



ITT

WEAR™ Pipe Restraint Vibration Isolator



Engineered for life

WEAR™ Pipe Restraints

ITT Energy Absorption is a premier supplier of engineered solutions for Noise Attenuation, Mechanical Shock & Vibration Isolation and Hydraulic/Pneumatic Actuation & Motion Control applications within the global Aviation, Defense and Industrial markets.

With our ENIDINE, Compact Automation and Turn-Act branded product lines, we offer a broad range of custom products to extend equipment life, improve comfort and increase safety & reliability.



ITT Corporation (www.itt.com) is a diversified high-technology engineering and manufacturing company dedicated to creating more livable environments, enabling communications and providing protection and safety. The company plays an important role in vital markets including water and fluids management, global defense and security, and motion and flow control. ITT employs approximately 40,000 people serving customers in more than 50 countries. Headquartered in White Plains, N.Y., the company generated \$9 billion in 2007 sales.

The Company reports its financial results under three reporting segments: Defense Electronics & Services, Fluid Technology and Motion & Flow Control. These three segments highlight the diversity and balance of the Company's portfolio, and better reflect each of the businesses that will be going forward.

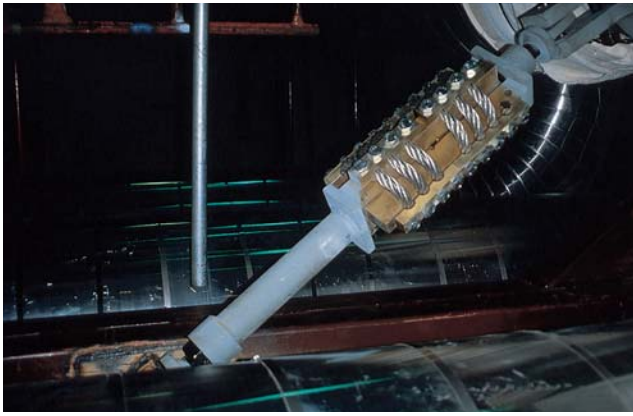
ENIDINE is part of the Motion & Flow segment of ITT.

Motion & Flow Control

Businesses in the Motion & Flow Control segment produce several leading products for the marine and leisure markets, specialty shock absorbers and brake friction materials for the transportation industry, as well as switch applications for industrial and aerospace use, and electrical connectors in telecommunications, computing, aerospace and industrial applications.

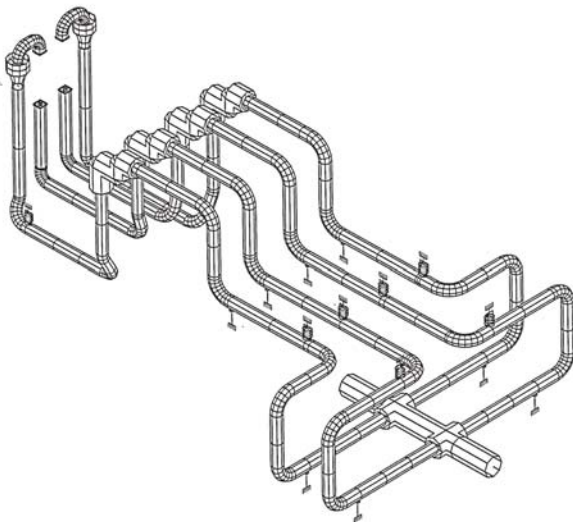


WEAR™ Pipe Restraints



WEAR™ (Wire Energy Absorbing Rope) pipe restraints are uniquely packaged wire rope isolators designed to protect structures from steady state vibration and isolate them from seismic and dynamic loads. These new generation energy absorbing restraints feature simple construction. There are no oils, seals or complex moving parts required to perform their function. The design has eliminated the problems often associated with hydraulic or mechanical restraints which are complex and prone to failure.

The Wire Rope Isolator, which is the basic element of the technology has been successfully used by the military for more than 25 years. As a result, it conforms to government and military quality control requirements. The restraint is thus exempt from surveillance testing. In-place visual inspection is all that is required to assure operability. The WEAR™ can be provided with a wide range of piping accessories and can be supplied to ISO 9001, Mil-Q, Mil-I, B31.1 or ASME Section III subsection NF.



Auto pipe analysis available upon request.

Options Available

Various end connections are available to meet existing hardware such as Bergen Paterson, Basic Engineers, PSA, Grinnel and others. For sizing or specific application information, call your local representative or Enidine directly.

Typical Applications

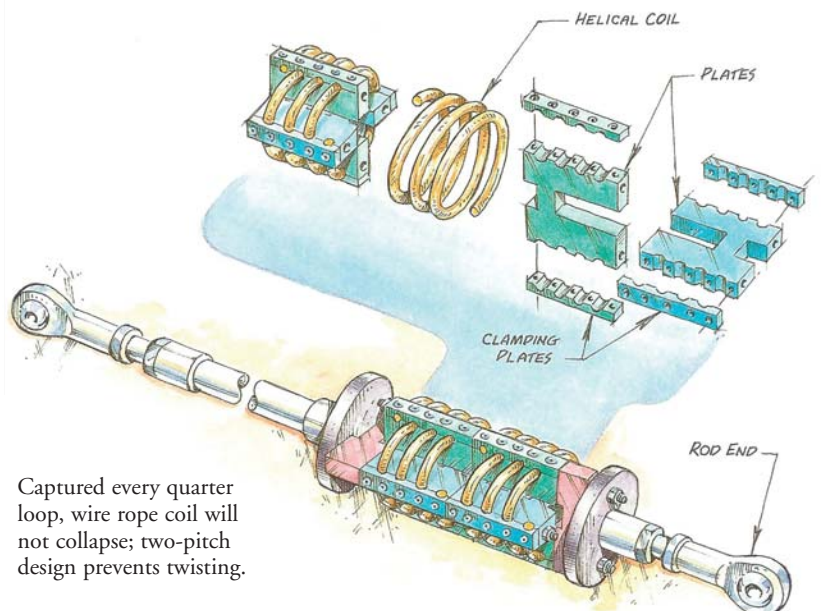
- Pipe Restraint
- Hydraulic Transients
- Power Generating Plants
- Chemical Plants
- Seismic Restraints
- Steady State Vibration
- Nuclear Plants
- Refineries
- Structural Vibration
- Wind Loading
- Pulp and Paper Mills

WEAR™ Benefits

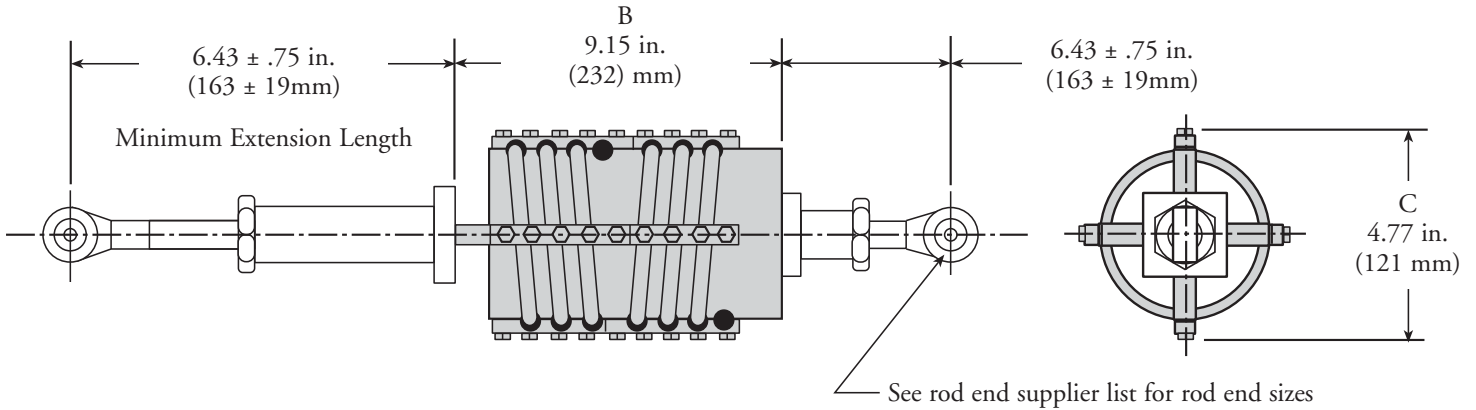
- Repeatable
- Environmentally Stable
- Low Structural Loading
- Dissipate Energy
- Wide Operating Temperature Range
- Proven Technology
- Simple Construction
- Corrosion Resistant
- High Cycle Fatigue Life
- No Maintenance

Environmental Conditions

Normal Temperature:	-40° to 200° F / -40° to 100° C
Faulted Temperature:	-40° to 350° F / -40° to 175° C
Humidity:	100% RH
Radiation:	1 x 10 ⁹ RAD
Pressure:	-14.7 psi to 100 psi 0 atm to 7 atm



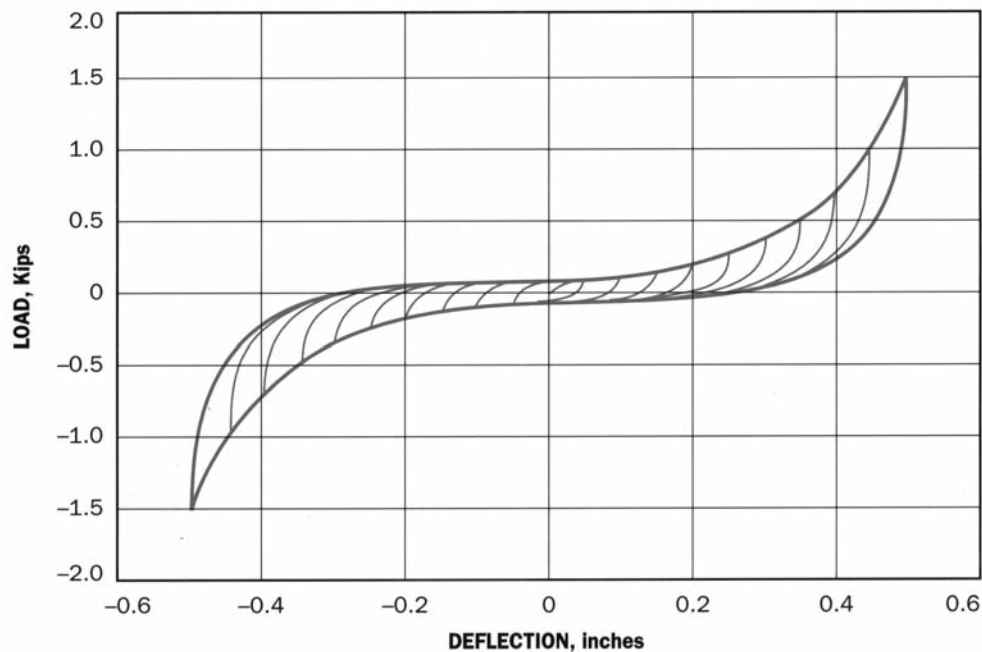
Captured every quarter loop, wire rope coil will not collapse; two-pitch design prevents twisting.



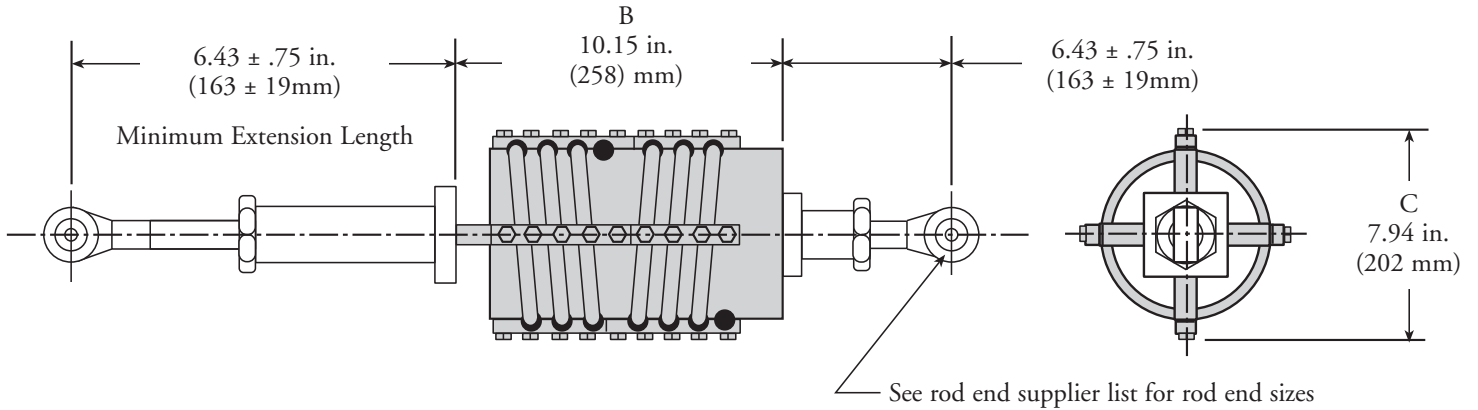
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	15.5 lbs. 0.2 lbs./in.	7,0 kg. 0,04 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	10 ± 5% 20 ± 5%	
Spring Rate	Mid-Stroke: Max-Stroke:	1.2 Kips/in. 3.0 Kips/in.	210 N/mm 525 N/mm
Stroke	Maximum:	± 0.5 in.	± 12,7 mm

Load vs. Deflection



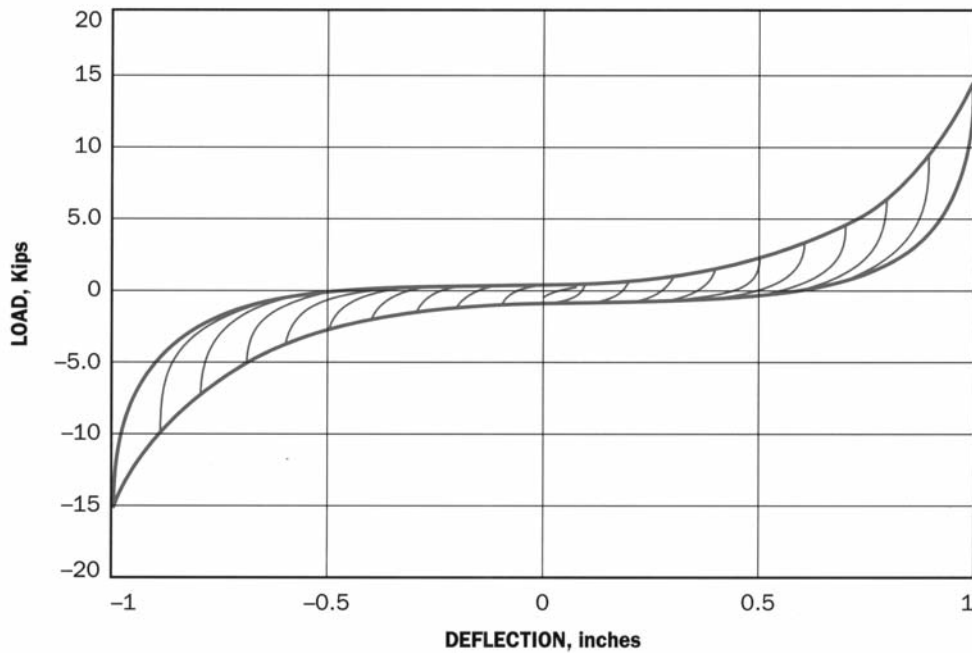
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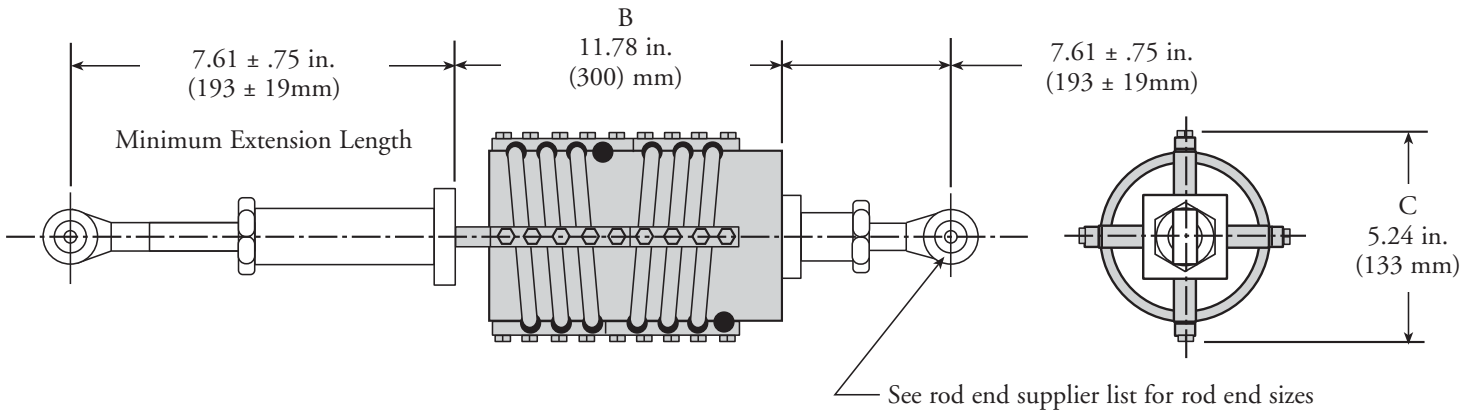
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	15.5 lbs. 0.2 lbs./in.	7,0 kg. 0,04 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	10 ± 5% 20 ± 5%	
Spring Rate	Mid-Stroke: Max-Stroke:	0.6 Kips/in. 1.5 Kips/in.	105 N/mm 263 N/mm
Stroke	Maximum:	± 1.0 in.	± 25,4 mm

Load vs. Deflection



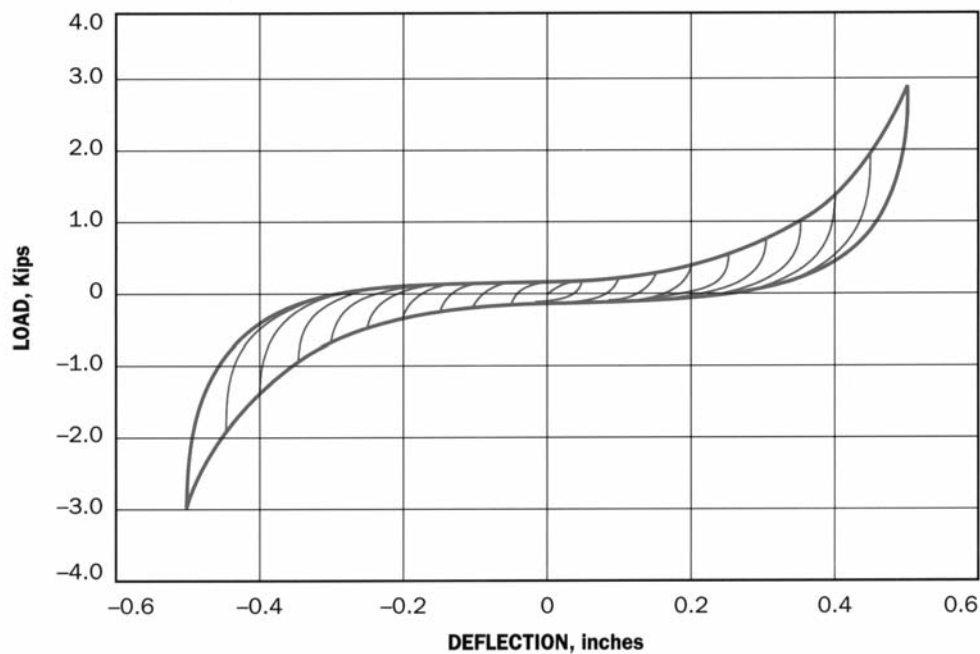
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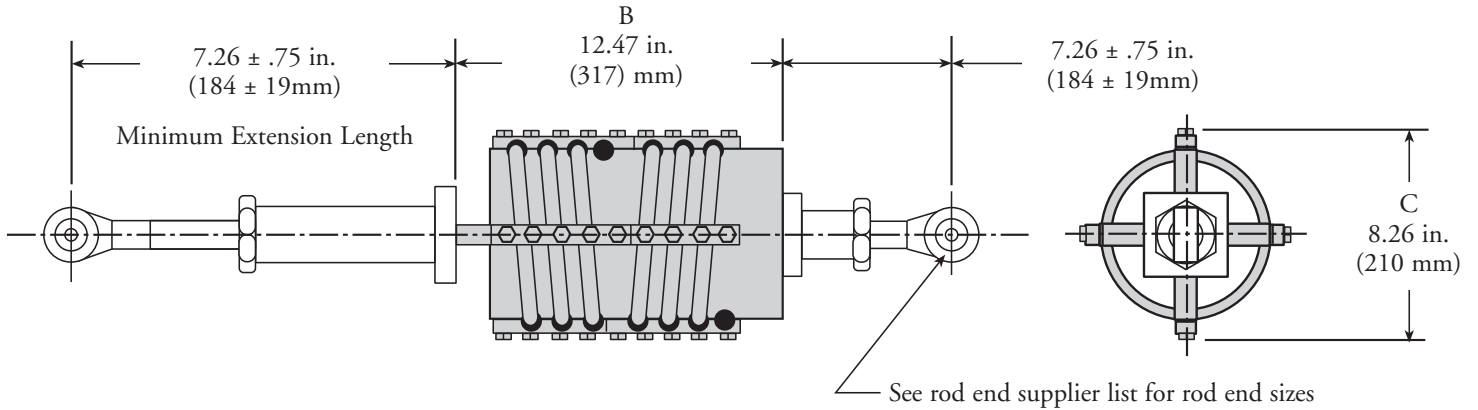
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	32.0 lbs. 0.3 lbs./in.	14,5 kg. 0,05 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	10 ± 5% 20 ± 5%	
Spring Rate	Mid-Stroke: Max-Stroke:	2.4 Kips/in. 6.0 Kips/in.	420 N/mm 1050 N/mm
Stroke	Maximum:	± 0.5 in.	± 12,7 mm

Load vs. Deflection



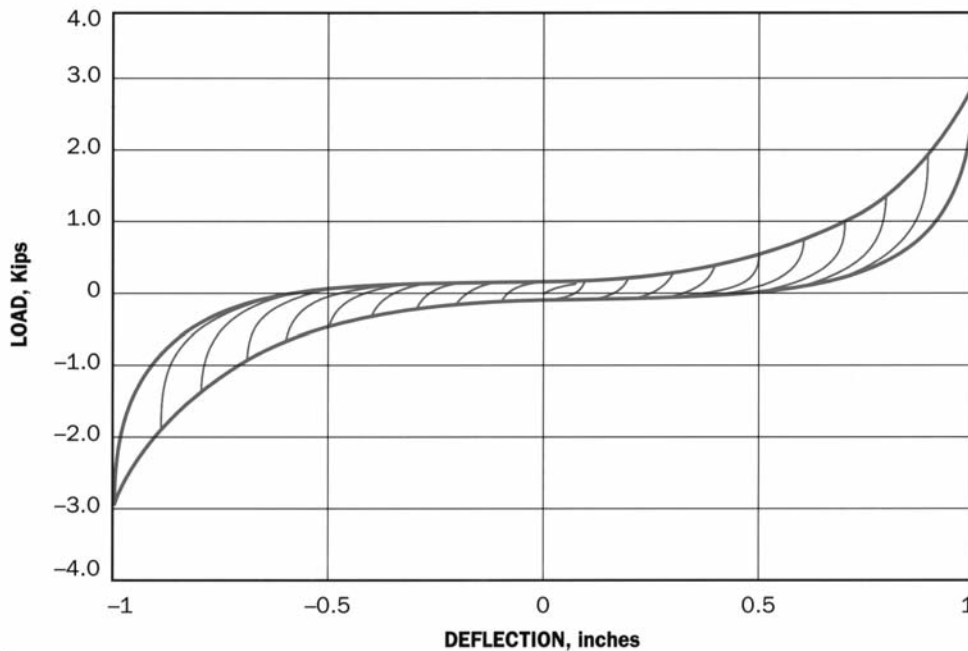
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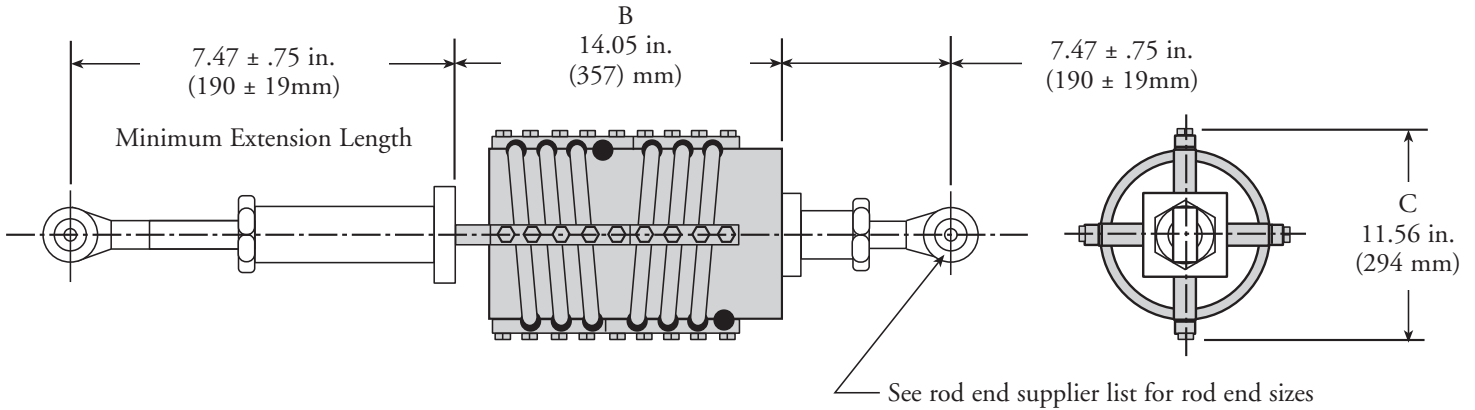
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	48.5 lbs. 0.3 lbs./in.	22,0 kg. 0,05 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	10 ± 5% 20 ± 5%	
Spring Rate	Mid-Stroke: Max-Stroke:	1.2 Kips/in. 3.0 Kips/in.	210 N/mm 525 N/mm
Stroke	Maximum:	± 0.5 in.	± 25,4 mm

Load vs. Deflection



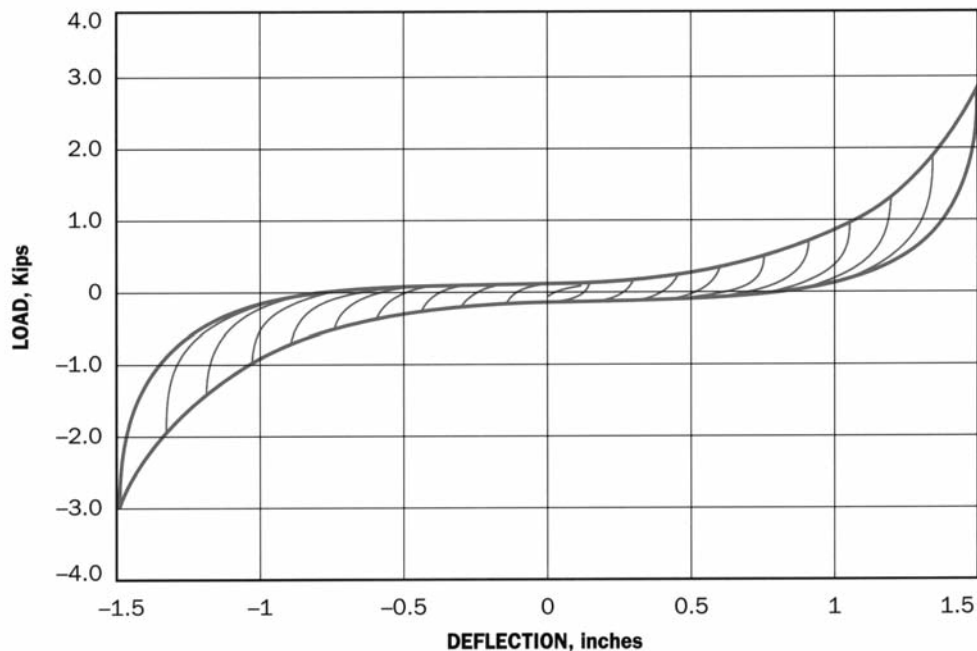
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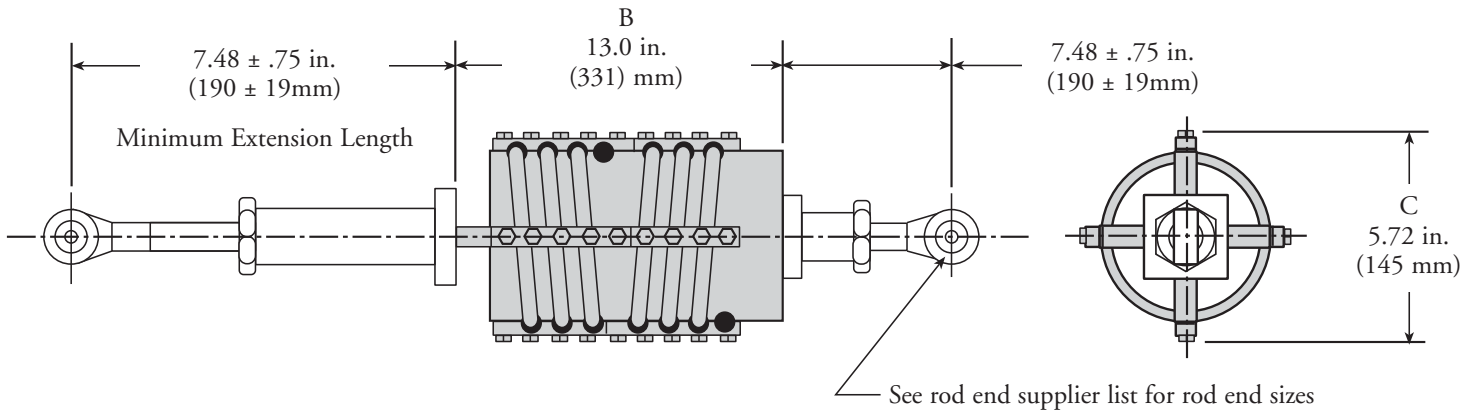
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	73.0 lbs. 0.3 lbs./in.	7,0 kg. 0,04 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	$10 \pm 5\%$ $20 \pm 5\%$	
Spring Rate	Mid-Stroke: Max-Stroke:	0.8 Kips/in. 2.0 Kips/in.	140 N/mm 350 N/mm
Stroke	Maximum:	± 0.5 in.	$\pm 38,1$ mm

Load vs. Deflection



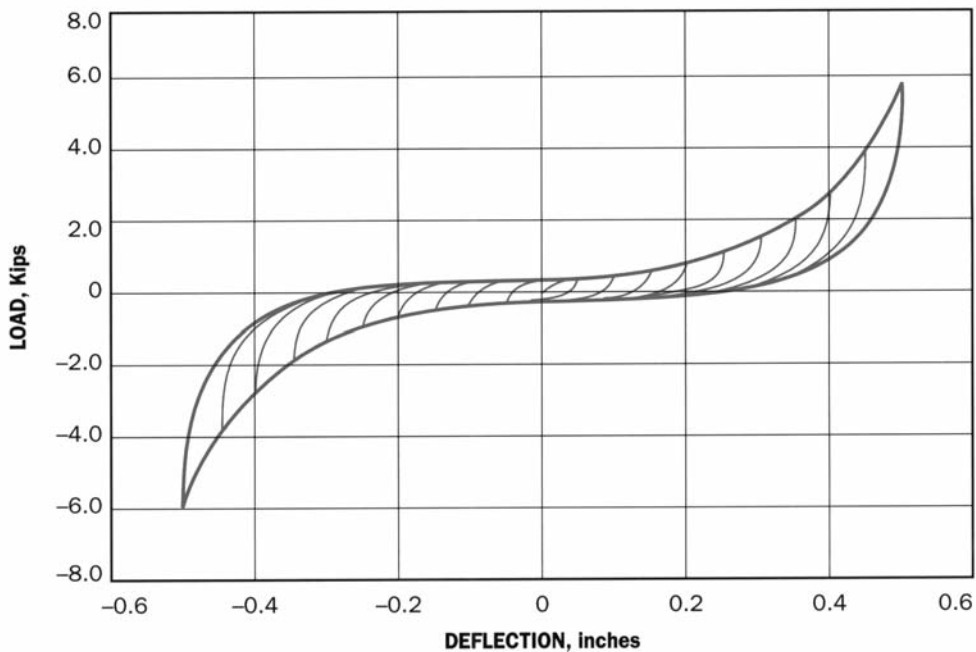
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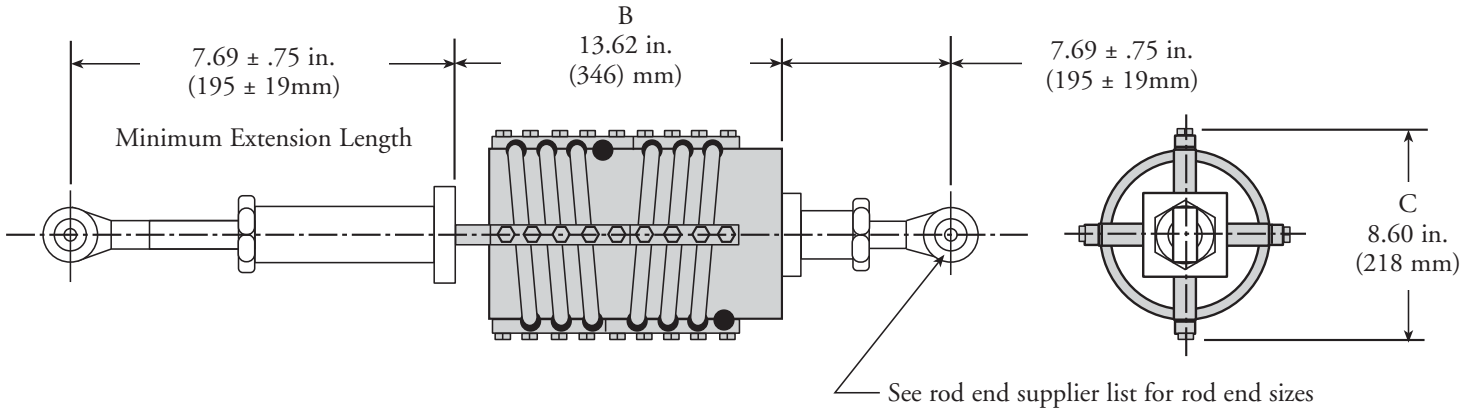
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	44.0 lbs. 0.3 lbs./in.	20,0 kg. 0,05 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	$10 \pm 5\%$ $20 \pm 5\%$	
Spring Rate	Mid-Stroke: Max-Stroke:	4.8 Kips/in. 12.0 Kips/in.	840 N/mm 2100 N/mm
Stroke	Maximum:	$\pm 0.5\text{ in.}$	$\pm 12,7\text{ mm}$

Load vs. Deflection



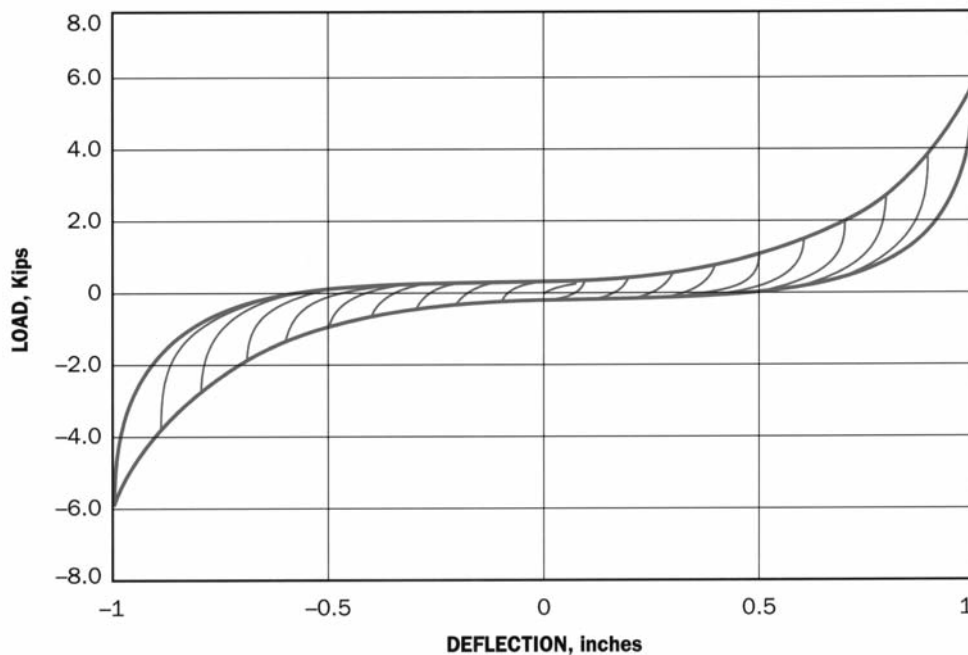
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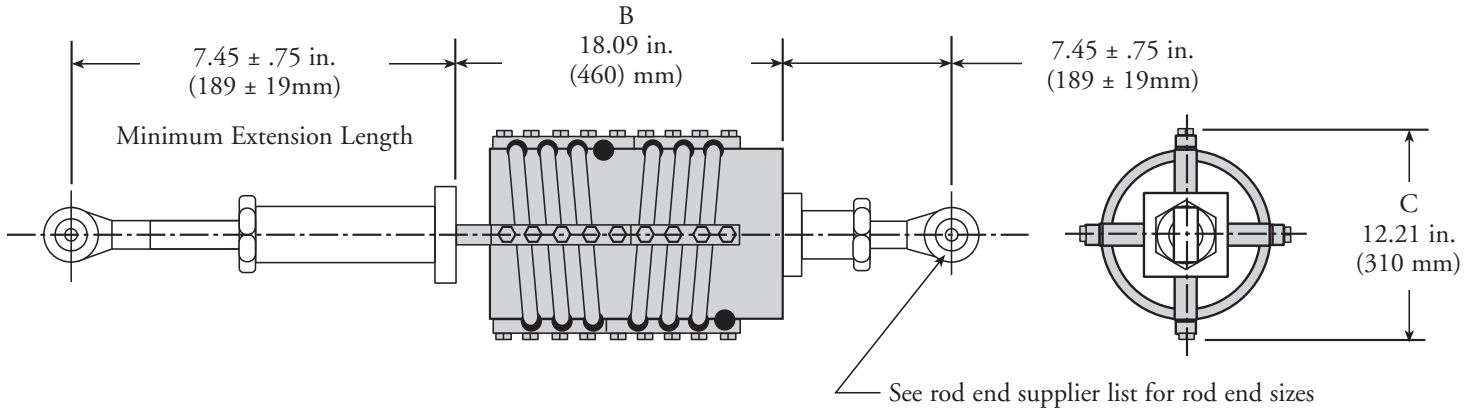
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	67.0 lbs. 0.3 lbs./in.	31,0 kg. 0,05 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	$10 \pm 5\%$ $20 \pm 5\%$	
Spring Rate	Mid-Stroke: Max-Stroke:	2,4 Kips/in. 6,0 Kips/in.	420 N/mm 1050 N/mm
Stroke	Maximum:	± 1.0 in.	$\pm 25,4$ mm

Load vs. Deflection



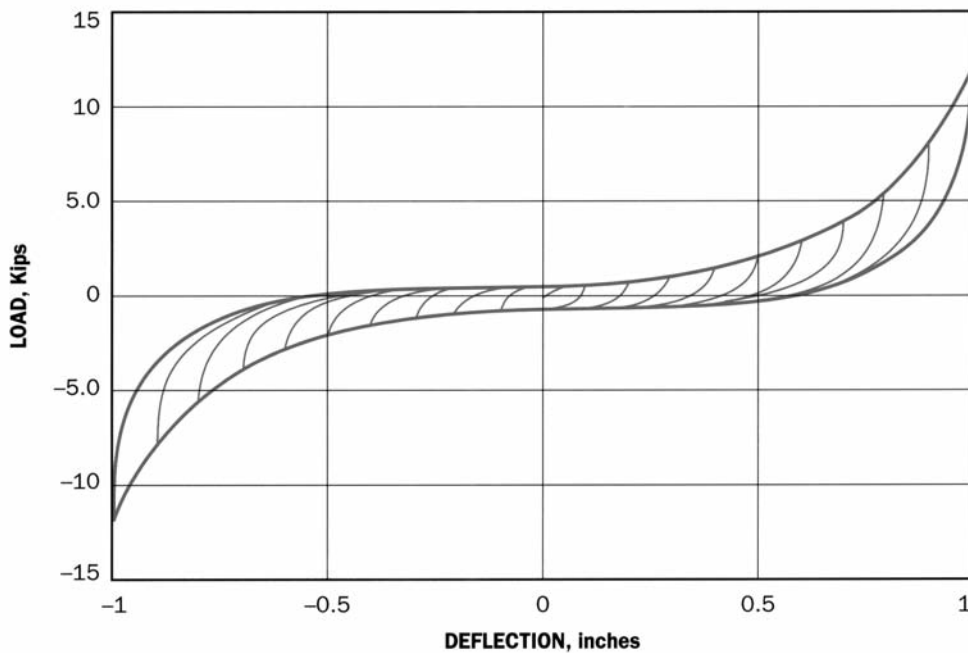
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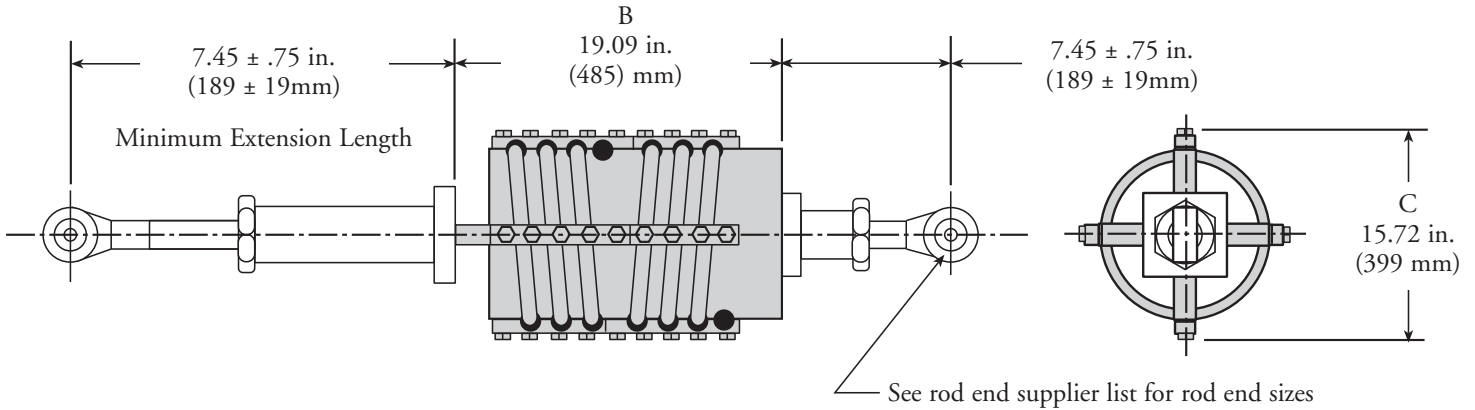
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	120.0 lbs. 0.3 lbs./in.	54,0 kg. 0,05 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	10 ± 5% 20 ± 5%	
Spring Rate	Mid-Stroke: Max-Stroke:	1.6 Kips/in. 4.0 Kips/in.	280 N/mm 700 N/mm
Stroke	Maximum:	± 1.5 in.	± 38,1 mm

Load vs. Deflection



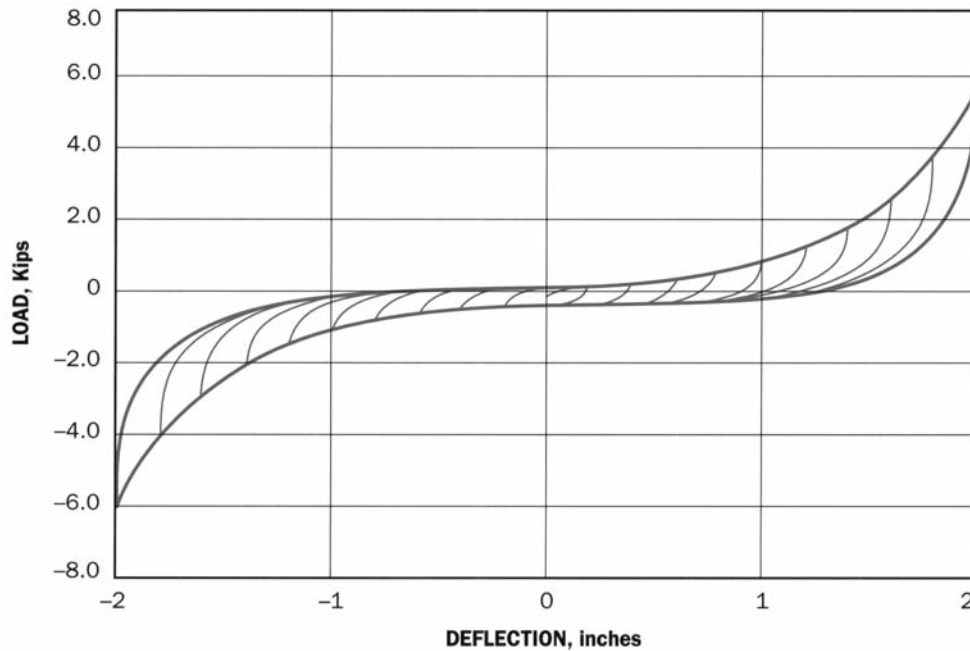
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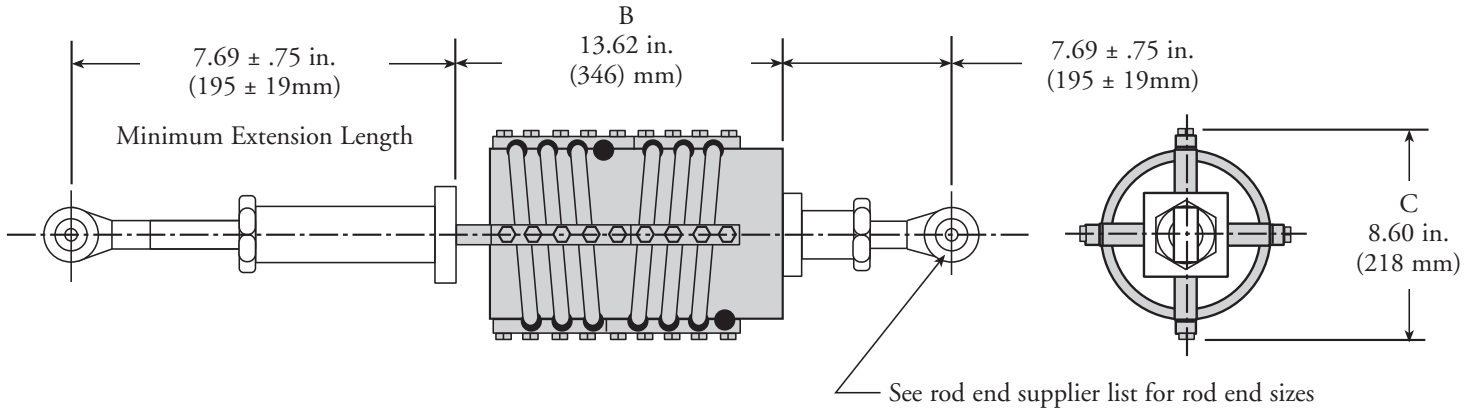
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	160.0 lbs. 0.3 lbs./in.	73,0 kg. 0,05 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	10 ± 5% 20 ± 5%	
Spring Rate	Mid-Stroke: Max-Stroke:	1.2 Kips/in. 3.0 Kips/in.	210 N/mm 525 N/mm
Stroke	Maximum:	± 2.0 in.	± 50,8 mm

Load vs. Deflection



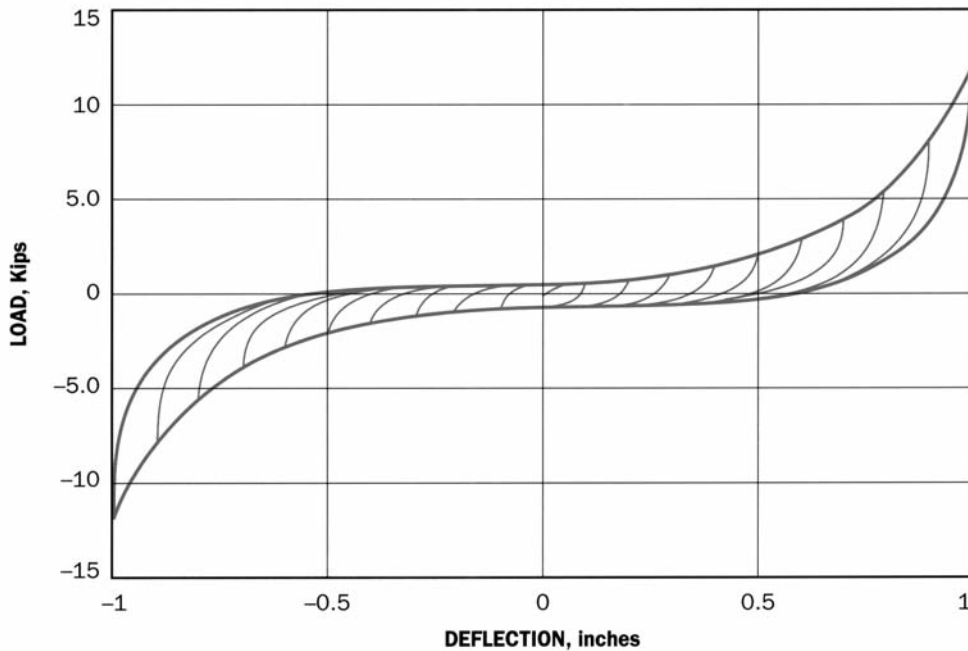
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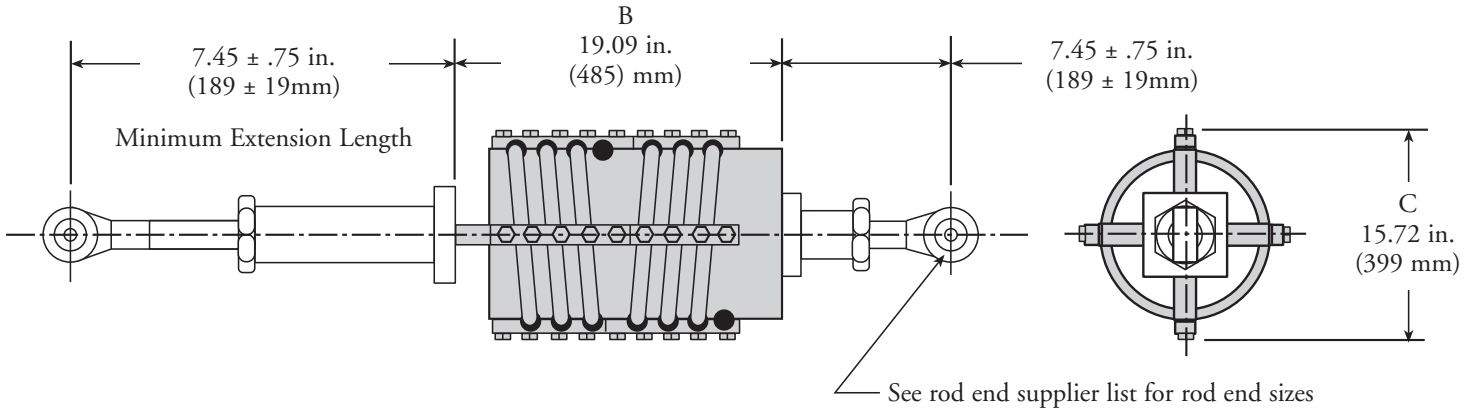
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	67.0 lbs. 0.3 lbs./in.	31,0 kg. 0,05 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	10 ± 5% 20 ± 5%	
Spring Rate	Mid-Stroke: Max-Stroke:	2.4 Kips/in. 6.0 Kips/in.	420 N/mm 1050 N/mm
Stroke	Maximum:	± 0.5 in.	± 12,7 mm

Load vs. Deflection



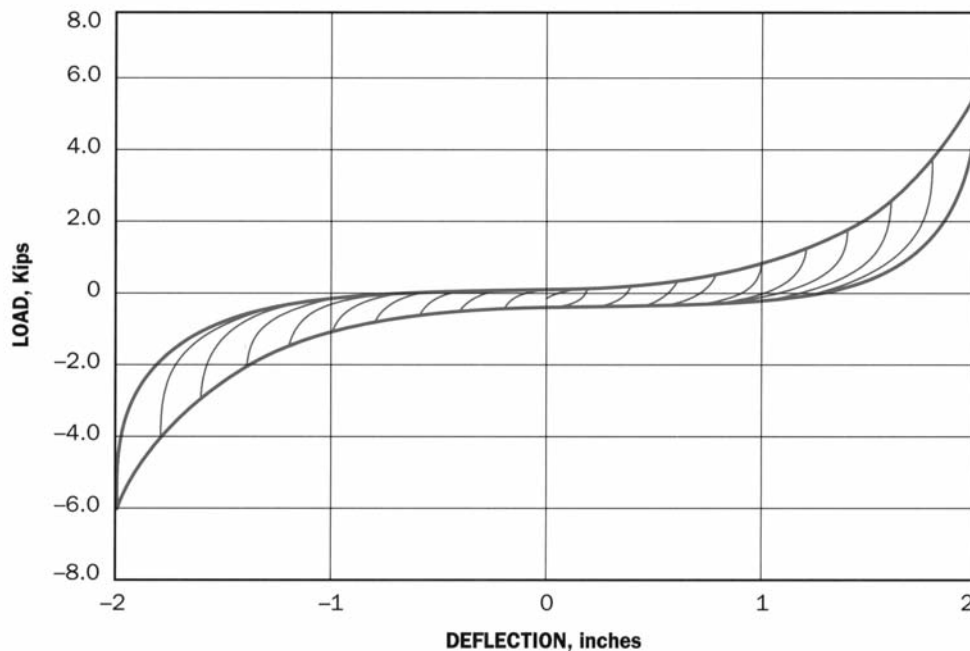
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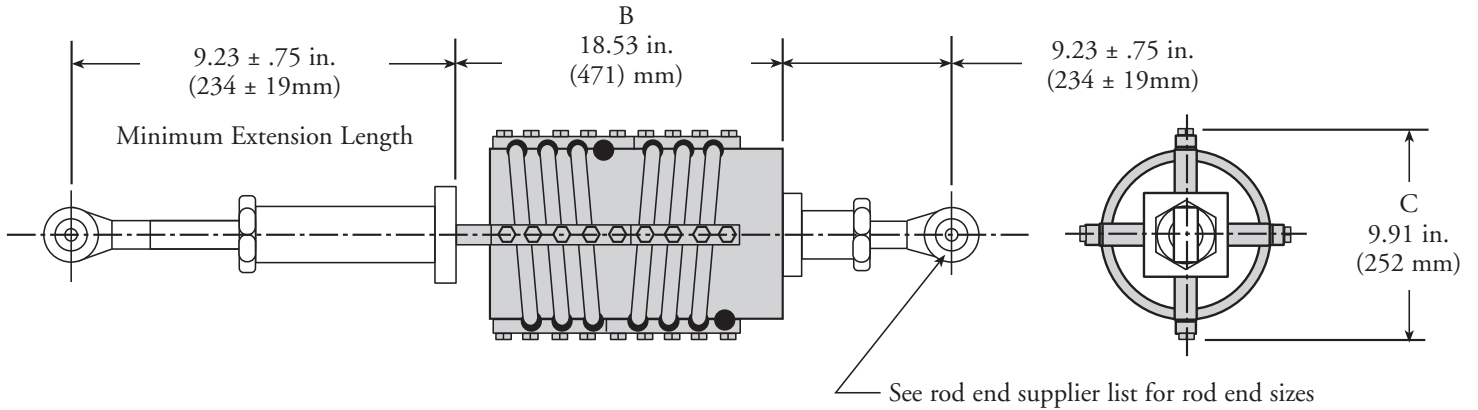
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	160.0 lbs. 0.3 lbs./in.	73,0 kg. 0,05 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	$10 \pm 5\%$ $20 \pm 5\%$	
Spring Rate	Mid-Stroke: Max-Stroke:	1.2 Kips/in. 3.0 Kips/in.	210 N/mm 525 N/mm
Stroke	Maximum:	± 2.0 in.	$\pm 50,8$ mm

Load vs. Deflection



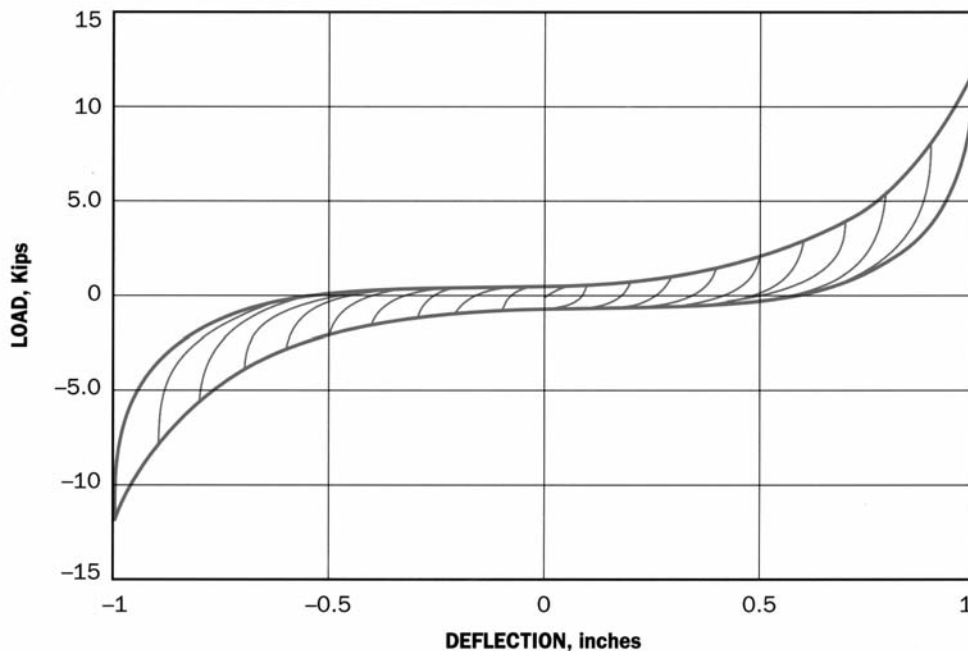
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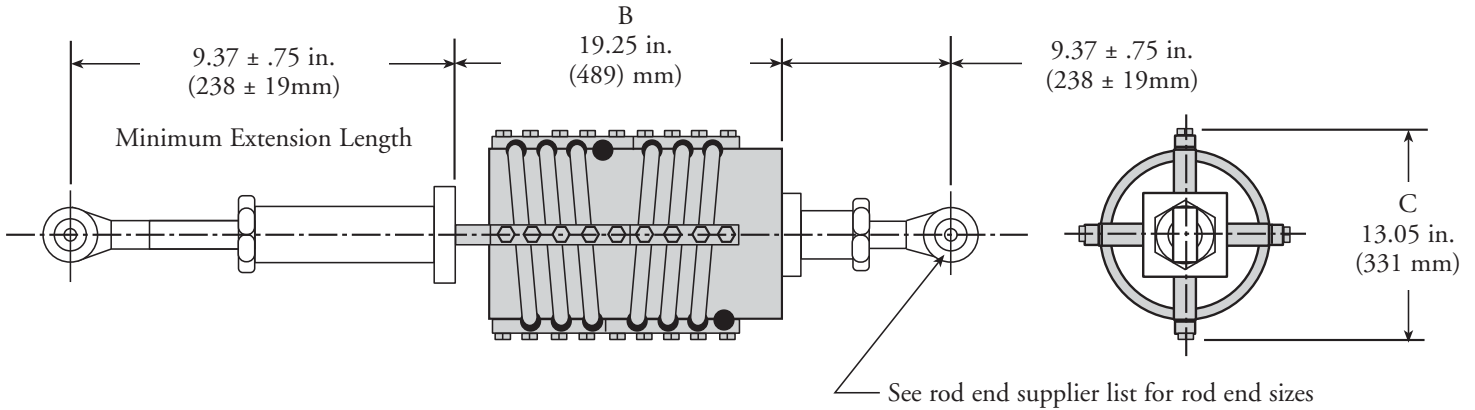
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	135.0 lbs. 0.4 lbs./in.	61,0 kg. 0,07 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	10 ± 5% 20 ± 5%	
Spring Rate	Mid-Stroke: Max-Stroke:	4.8 Kips/in. 12.0 Kips/in.	840 N/mm 2100 N/mm
Stroke	Maximum:	± 1.0 in.	± 25,4 mm

Load vs. Deflection



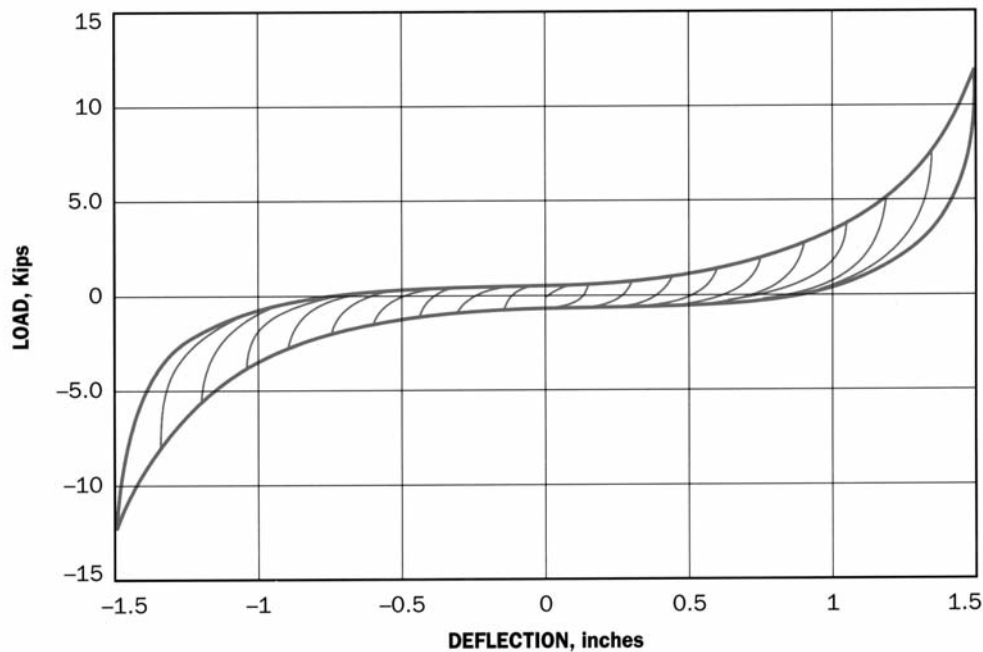
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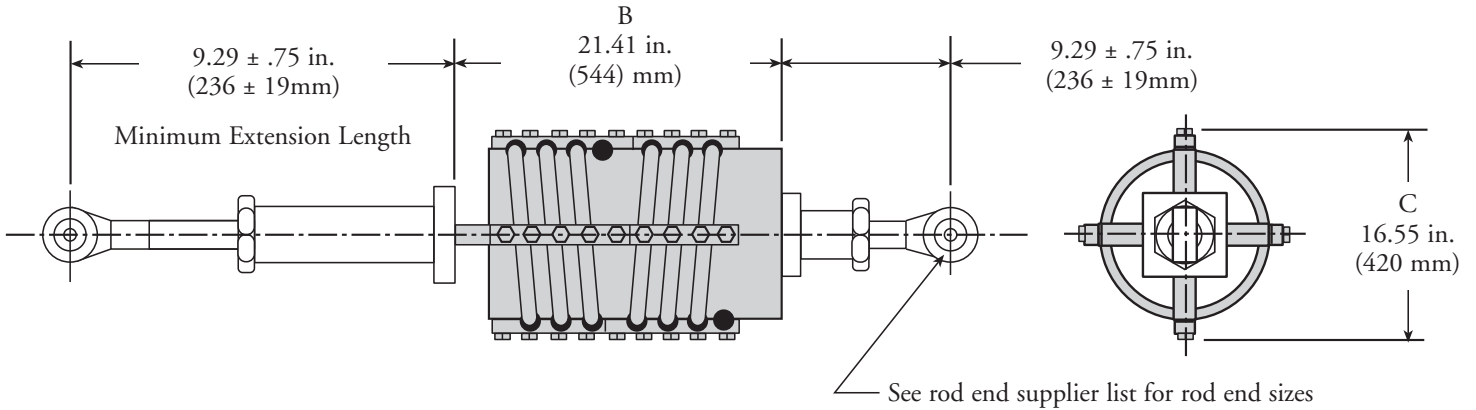
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	187.0 lbs. 0.4 lbs./in.	85,0 kg. 0,07 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	$10 \pm 5\%$ $20 \pm 5\%$	
Spring Rate	Mid-Stroke: Max-Stroke:	3.2 Kips/in. 8.0 Kips/in.	560 N/mm 1400 N/mm
Stroke	Maximum:	± 1.5 in.	$\pm 38,1$ mm

Load vs. Deflection



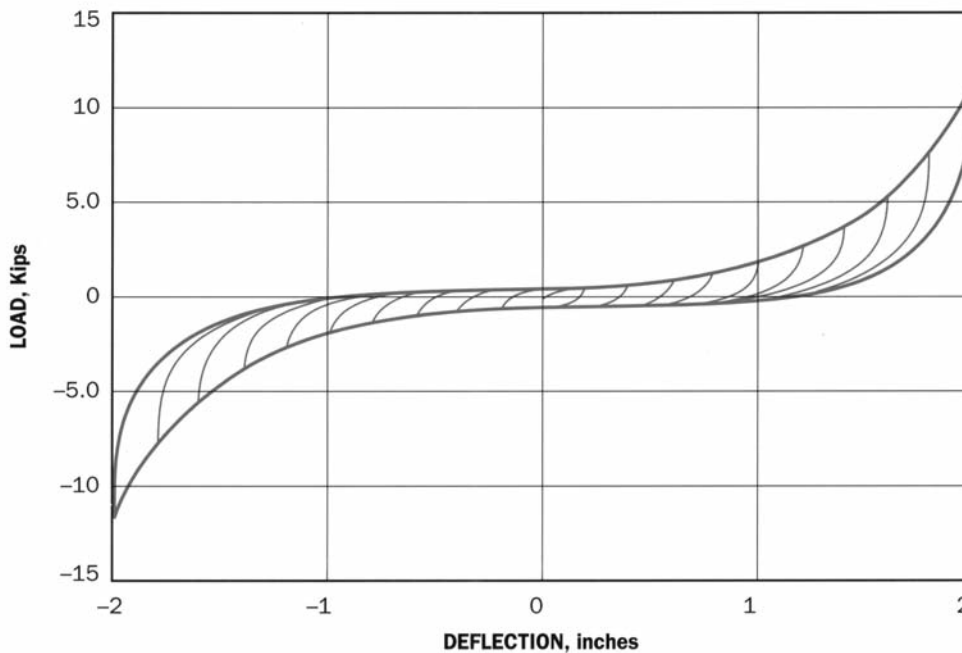
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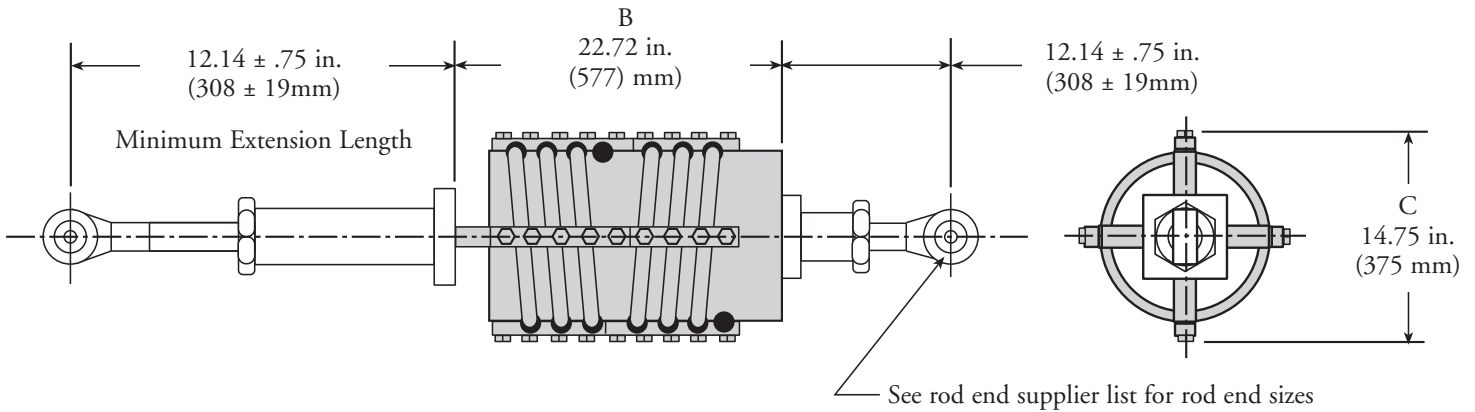
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	260.0 lbs. 0.4 lbs./in.	118,0 kg. 0,07 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	$10 \pm 5\%$ $20 \pm 5\%$	
Spring Rate	Mid-Stroke: Max-Stroke:	2.4 Kips/in. 6.0 Kips/in.	420 N/mm 1050 N/mm
Stroke	Maximum:	± 2.0 in.	$\pm 50,8$ mm

Load vs. Deflection



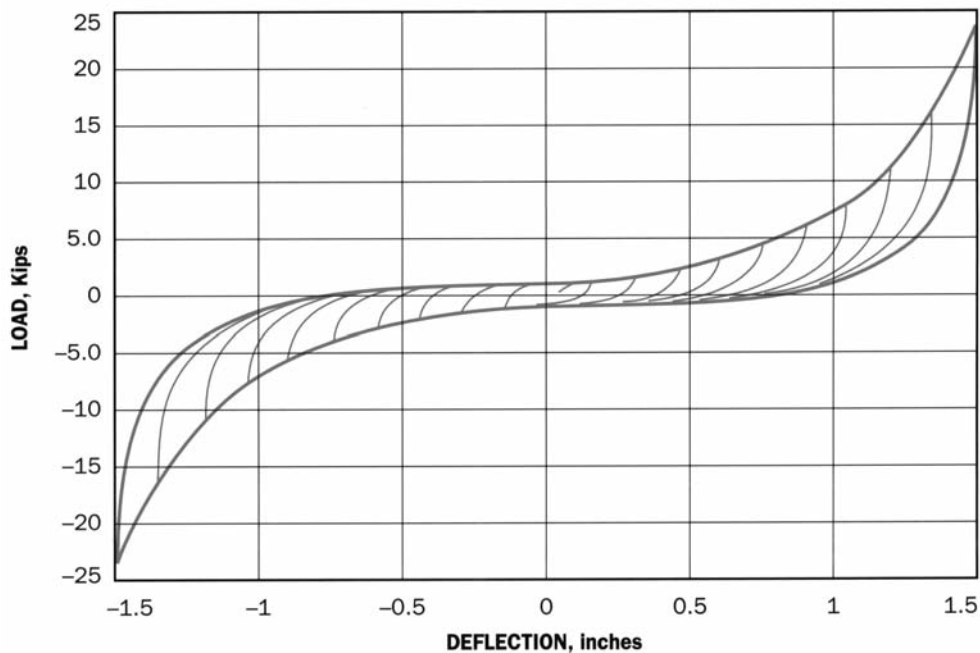
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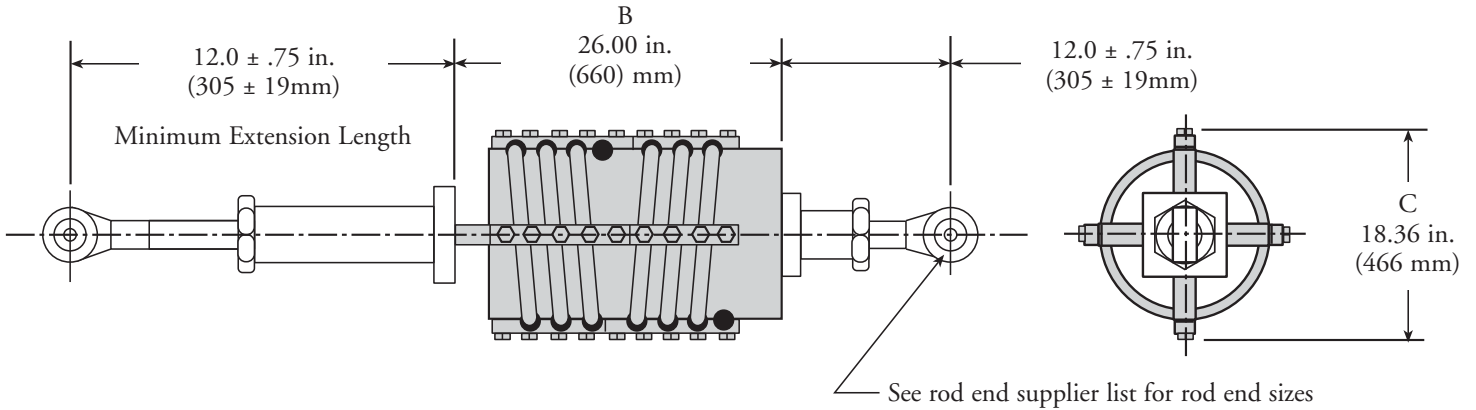
Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	332.0 lbs. 1.0 lbs./in.	151,0 kg. 0,02 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	$10 \pm 5\%$ $20 \pm 5\%$	
Spring Rate	Mid-Stroke: Max-Stroke:	6.4 Kips/in. 16.0 Kips/in.	1120 N/mm 2800 N/mm
Stroke	Maximum:	± 1.5 in.	$\pm 38,1$ mm

Load vs. Deflection



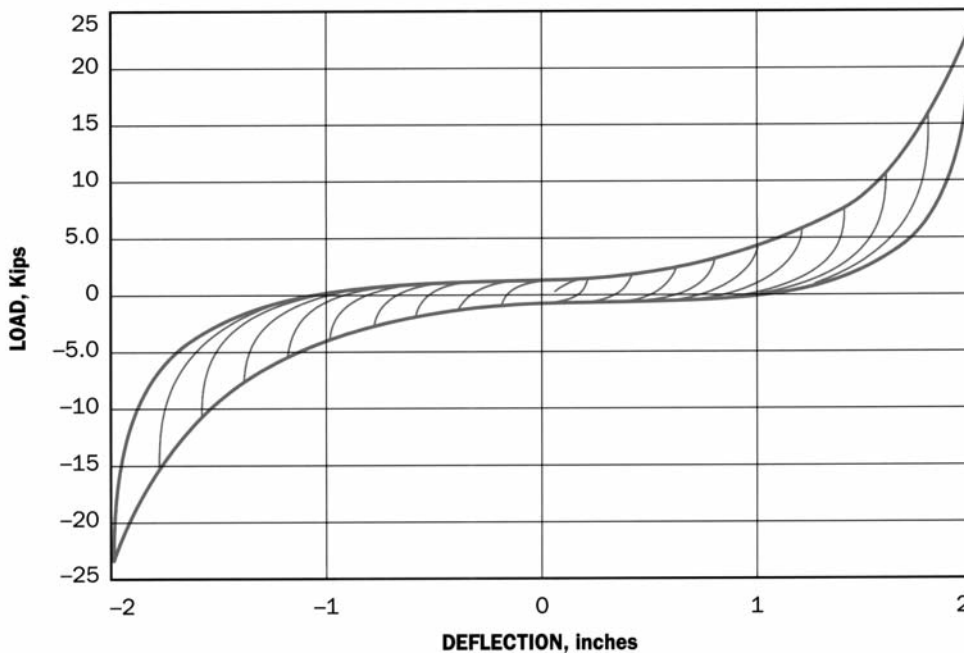
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Specifications

Unit Weight	Total Minimum Weight: Additional Weight per Extension Length:	446.0 lbs. 1.0 lbs./in.	202,0 kg. 0,02 kg/cm
Damping	At 100% Stroke: At 10% Stroke:	$10 \pm 5\%$ $20 \pm 5\%$	
Spring Rate	Mid-Stroke: Max-Stroke:	4.8 Kips/in. 12.0 Kips/in.	840 N/mm 2100 N/mm
Stroke	Maximum:	± 2.0 in.	$\pm 50,8$ mm

Load vs. Deflection



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