Jarret Series
BC1N, BC5, LR Series

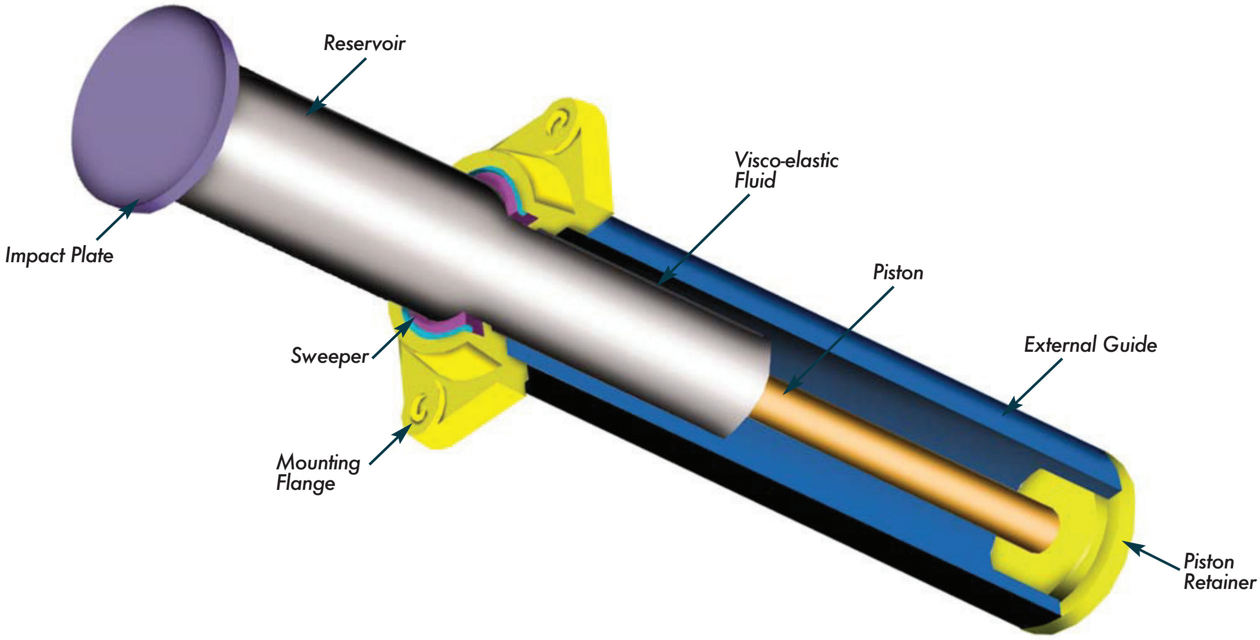
The design of Jarret Industrial Shock Absorber utilizes the unique compression and shear characteristics of specially formulated silicone elastomers.

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**.

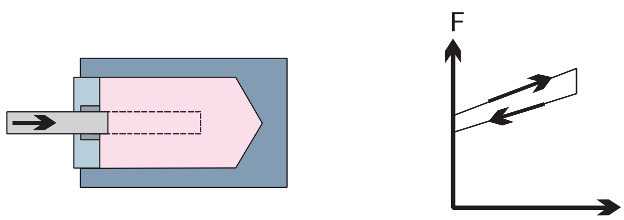
Applications
Shock protection for all types of industries including:
Defense, Automobile, Railroad, Materials Handling, Marine, Pulp/Paper, Metal Producing and Processing.

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

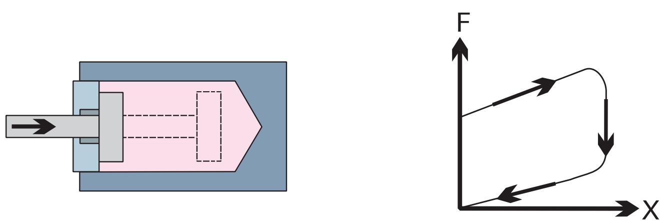
Visco-elastic Technology



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



Compressibility:
Preloaded spring function
- $F = F_0 + KX$



Viscosity:
Shock absorber function
- $F = F_0 + KX + CV^{\alpha}$ with α between 0,1 and 0,4

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

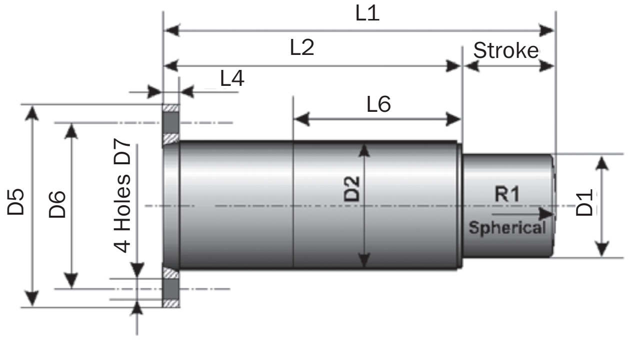
Preloaded Spring Shock Absorbers:
Combine Spring and Shock Absorber Functions
- Dissipate between 30% and 100% of energy
- Force/stroke characteristics remain relatively unchanged between 15°F and 160°F (-10°C and + 70°C)

Shock Absorber Without Spring Return:
Shock Absorbing Function Only
- Dampening devices
- Blocking Devices

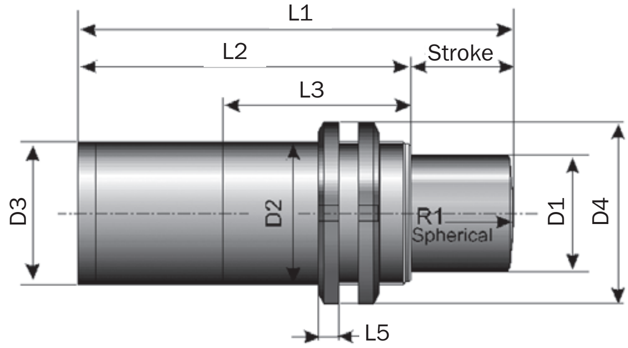
Jarret Shock Absorbers
BC1N Series

BC1ZN → BC1GN Series

Technical Data



Rear flange mounting - Fa



Threaded body mounting - Fc

Catalog No./ Model	Max Energy Capacity in-lbs. (kJ)	Stroke in. (mm)	Return Force Extension lbs. (kN)	Return Force Compression lbs. (kN)	Rdy0 lbs. (kN)	Rdymax Max Shock Force lbs. (kN)
BC1ZN	885 (0,1)	0.47 (12)	211.3 (0,94)	1,213.97 (5,4)	1349 (6)	2473 (11)
BC1BN	3806 (0,43)	0.87 (22)	562 (2,5)	3,147.32 (14,0)	3,147 (14)	6070 (27)
BC1DN	13,276 (1,5)	1.4 (35)	1,169 (5,2)	6,474.5 (28,8)	6,295 (28)	13,489 (60)
BC1EN	30,093 (3,4)	1.8 (45)	1,753.5 (7,8)	9,666.78 (43,0)	10,116 (45)	22,481 (100)
BC1FN	61,955 (7)	2.4 (60)	3,057.4 (13,6)	17,220.36 (76,6)	20,233 (90)	33,721 (150)
BC1GN	123,910 (14)	3.1 (80)	4,271.4 (19,0)	29,225.16 (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)	Mass 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)	R. 5.1 (R.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)	R. 5.9 (R.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)	R. 13.8 (R.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)

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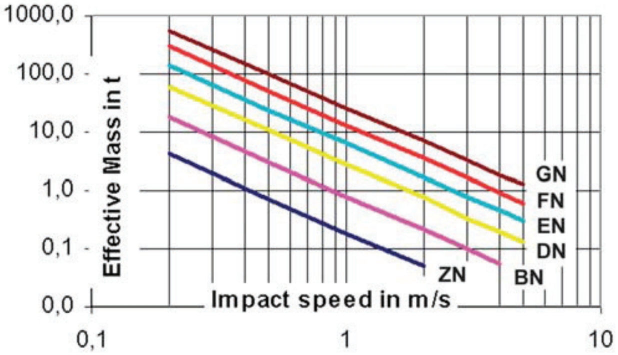
BC1ZN → BC1GN Series

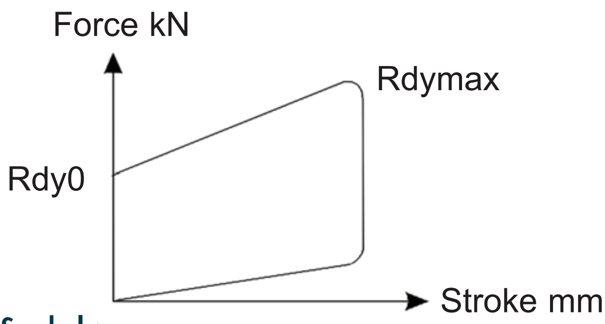
Application Worksheet

1 - Selection Chart



Based On

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



Symbols:

En = Energy Capacity
C = Maximum Stroke
Rdy = Dynamic Reaction

2 - Energy Calculation

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

3 - Allowable Impact Frequency

$$F < 20 \times \frac{En}{E} \text{ Impacts/hour}$$

4 - Effective Stroke Calculation

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

5 - Calculation of Effective Reaction Rdy_e

$$Rdy_e = \left[\left(\frac{Rdymax - Rdy0}{C}\right) \times Ce + Rdy0\right](0{,}1V + 0{,}8)$$

6 - Application Example

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

1: BC1FN Selected

2: Energy dissipated per impact is: 4,8 kJ

3: Allowable impact frequency < 20x7/4.8

4: Required stroke is 49 mm

$$Ce = 60\left(\sqrt{\frac{4{,}8}{7\,(0{,}03 \times 0.8 + 0{,}24)} + 1{,}36} - 1{,}17\right)$$

5: With an Rdy_e = [(150 - 90) x 49/60) + 90)] x (0,1 x 0,8 + 0,8) = 122 kN

Compare with standard mechanical characteristics:

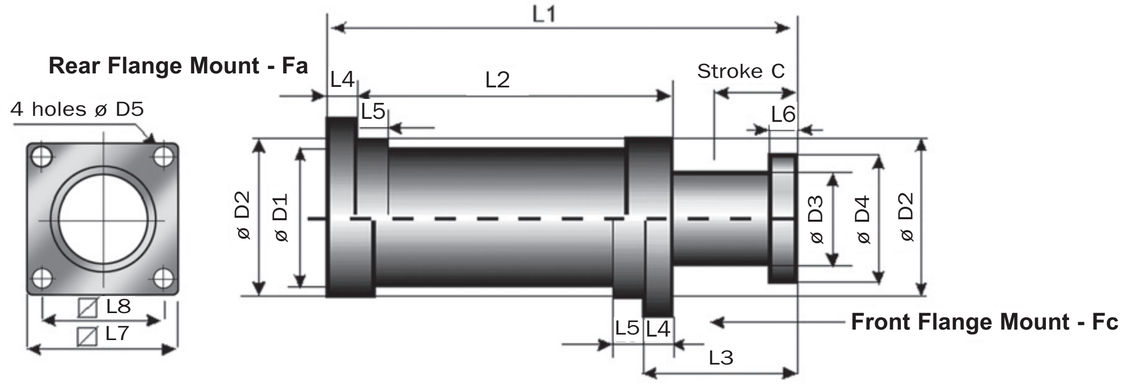
En = 7 kJ, C = 60mm, Rdy0 = 90 kN and
Rdymax = 150 kN

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

Jarret Shock Absorbers
BC5 Series

BC5A → BC5E Series

Technical Data



Catalog No./ Model	Max Energy Capacity in-lbs. (kJ)	Stroke in. (mm)	Return Force Extension lbs. (kN)	Return Force Compression lbs. (kN)	Rdy0 lbs. (kN)	Rdymax Max Shock Force 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)	Mass lbs. (kg)
BC5A	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	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	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	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	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.

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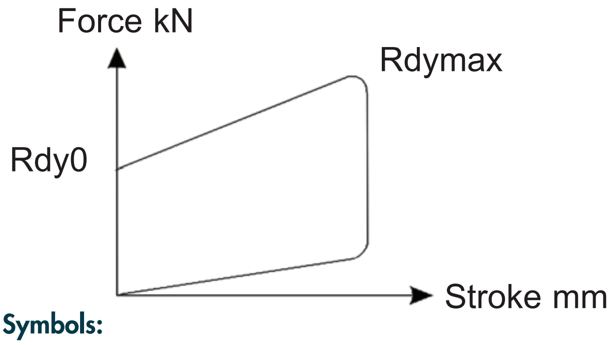
BC5A ➞ BC5E Series

Application Worksheet

Based On

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



Symbols:

En = Energy Capacity
C = Maximum Stroke
Rdy = Dynamic Reaction

1 - Energy Calculation

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

2 - Allowable Impact Frequency

$$F < 15 \times \frac{En}{E} \text{ Impacts/hour}$$

3 - Effective Stroke Calculation

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

4 - Calculation of Effective Reaction Rdy_e

$$Rdy_e = \left[\left(\frac{Rdymax - Rdy0}{C}\right) \times Ce + Rdy0\right](0{,}1V + 0{,}8)$$

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: $E = \frac{1}{2}\left(\frac{1}{2} mV^2\right)$ - Selection BC5-E

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

3: Required stroke is 167 mm

$$Ce = 180 \times \left(\sqrt{\frac{108}{150\,(0{,}03 \times 0.6 + 0{,}24)} + 1{,}36} - 1{,}17\right) = 156 \text{ mm}$$

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

= 893 kN < 1000 kN, maximum allowable impact frequency

Compare with standard mechanical characteristics for each shock absorber:

En = 150 kJ, C = 180 mm, Rdy0 = 640 kN and Rdy_{max} = 1100 kN

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