{2} mV^2 \right)$$

$$E = \frac{1}{2} \left(\frac{1}{2} 300 \times 1,2^2 \right) = 108 \text{ kJ}$$

2. Selection BC5E-180

3. Maximum allowable impact frequency is $15 \times \frac{150}{108}$ 21 impacts/hour. Therefore 15 impacts/hour is acceptable.

$$15 < 15 \times \frac{150}{108}$$

$$15 < 21$$

4. Effective (actual) stroke is 167 mm

$$C_e = 180 \times \left(\sqrt{\frac{108}{150 (0,03 \times 0,6 + 0,24)}} + 1,36 - 1,17 \right) = 156 \text{ mm}$$

$$5. Rdy_e = \left[(1\ 100 - 640) \times \frac{156}{180} + 640 \right] (0,1 \times 0,6 + 0,8)$$

$$Rdy_e = 893 \text{ kN} < 1000 \text{ kN}$$

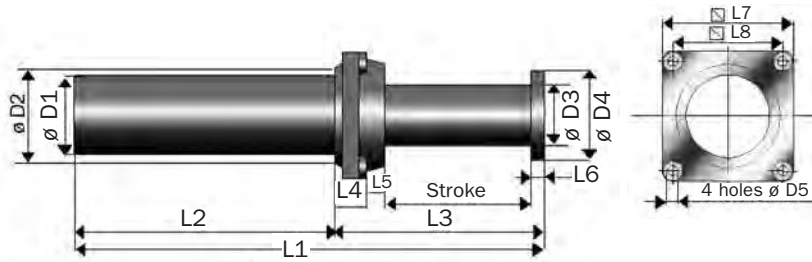
6. Compare standards to results:

	BC5E-180	APPLICATION
E (kJ) =	150	> 108
IF =	21	> 15
C (mm) =	180	> 156
Rdy _{max} (kN)	1100	> 893

Note: maximum allowed structural load is 1 000 kN > 893 kN

**All performance characteristics can be modified.
Please advise us of your specific requirements.**

XLR6-150 → XLR-800 Series



XLR Series - Front Flange Mount- Fc

Catalog No./ Model	Max Energy Capacity in-lbs. (kJ)	Stroke in. (mm)	Return Force		Rdy ₀ lbs. (kN)	Rdy _{max} Shock Force lbs. (kN)
			Extension lbs. (kN)	Compression lbs. (kN)		
XLR6-150	53,104 (6)	5.9 (150)	652 (2,9)	4,609 (20,5)	5,620 (25)	11,240 (50)
XLR12-150	106,209 (12)	5.9 (150)	1,866 (8,3)	8,655 (38,5)	14,837 (66)	22,481 (100)
XLR12-200	106,209 (12)	7.9 (200)	1,259 (5,6)	6,744 (30,0)	9,442 (42)	17,535 (78)
XLR25-200	221,269 (25)	7.9 (200)	3,012 (13,4)	16,726 (74,4)	21,537 (95)	33,721 (150)
XLR25-270	221,269 (25)	10.6 (270)	2,495 (11,1)	11,555 (51,4)	14,837 (66)	25,179 (112)
XLR50-275	442,537 (50)	10.8 (275)	4,429 (19,7)	29,225 (130,0)	26,527 (118)	51,706 (230)
XLR50-400	442,537 (50)	15.7 (400)	2,900 (12,9)	18,839 (83,8)	16,861 (75)	33,721 (150)
XLR100-400	885,075 (100)	15.7 (400)	5,620 (25,0)	36,531 (162,5)	39,342 (175)	71,939 (320)
XLR100-600	885,075 (100)	23.6 (600)	2,608 (11,6)	29,765 (132,4)	19,109 (85)	51,706 (230)
XLR150-800	1,327,612 (150)	31.5 (800)	5,216 (23,2)	34,216 (152,2)	17,984 (80)	56,202 (250)

Impact Speed: Types XLR and BCLR Series shock absorbers are designed for impact velocities of up to 2 m/sec. Higher impact velocities require custom modification.

Catalog No./ Model	L1 in. (mm)	L2 in. (mm)	L3 in. (mm)	L4 in. (mm)	L5 in. (mm)	L6 in. (mm)	L7 in. (mm)	L8 in. (mm)	D1 in. (mm)	D2 in. (mm)	D3 in. (mm)	D4 in. (mm)	D5 in. (mm)	Weight lbs. (kg.)
XLR6-150	16.1 (410)	9.1 (231)	7.0 (179)	0.75 (19)	0 (0)	0.39 (10)	3.5 (90)	2.8 (70)	2.0 (50)	3.5 (90)	1.5 (38)	2.0 (50)	0.35 (9)	9.3 (4,2)
XLR12-150	18.9 (480)	11.2 (285)	7.7 (195)	0.71 (18)	0.60 (15)	0.47 (12)	4.3 (110)	3.3 (85)	3.0 (75)	3.5 (90)	2.2 (57)	3.1 (80)	0.43 (11)	24.3 (11)
XLR12-200	20.9 (530)	11.2 (285)	9.6 (245)	0.71 (18)	0.60 (15)	0.47 (12)	4.3 (110)	3.3 (85)	3.0 (75)	3.5 (90)	2.2 (57)	3.1 (80)	0.43 (11)	24.3 (11)
XLR25-200	24.4 (620)	14.6 (370)	9.8 (250)	0.79 (20)	0.71 (18)	0.47 (12)	5.3 (135)	4.1 (105)	3.5 (90)	4.3 (110)	2.8 (72)	4.0 (100)	0.6 (14)	44.1 (20)
XLR25-270	27.2 (690)	14.6 (370)	12.6 (320)	0.79 (20)	0.71 (18)	0.47 (12)	5.3 (135)	4.1 (105)	3.5 (90)	4.3 (110)	2.8 (72)	4.0 (100)	0.6 (14)	55.1 (25)
XLR50-275	33.7 (855)	20.5 (520)	13.2 (335)	1.0 (25)	0.79 (20)	0.60 (15)	6.9 (175)	5.5 (140)	4.3 (110)	5.9 (150)	3.4 (87)	4.7 (120)	0.71 (18)	88.2 (40)
XLR50-400	38.6 (980)	20.5 (520)	18.1 (460)	1.0 (25)	0.79 (20)	0.60 (15)	6.9 (175)	5.5 (140)	4.3 (110)	5.9 (150)	3.4 (87)	4.7 (120)	0.71 (18)	88.2 (40)
XLR100-400	53.9 (1370)	35.8 (910)	18.1 (460)	1.0 (25)	0.79 (20)	0.60 (15)	6.9 (175)	5.5 (140)	4.3 (110)	5.9 (150)	3.4 (87)	4.7 (120)	0.71 (18)	143.3 (65)
XLR100-600	61.8 (1570)	35.8 (910)	26.0 (660)	1.0 (25)	0.79 (20)	0.60 (15)	6.9 (175)	5.5 (140)	4.3 (110)	5.9 (150)	3.4 (87)	4.7 (120)	0.71 (18)	143.3 (65)
XLR150-800	103.9 (2640)	70.1 (1780)	33.9 (860)	1.0 (25)	0.79 (20)	0.60 (15)	6.9 (175)	5.5 (140)	4.3 (110)	5.9 (150)	3.4 (87)	4.7 (120)	0.71 (18)	253.5 (115)

Rear Flange Mounting - Fa on Request.

Spring and shock absorber products are capable of functioning between 15°F and 160°F (-10°C and + 70°C). However, standard products are not intended for use over the full rated temperature range. Consult factory for special product considerations required to accommodate operation over a wide temperature range.

Jarret Shock Absorbers

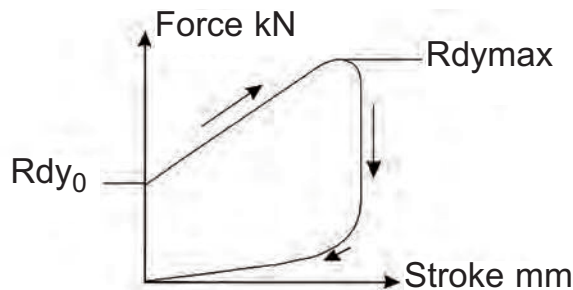
XLR Series

Sizing Example

XLR6-150 → XLR-800 Series

Based On

- Impact velocity (V) : 2 m/s
- Operating temperature : 20° to + 40°C
- Surface protection : Electrolytic zinc & Painting
- Dynamic performance diagram



Symbols:

- En = Energy Capacity (kJ)
- C = Maximum Stroke (mm)
- Rdy = Dynamic Reaction Force (kN)

1 - Energy Calculation

$$E = \frac{1}{2} M_e V_e^2$$

2 - Allowable Impact Frequency (IF)

$$IF < 8 \times \frac{E_n}{E} \text{ Impacts/hour}$$

3 - Required Stroke Calculation

$$C_e = C \left(\sqrt{\frac{E}{E_n (0,027 V + 0,22)}} + 1,83 - 1,35 \right)$$

4 - Calculation of Effective Reaction Rdy_e

$$Rdy_e = \left[\left(\frac{Rdy_{max} - Rdy_0}{C} \right) \times C_e + Rdy_0 \right] (0,1V + 0,8)$$

5 - Application Example Data:

- Effective mass = 30 t
- Effective impact speed = 2,2
- Maximum allowable structural force = 350 kN
- Impact frequency = 10/hr

1: Energy dissipated/impact is 72,6 kJ

$$E = \frac{1}{2} \times 15 \times (2,2)^2$$

$$E = 72,6 \text{ kJ}$$

2: XLR100-400 selected

3: Maximum allowable impact frequency

$$IF < 8 \times 100 / 72,6 = 11$$

(10 < 11 impacts/hour is acceptable)

4: Effective (actual) stroke:

$$C_e = 400 \times \left(\sqrt{\frac{72,6}{100 (0,027 \times 2,7 + 0,22)}} + 1,83 - 1,35 \right)$$

$$C_e = 290,3 \text{ mm}$$

$$5: Rdy_e = \left[\left(\frac{320 - 175}{400} \right) 290,3 + 175 \right] (0,1 \times 2,2 + 0,8)$$

$$Rdy_e = 285,8 \text{ kN}$$

(which is less than maximum allowable reaction force of 350 kN)

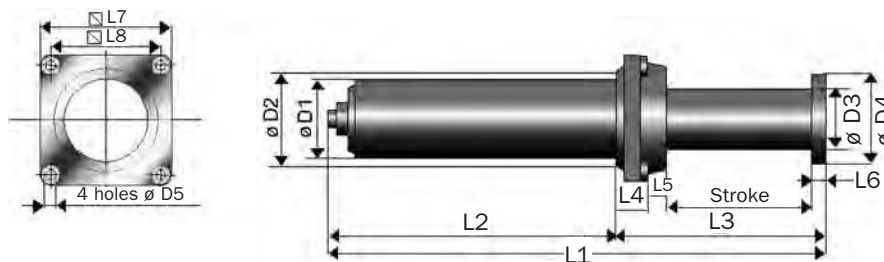
6. Compare standards to results:

	XLR100-400	APPLICATION
E (kJ) =	100	> 72,6
IF =	11	> 10
C (mm) =	400	> 301,8
Rdy _{max} (kN)	320	> 290,1

Note: maximum allowed structural load is 350 kN > 290,1 kN

**All performance characteristics can be modified.
Please advise us of your specific requirements.**

BCLR-100 → BCLR-1000 Series



BCLR Series - Front Flange Mount- Fc

Catalog No./ Model	Max Energy Capacity in-lbs. (kJ)	Stroke in. (mm)	Return Force		Rdy ₀ lbs. (kN)	Rdymax Max Shock Force lbs. (kN)
			Extension lbs. (kN)	Compression lbs. (kN)		
BCLR-100	885,075 (100)	15.7 (400)	6,744 (30,0)	36,403 (161,9)	42,714 (190)	69,691 (310)
BCLR-150	1,327,612 (150)	19.7 (500)	9,330 (41,5)	47,300 (201,4)	44,962 (200)	85,427 (380)
BCLR-220S	1,947,614 (220)	15.7 (400)	10,116 (45,0)	60,698 (270,0)	85,427 (380)	153,994 (685)
BCLR-250	2,212,686 (250)	25.6 (650)	10,116 (45,0)	56,877 (253,0)	60,698 (270)	110,156 (490)
BCLR-400	3,540,298 (400)	33.5 (850)	11,144 (49,6)	69,214 (307,9)	74,187 (330)	134,885 (600)
BCLR-600	5,310,477 (600)	41.3 (1050)	10,678 (47,5)	79,020 (351,5)	83,179 (370)	166,359 (740)
BCLR-800	7,080,597 (800)	47.2 (1200)	14,433 (64,2)	99,141 (441,0)	96,668 (430)	193,336 (860)
BCLR-1000	8,850,746 (1000)	51.2 (1300)	19,109 (85,0)	120,048 (534,0)	112,405 (500)	224,809 (1000)

Impact Speed: Types XLR and BCLR Series shock absorbers are designed for impact velocities of up to 2 m/sec. Higher impact velocities require custom modification.

Catalog No./ Model	L1 in. (mm)	L2 in. (mm)	L3 in. (mm)	L4 in. (mm)	L5 in. (mm)	L6 in. (mm)	L7 in. (mm)	L8 in. (mm)	D1 in. (mm)	D2 in. (mm)	D3 in. (mm)	D4 in. (mm)	D5 in. (mm)	Weight lbs. (kg.)
BCLR-100	44.1 (1120)	26.0 (660)	18.1 (460)	1.0 (25)	0.79 (20)	0.60 (15)	6.9 (175)	5.5 (140)	5.1 (130)	5.9 (150)	4.3 (110)	5.5 (140)	0.71 (18)	139.0 (63)
BCLR-150	53.1 (1350)	30.5 (775)	22.6 (575)	1.2 (30)	1.0 (25)	0.79 (20)	8.5 (215)	6.7 (170)	5.5 (140)	7.3 (185)	4.7 (120)	5.9 (150)	0.87 (22)	198.4 (90)
BCLR-220S	49.5 (1258)	30.8 (783)	18.7 (475)	1.2 (30)	1.0 (25)	0.79 (20)	8.5 (215)	6.7 (170)	6.3 (160)	N/A	5.3 (134)	6.3 (160)	0.87 (22)	243 (110)
BCLR-250	68.9 (1750)	40.4 (1025)	28.5 (725)	1.2 (30)	1.0 (25)	0.79 (20)	8.5 (215)	6.7 (170)	6.1 (155)	7.3 (185)	6.9 (135)	6.7 (170)	0.87 (22)	297.6 (135)
BCLR-400	86.0 (2185)	49.2 (1250)	36.8 (935)	1.4 (35)	1.0 (25)	1.0 (25)	10.4 (265)	8.3 (210)	6.9 (175)	9.3 (235)	5.9 (150)	7.5 (190)	1.1 (27)	480.6 (218)
BCLR-600	100.6 (2555)	55.9 (1420)	44.7 (1135)	1.4 (35)	1.0 (25)	1.0 (25)	10.4 (265)	8.3 (210)	7.9 (200)	9.3 (235)	6.9 (175)	8.5 (215)	1.1 (27)	650.4 (295)
BCLR-800	115.6 (2935)	64.2 (1630)	51.4 (1305)	1.6 (40)	1.4 (35)	1.2 (30)	11.8 (300)	9.4 (240)	8.7 (220)	10.6 (270)	7.5 (190)	9.3 (235)	1.2 (30)	926 (420)
BCLR-1000	127.0 (3225)	71.7 (1820)	55.3 (1405)	1.6 (40)	1.4 (35)	1.2 (30)	11.8 (300)	9.4 (240)	9.1 (230)	10.6 (270)	8.1 (205)	9.8 (248)	1.2 (30)	1036.2 (470)

Rear Flange Mounting - Fa on Request.

Spring and shock absorber products are capable of functioning between 15°F and 160°F (-10°C and + 70°C). However, standard products are not intended for use over the full rated temperature range. Consult factory for special product considerations required to accommodate operation over a wide temperature range.

Jarret Shock Absorbers

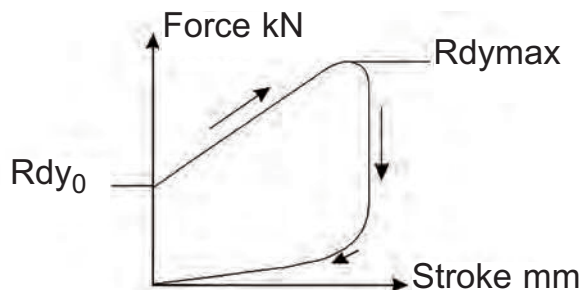
BCLR Series

Sizing Example

BCLR-100 → BCLR-1000 Series

Based On

- Impact velocity (V) : 2 m/s
- Operating temperature : 20° to + 40°C
- Surface protection : Electrolytic zinc & Painting
- Dynamic performance diagram



Symbols:

E_n = Energy Capacity (kJ)

C = Maximum Stroke (mm)

R_{dy} = Dynamic Reaction Force (kN)

1 - Energy Calculation

$$E = \frac{1}{2} M_e V_e^2$$

2 - Allowable Impact Frequency (IF)

$$IF < 8 \times \frac{E_n}{E} \text{ Impacts/hour}$$

3 - Required Stroke Calculation

$$C_e = C \left(\sqrt{\frac{E}{E_n (0,027 V + 0,22)}} + 1,83 - 1,35 \right)$$

4 - Calculation of Effective Reaction R_{dy_e}

$$R_{dy_e} = \left[\left(\frac{R_{dy_{max}} - R_{dy_0}}{C} \right) \times C_e + R_{dy_0} \right] (0,1V + 0,8)$$

5 - Application Example:

Effective mass = 75 t

Effective impact speed = 2,7

Maximum allowable structural force: 650 kN

Impact frequency = 10/hr

1: Energy dissipated/impact is 274 kJ

2: BCLR-400 selected

3: Maximum allowable impact frequency
 $IF < 8 \times 400 / 274 = 12$ (10 impacts/hour is acceptable)
 $10 < 12$

4: Effective (actual) stroke:

$$C_e = 850 \times \left(\sqrt{\frac{274}{400 (0,027 \times 2,7 + 0,22)}} + 1,83 - 1,35 \right)$$

$$C_e = 587\text{mm}$$

5: $R_{dy_e} = 520 (0,1 \times 2,7 + 0,8) = 556 \text{ kN}$

(which is less than maximum allowable reaction force of 650 kN)

6. Compare standards to results:

	BCLR-400		APPLICATION
E (kJ) =	400	>	274
IF =	12	>	10
C (mm) =	850	>	587
$R_{dy_{max}}$ (kN)	600	>	556

Note: maximum allowed structural load is 650 kN > 556 kN

**All performance characteristics can be modified.
 Please advise us of your specific requirements.**