Impact Bumpers

CONDUCTIX wampfler

DELACHAUX GROUP

Conductix Incorporated

The technical data and images which appear in this manual are for informational purposes only. **NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE CREATED BY THE DESCRIPTIONS AND DEPICTIONS OF THE PRODUCTS SHOWN IN THIS MANUAL**. Conductix makes no warranty (and assumes no liability) as to function of equipment or operation of systems built according to customer design or of the ability of any of its products to interface, operate or function with any portions of customer systems not provided by Conductix.

Seller agrees to repair or exchange the goods sold hereunder necessitated by reason of defective workmanship and material discovered and reported to Seller within one year after shipment of such goods to Buyer.

Except where the nature of the defect is such that it is appropriate, in Seller's judgment, to effect repairs on site, Seller's obligation hereunder to remedy defects shall be limited to repairing or replacing (at Seller's option) FOB point of original shipment by Seller, any part returned to Seller at the risk and cost of Buyer. Defective parts replaced by Seller shall become the property of Seller.

Seller shall only be obligated to make such repair or replacement if the goods have been used by Buyer only in service recommended by Seller and altered only as authorized by Seller. Seller is not responsible for defects which arise from improper installation, neglect, or improper use or from normal wear and tear.

Additionally, Seller's obligation shall be limited by the manufacturer's warranty (and is not further warranted by Seller) for all parts procured from others according to published data, specifications or performance information not designed by or for Seller.

Seller further agrees to replace or at Seller's option to provide a refund of the sales price of any goods that do not conform to applicable specifications or which differ from that agreed to be supplied which non-conformity is discovered and forthwith reported to Seller within thirty (30) days after shipment to the Buyer. Seller's obligation to replace or refund the purchase price for non-conforming goods shall arise once Buyer returns such goods FOB point of original shipment by Seller at the risk and cost of Buyer. Goods replaced by Seller shall become the property of Seller.

There is no guarantee or warranty as to anything made or sold by Seller, or any services performed, except as to title and freedom from encumbrances and, except as herein expressly stated and particularly, and without limiting the foregoing, **there is no guarantee or warranty, express or implied, of merchantability or of fitness for any particular purpose or against claim of infringement or the like.**

Seller makes no warranty (and assumes no liability) as to function of equipment or operation of systems built to Buyer's design or of the ability of any goods to interface, operate or function with any portions of Buyer's system not provided by Seller.

Seller's liability on any claim, whether in contract, tort (including negligence), or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair, replacement or use of any products or services shall in no case exceed the price paid for the product or services or any part thereof which give rise to the claim. In no event shall Seller be liable for consequential, special, incidental or other damages, nor shall Seller be liable in respect of personal injury or damage to property not the subject matter hereof unless attributable to gross misconduct of Seller, which shall mean an act or omission by Seller demonstrating reckless disregard of the foreseeable consequences thereof.

Seller is not responsible for incorrect choice of models or where products are used in excess of their rated and recommended capacities and design functions or under abnormal conditions. Seller assumes no liability for loss of time, damage or injuries to property or persons resulting from the use of Seller's products. Buyer shall hold Seller harmless from all liability, claims, suits and expenses in connection with loss or damage resulting from operation of products or utilization of services, respectively, of Seller and shall defend any suit or action which might arise there from in Buyer's name - provided that Seller shall have the right to elect to defend any such suit or action for the account of Buyer. The foregoing shall be the exclusive remedies of the Buyer and all persons and entitles claiming through the Buyer.

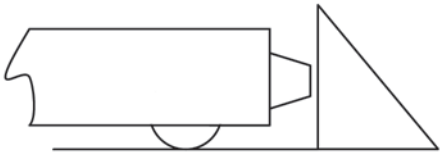
INDEX

1.0 Bumper Formulas

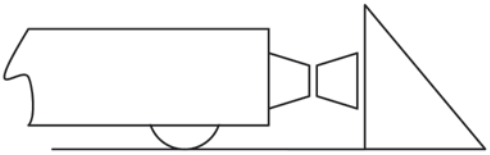
The following formulas should be used to calculate the energy to be absorbed by Conductix - Wampfler impact bumpers.

1.1 Crane Bridge: $\text{Energy} = (E) = \dfrac{[(1/2W_1 + W_2) \times (V_1)2] \text{ (Joules)}}{2}$

1.1.1 Examples of Typical Bridge Bumper Arrangements:



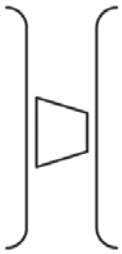
Single Bumper per End truck
Energy = E



4 Bumper Arrangement
(End truck to end stop)
Energy = $\frac{E}{2}$

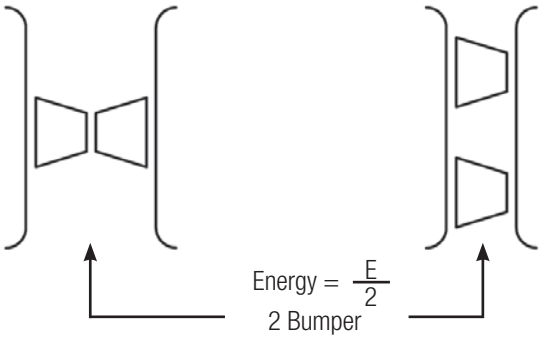
1.2 Trolley: Energy = (E) = (1/2W2) x (V2)2 (Joules)

1.2.1 Examples of Typical Trolley Bumper Arrangements:



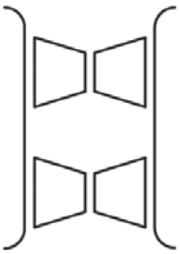
Energy = E

Single Bumper
Arrangement



Energy = $\frac{E}{2}$

2 Bumper
Arrangements



Energy = $\frac{E}{4}$

4 Bumper
Arrangement

Where:
W_1 = Bridge weight in (kg)
W_2 = Trolley weight in (kg) **
V_1 = Bridge speed in (m/s) at 40% of rated load speed with power off *
V_2 = Trolley speed in (m/s) at 50% of rated load speed with power off *

Conversion Formulas:
Multiply (lbs) by 0.454 to get (kg)
Multiply (ft/s) by 0.305 to get (m/s)

Notes:

* *As per CMAA Specification #70*

** *If the load to be lifted is suspended by wire rope, it will swing at the moment of impact. The added load on the bumper is negligible. The lifted load need only be added to the trolley weight if it is rigidly suspended (i.e. stripped crane).*

2.0 Bumper Selection

2.0 To select the correct bumper for your application, follow these steps;

1.) Calculate the Kinetic Energy (E) to be absorbed using the appropriate formula either 1.1 or 1.2.

2.) Divide the Kinetic Energy by the number of bumpers to be used (see section 1.1.1 or 1.2.1).

3.) Select the appropriate bumper from Table 1.

Example:

Determine bridge and trolley bumper sizes for overhead bridge crane with the following parameters:
bridge speed is 250 ft./min.
trolley speed is 125 ft./min.
bridge weight is 40,000 lbs.
trolley weight is 10,000 lbs.

Step 1.

Convert parameters to correct units.

W_1 = 40,000 lbs. → 40,000 x 0.454 = 18160 Kg.

W_2 = 10,000 lbs. → 10,000 x 0.454 = 4540 Kg.

V_1 = 250 ft./min. → 40% = 100 ft./min.

→ $\frac{100 \text{ft./min.}}{60}$ = 1.67 ft./sec.

→ 1.67 ft./sec. x 0.305 = 0.51 m/s

V_2 = 125 ft./min → 50% = 63 ft./min.

→ $\frac{63 \text{ ft./min.}}{60}$ = 1.05 ft./sec.

→ 1.05 ft./sec. x 0.305 = 0.32 m/s.

Step 2.

Calculate the kinetic energy to be absorbed.

Bridge Crane: $\frac{(1/2 W_1 + W_2) \times (V_1)^2}{2} \rightarrow E = \frac{(\frac{18160}{2} + 4540) \times (.51)^2}{2}$

→ E = 13620 x 2.6

→ E = 1771 Joules

Trolley: $(1/2 W_2) \times (V_2) \rightarrow E = \frac{(\frac{4540}{2}) \times (.32)^2}{2}$

→ E = 2270 x 0.102

→ E = 232 Joules

Step 3.

Based on the bumper arrangement to be used (see section 1.1.1 & 1.2.1), calculate the energy to be absorbed by the bumpers.

Bridge: 4 Bumper Arrangement → $E = \frac{1771}{2}$

E = 886 Joules

Trolley: 2 Bumper Arrangement → $E = \frac{232}{2}$

E = 116 Joules

2.0 Bumper Selection

Step 4.

Based on the calculated energy values from Step 3,Select the appropriate bumper from Table 1.

Bridge bumpers (4) required (plate style) = PN 30607 *125mm. Dia.*

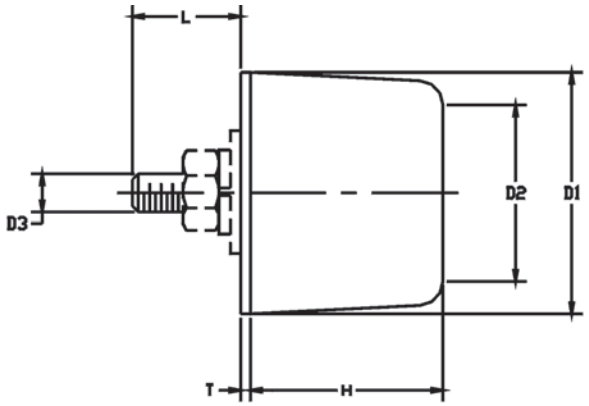
Trolley bumpers (2) required (stud style) = PN 30603 *63mm. Dia.*

Table 1:

Diameter D1	Part No:		E (J)	Max. Compression Length (mm)
	Stud Type	Plate Type		
25	30600		25	10
40	30601		50	16
50	30602		100	20
63	30603		200	25
80	30604	30605	400	32
100	38791	30606	800	40
125	38791B	30607	1600	50
160	38791C	30608	3200	63
200	38791D	30809	6400	80
250	38791E	30610	12500	100

2.0 Bumper Selection

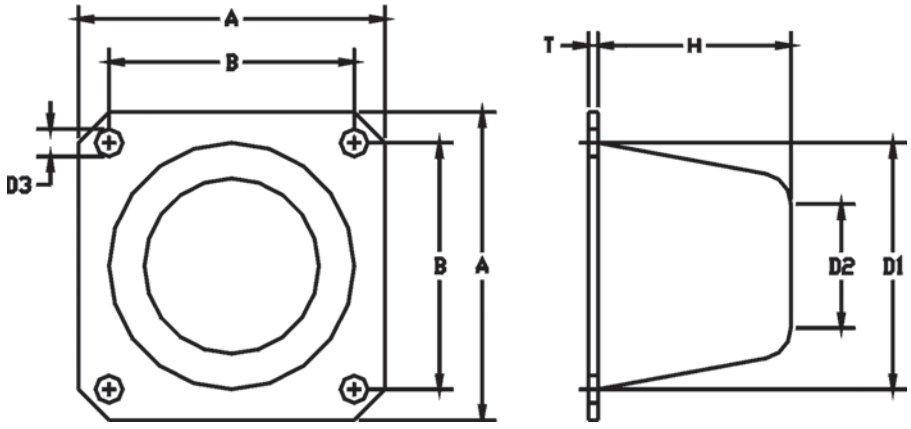
Stud Type:



Part Number	D1	D2	D3	H	L	T
30600	25	18	M6	20	10	2
30601	40	27	M8	32	28	2
30602	50	38	M10	40	28	2
30603	63	45	M10	50	27	3
30604	80	57	M12	63	37	3
38791	100	73	M16	80	45	4
38791B	125	92	M16	100	45	4
38791C	160	114	M20	125	48	6
38791D	200	147	M20	160	48	6
38791E	250	183	M24	200	50	6

* All Dimensions are in mm.

Plate Type:



Part Number	D1	D2	D3	A	B	H	T
30605	80	57	9	100	80	63	3
30606	100	73	9	125	100	80	4
30607	125	92	11	160	125	100	4
30608	160	114	11	200	160	125	6
30609	200	147	13	250	200	160	6
30610	250	183	13	315	250	200	8

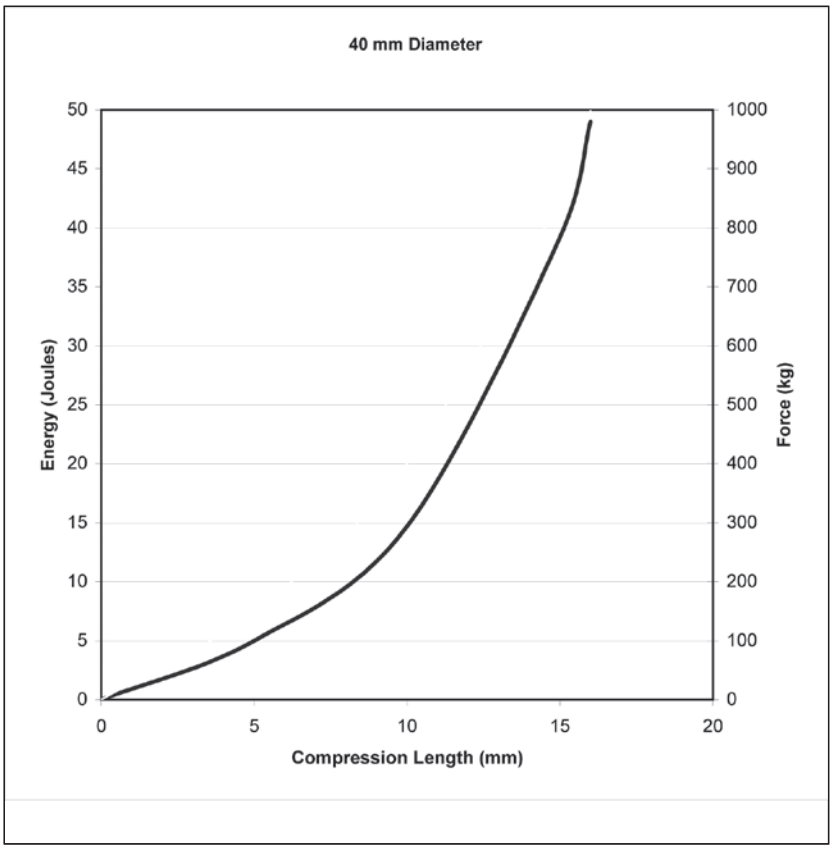
* All Dimensions are in mm.

3.0 Bumper Charts

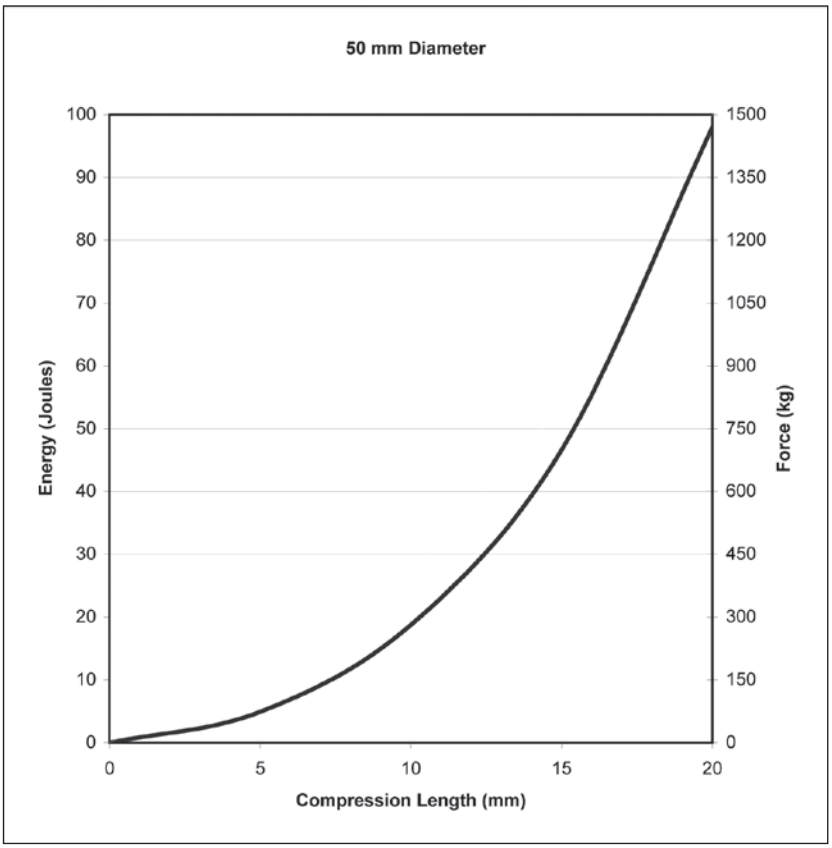
The following charts are to be used once you have calculated the correct bumper for your application. They provide the final force transmitted through the bumper and the corresponding compression value.

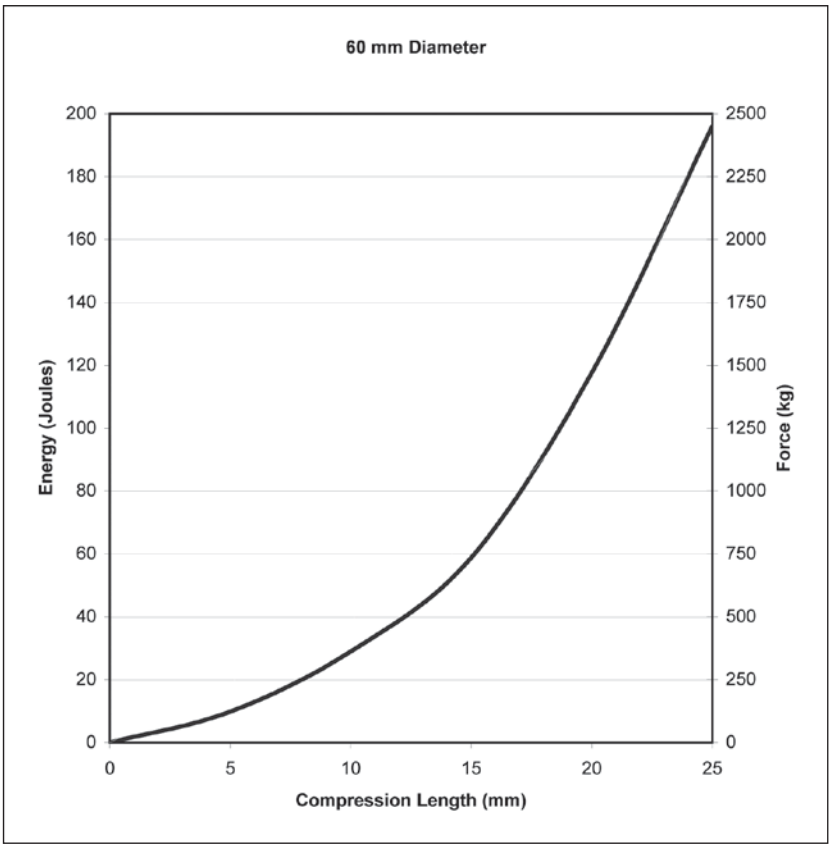
To use:

1) Select the graph for the bumper required.
2) At the calculated energy value for your application draw a horizontal line to the right until it intersects with the curved line.
3) Draw a vertical line downward at this intersection towards the bottom base line. This will provide the amount of compression of the bumper.
4) Determine the final force, continue the horizontal line to the right, the appropriate value can be determined by the right hand axis values.

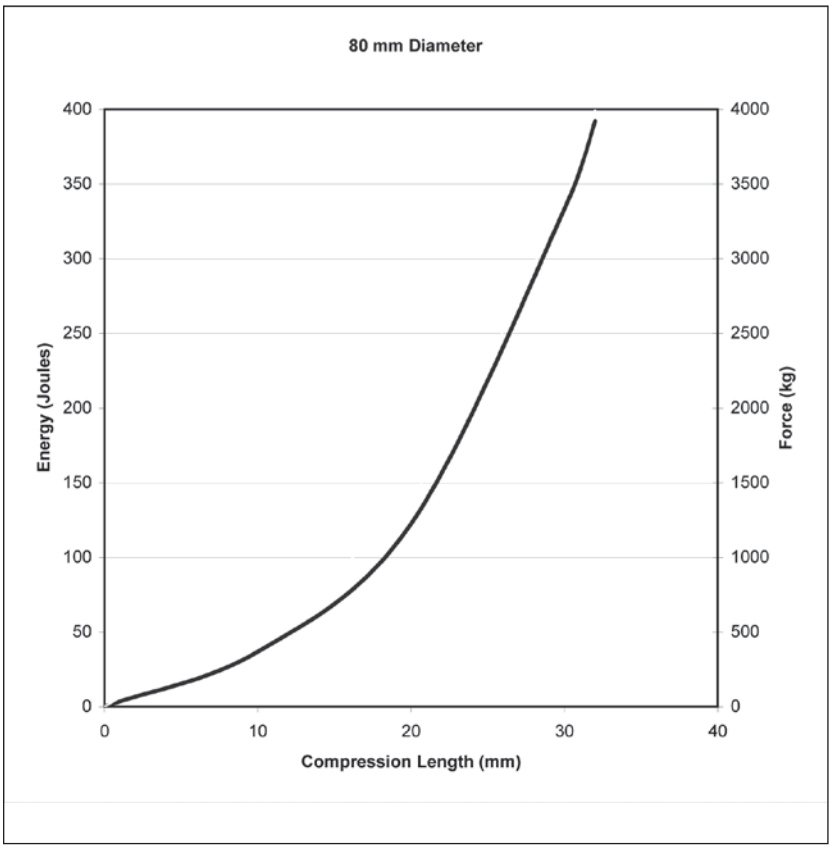


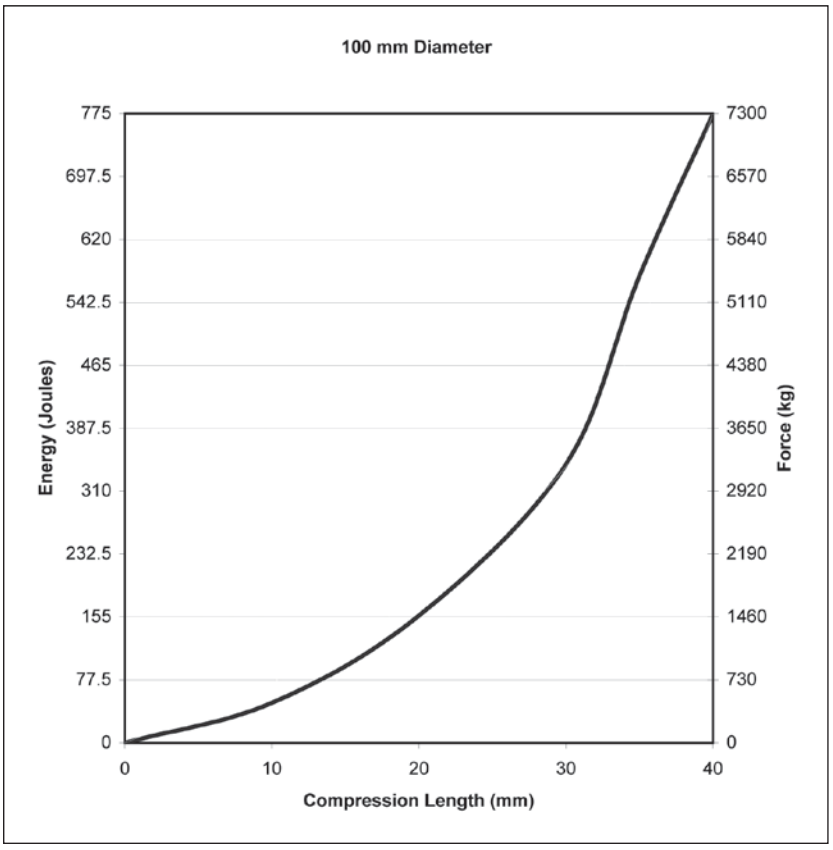
3.0 Bumper Charts



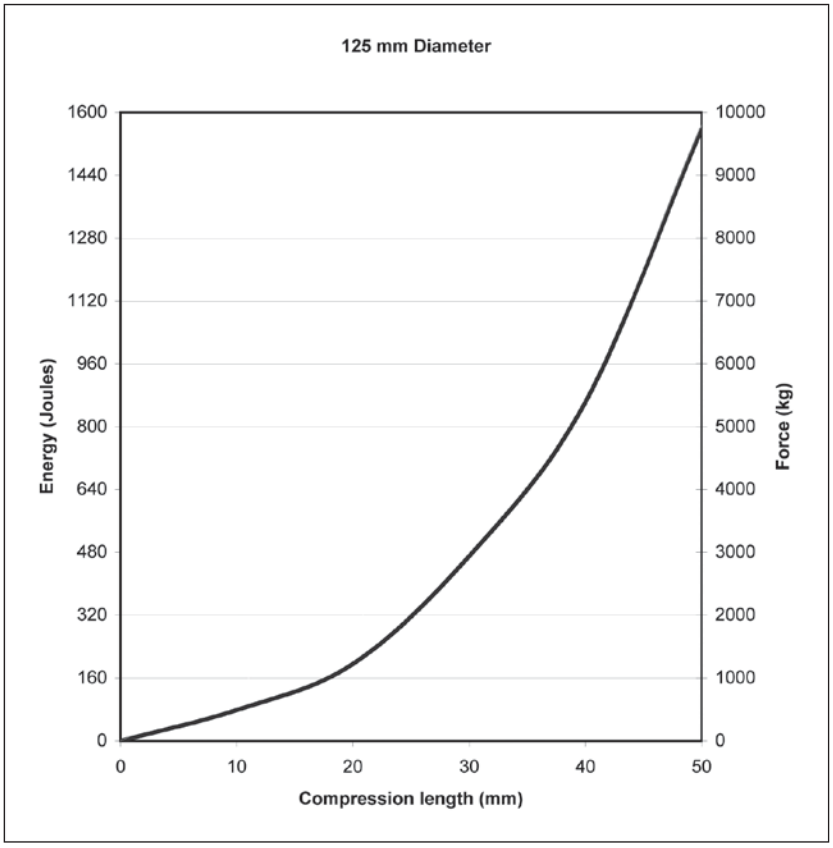


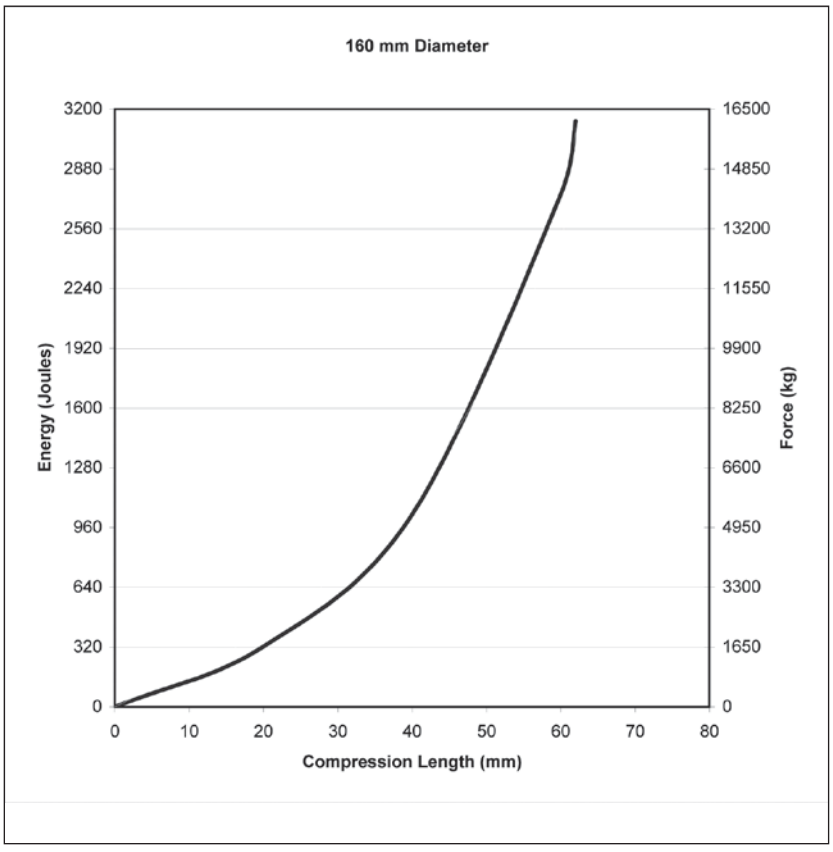
3.0 Bumper Charts



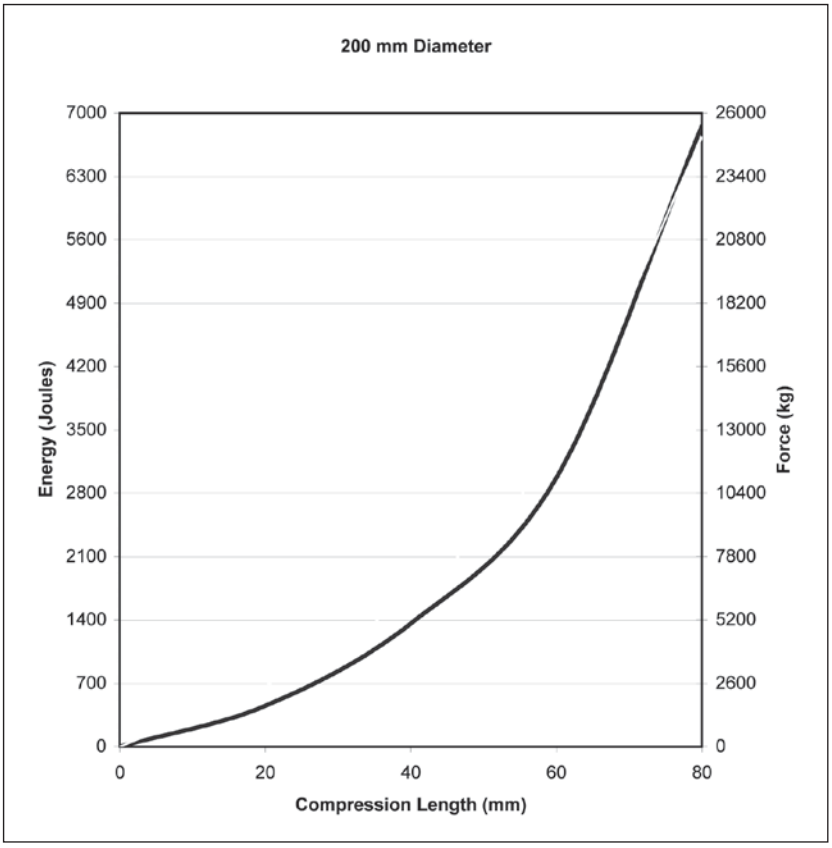


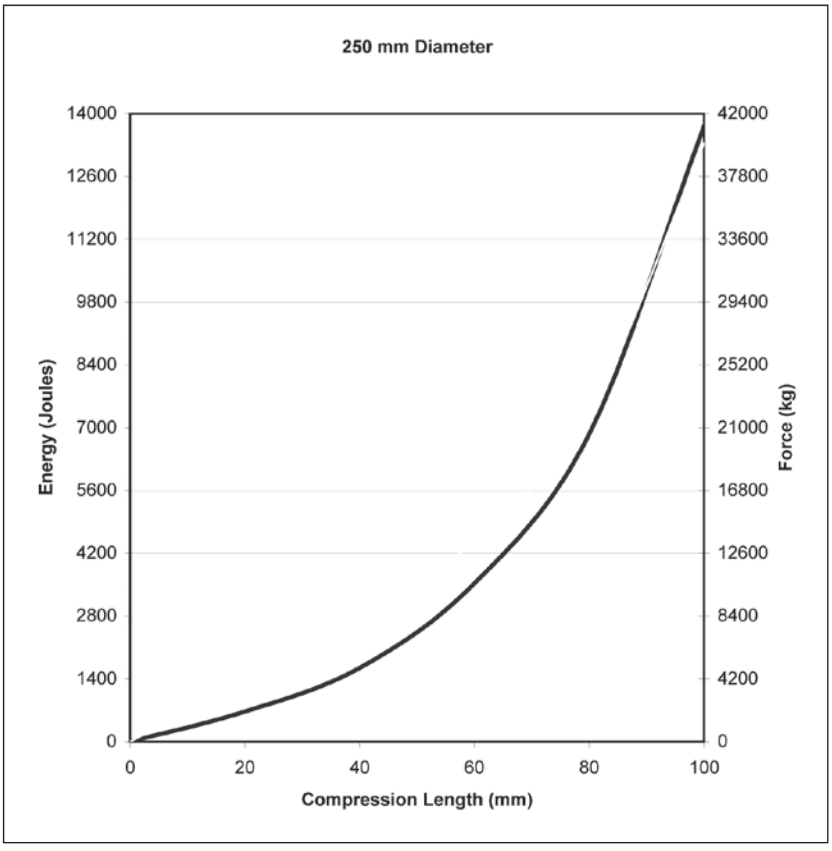
3.0 Bumper Charts





3.0 Bumper Charts





Notes

Notes

Notes

www.conductix.com

Conductix-Wampfler
10102 F Street
Omaha, NE 68127
USA

Customer Support
Phone: 800 521 4888
Fax: 800 780 8329

Phone: 402 339 9300
Fax: 402 339 9627

info.us@conductix.com
www.conductix.com