

Load Diagrams

Program 0180 Cellular Buffers

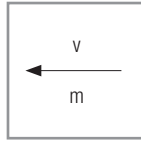
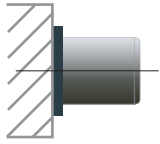


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Cellular Buffers Program 0180

Calculation and Selection of Impact Buffers made of Diepocell®

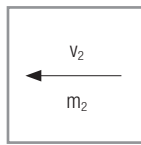
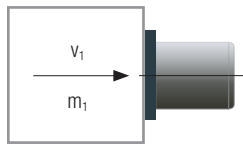
- Mass against stop



$$W = \frac{1}{2}m \cdot v^2$$

The calculation method is on the next page.

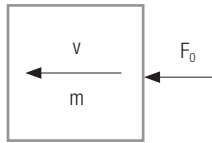
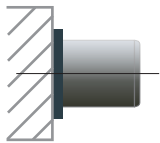
- Mass against mass



$$W = \frac{m_1 \cdot m_2 (v_1 + v_2)^2}{2(m_1 + m_2)}$$

$m_1 = m_2$ and $v_1 = v_2$
 $W = m \cdot v^2$

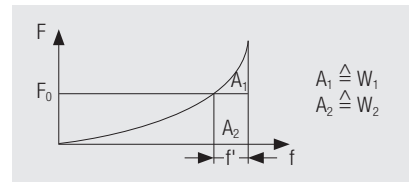
- Mass with drive against stop



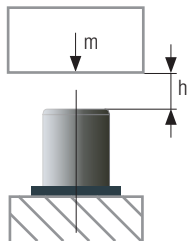
$$W = \frac{1}{2}m \cdot v^2$$

$$W_2 = F_0 \cdot f'$$

Buffer-force compression diagram



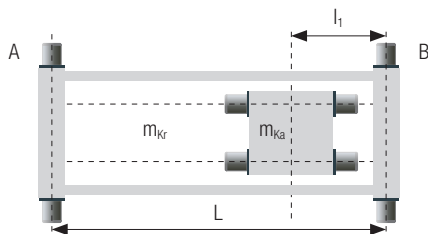
- Mass in free fall (formula not applicable for lifts)



$$W = m \cdot g \cdot h$$

This formula is **not** applicable for lifts.

- Crane-buffer calculation



$$W_B = \frac{1}{2}m_B \cdot v^2$$

$$m_B = \frac{m_{kr}}{2} + \frac{m_{ka}(L - l_1)}{L}$$

- pendular movement of the load is not considered
- rotational energy from motor drive is to be considered
- reduced velocity in accordance with DIN 15018:
v = 100% nominal velocity on trolleys
v = 85% nominal velocity on cranes
v = 70% nominal velocity on cranes with breaking devices

- Formula for calculating deceleration

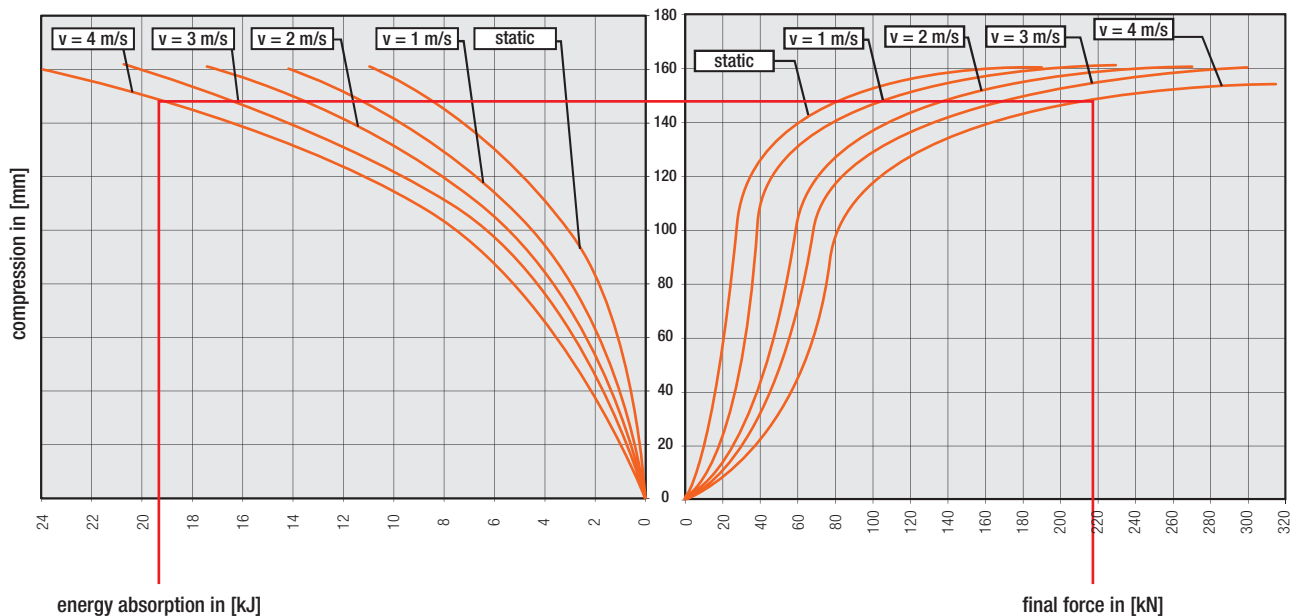
$$a_{mitt} = \frac{v^2}{2f}$$

$$a_{max} = \frac{F}{m}$$

a _{mitt} : average deceleration (m/s ²)	h: drop height (m)	m _B : mass at rail B (kg)
a _{max} : maximum deceleration (m/s ²)	L: rail spacing (m)	v: operating velocity (m/s)
F ₀ : drive force (kN)	l: distance m _{ka} to B (m)	v _{1/2} : velocity of body 1/ body 2 (m/s)
F: final force (kN)	m: mass (kg)	W: kinetic energy (J)
f: buffer compression (m)	m _{kr} : crane mass w/o trolley (kg)	W ₁ : kinetic energy (J)
f': operating compression (m)	m _{ka} : trolley mass (kg)	W ₂ : work created by F ₀ (J)
g: gravity acceleration (9,81 m/s ²)	m ₁ /m ₂ : mass of body 1/body 2 (kg)	W _{zul} : permitted energy input (J)

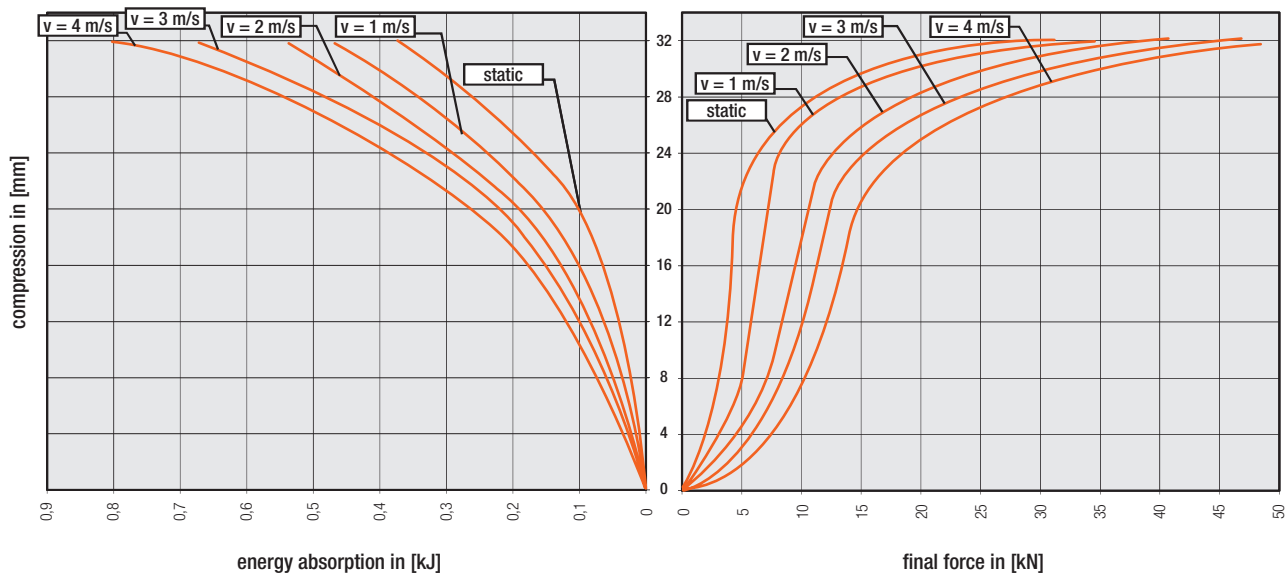
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Exemplary Calculation and Selection of a Diepocell® Impact Buffer



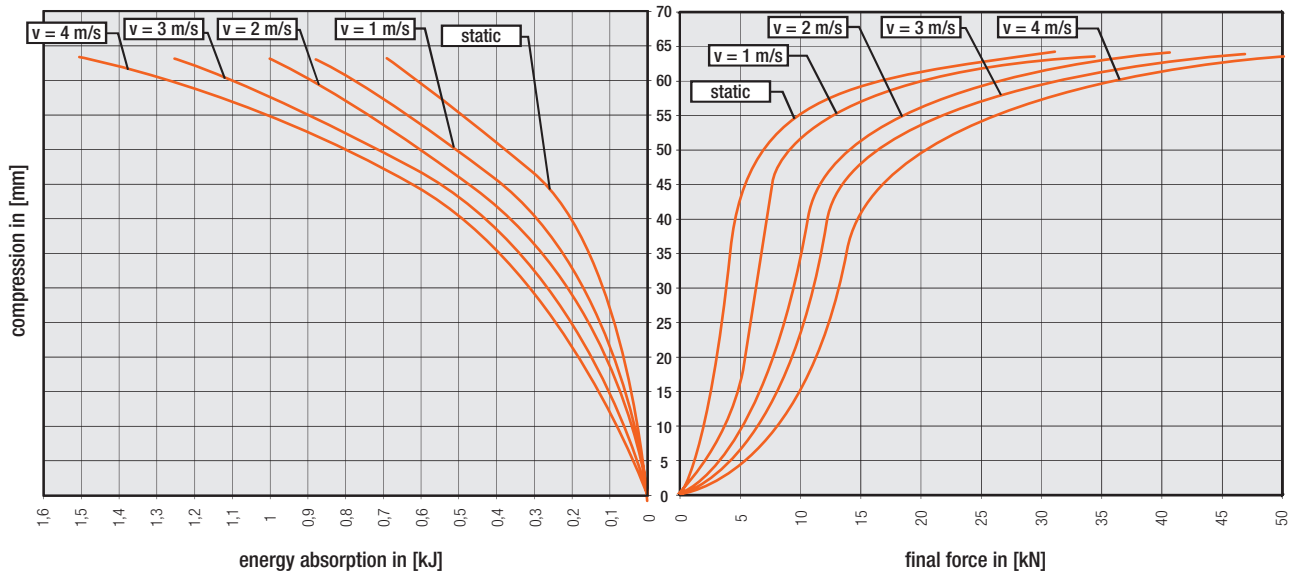
Application: mass against a stop
Formula: $W = \frac{1}{2}m \cdot v^2$
Parameters: mass $m = 2490$ kg
 velocity $V = 4$ m/s
Calculation: $W = \frac{1}{2} \times 2490 \text{ kg} \times (4,0 \text{ m/s})^2$
 $= 19920 \text{ Nm [J]}$
 $= 19,92 \text{ kNm [kJ]}$

80 x 40 Energy Absorption / Final Force

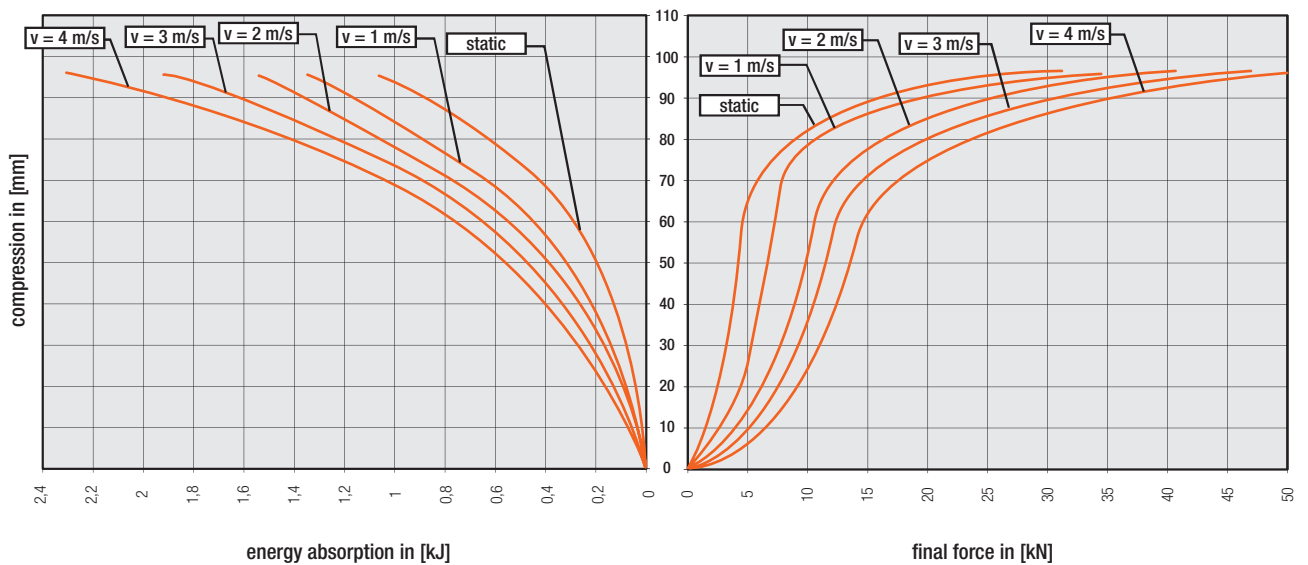


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80 x 80 Energy Absorption / Final Force

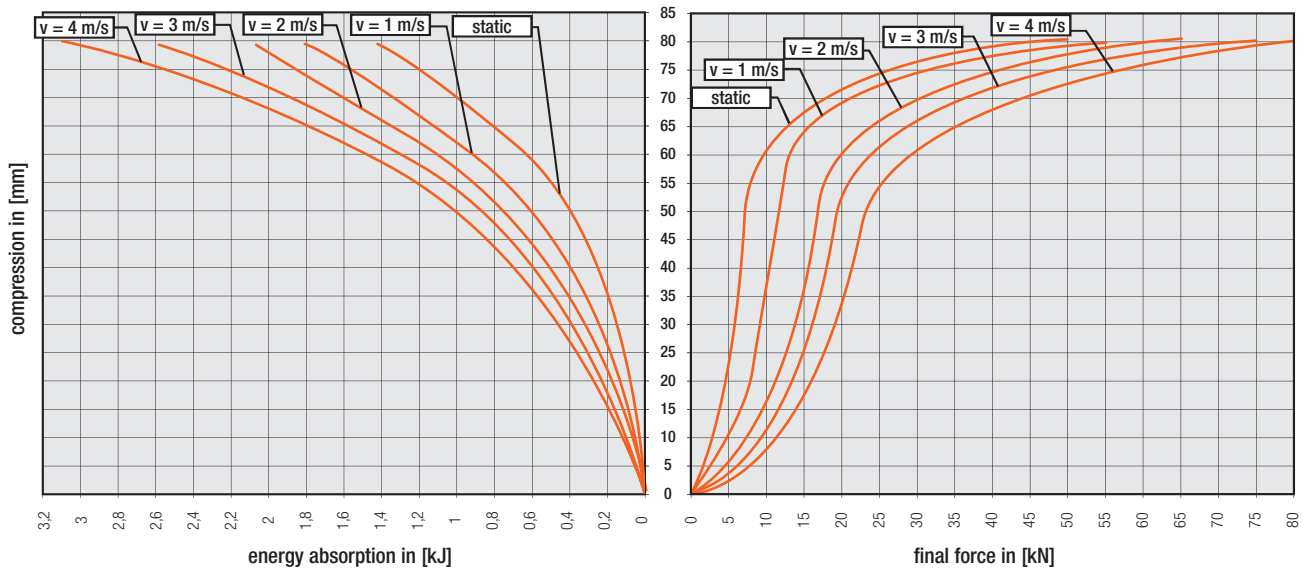


80 x 120 Energy Absorption / Final Force

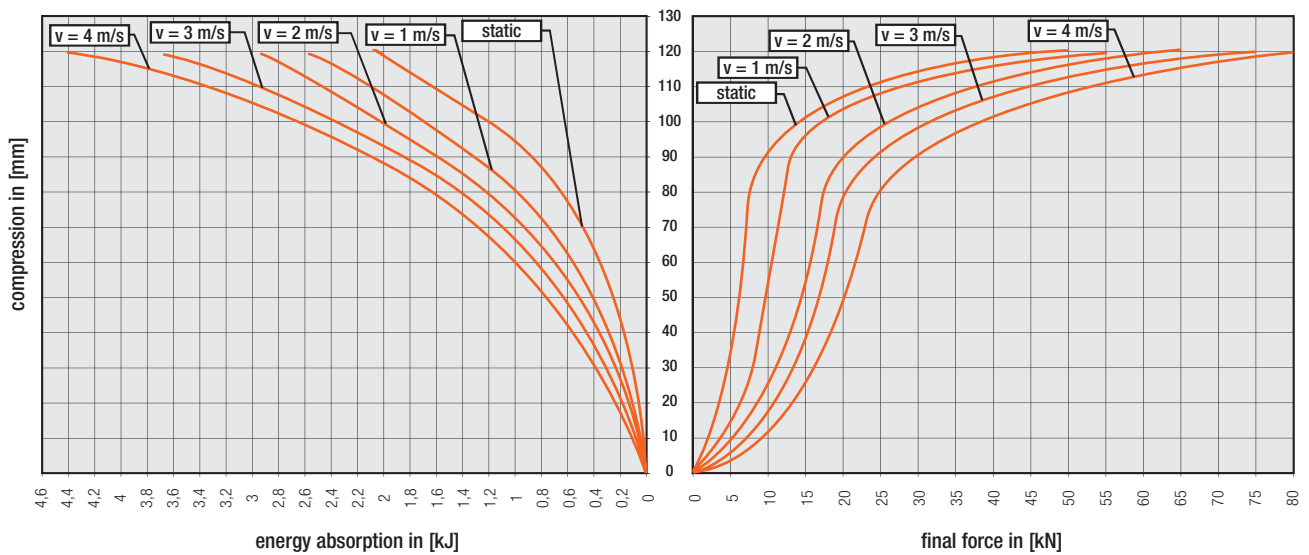


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100 x 100 Energy Absorption / Final Force

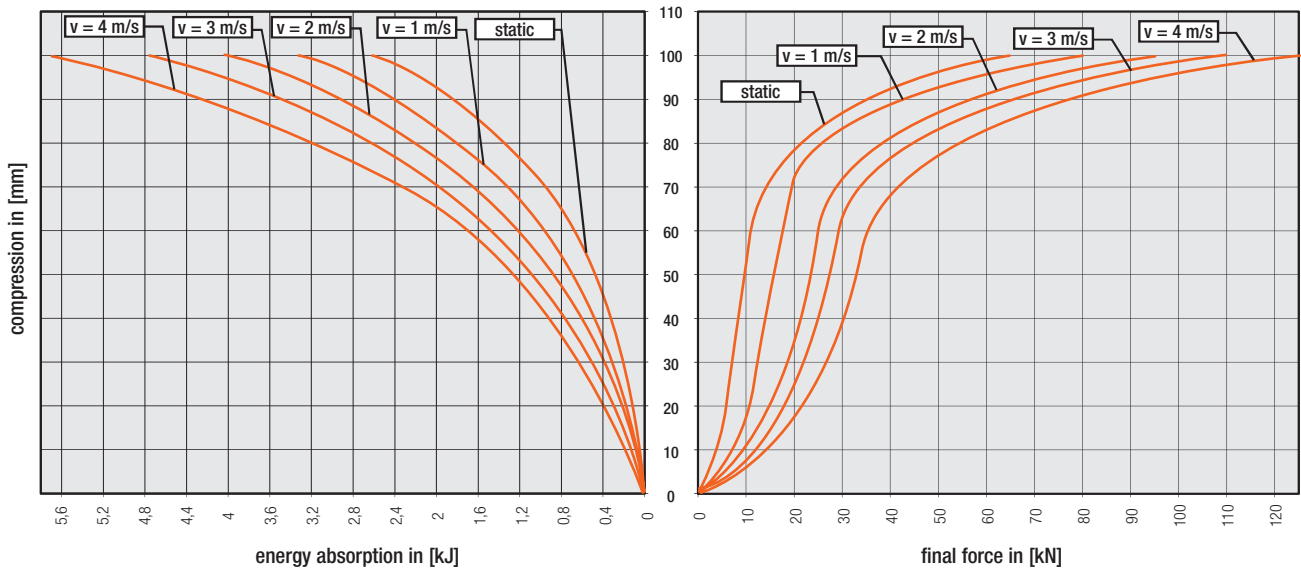


100 x 150 Energy Absorption / Final Force

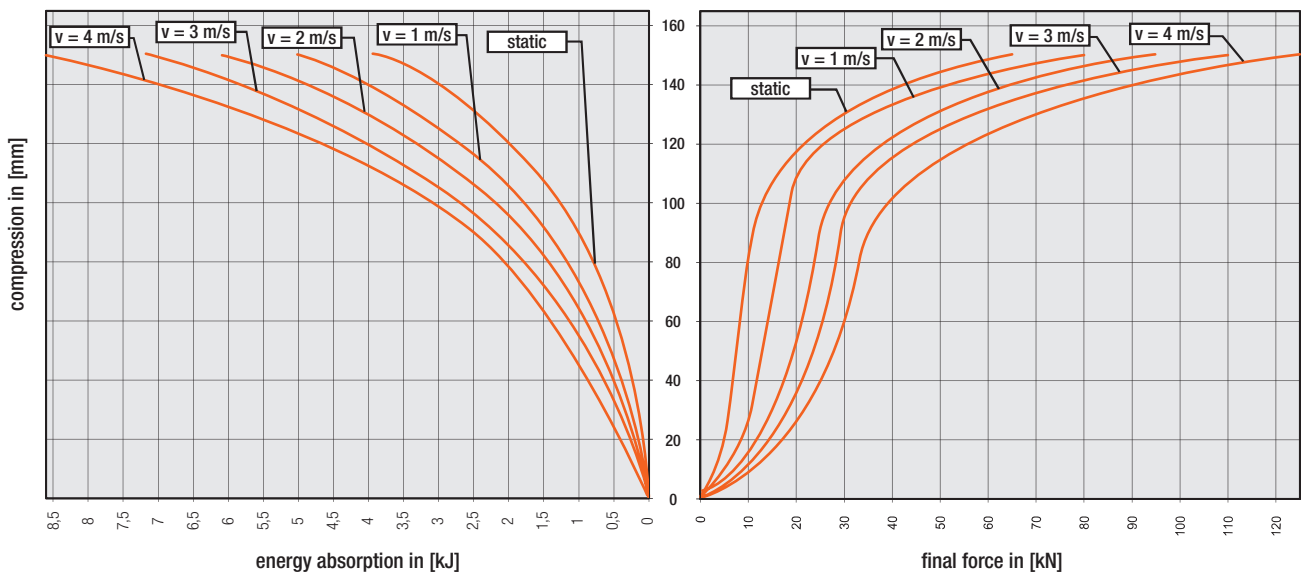


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125 x 125 Energy Absorption / Final Force

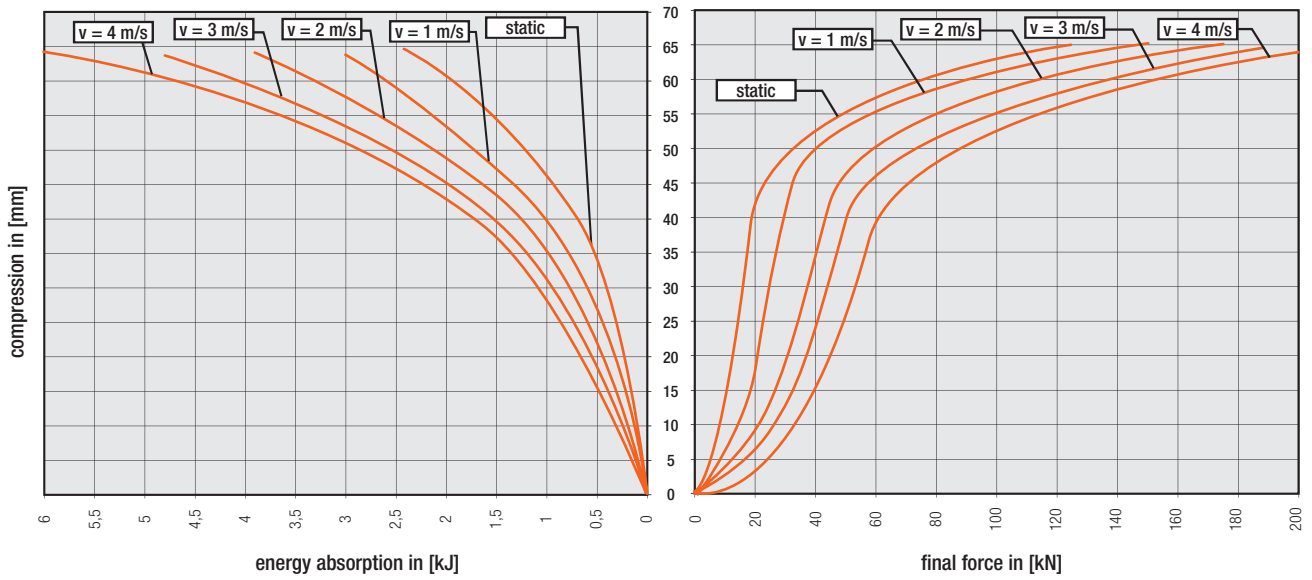


125 x 190 Energy Absorption / Final Force

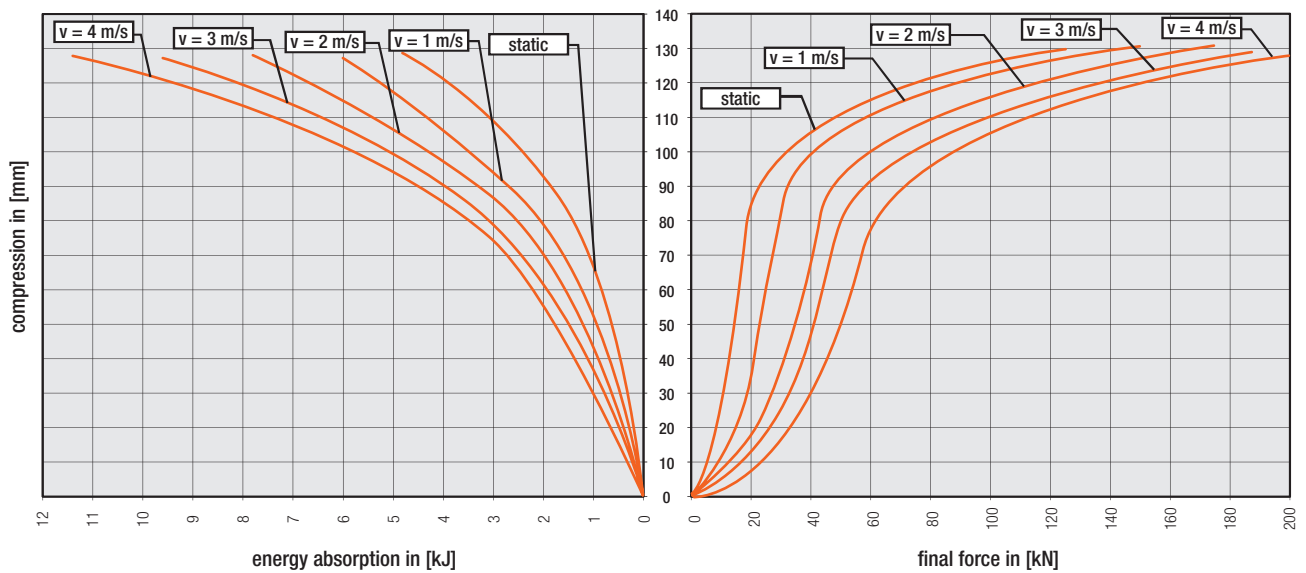


Cellular Buffers Program 0180

160 x 80 Energy Absorption / Final Force

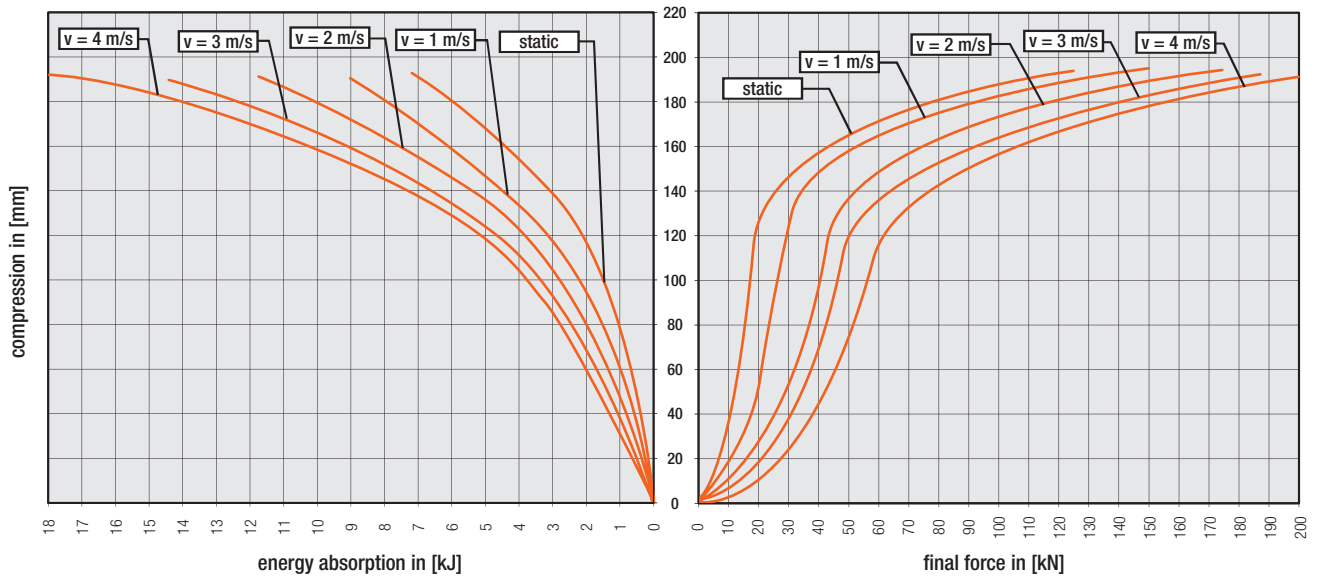


160 x 160 Energy Absorption / Final Force

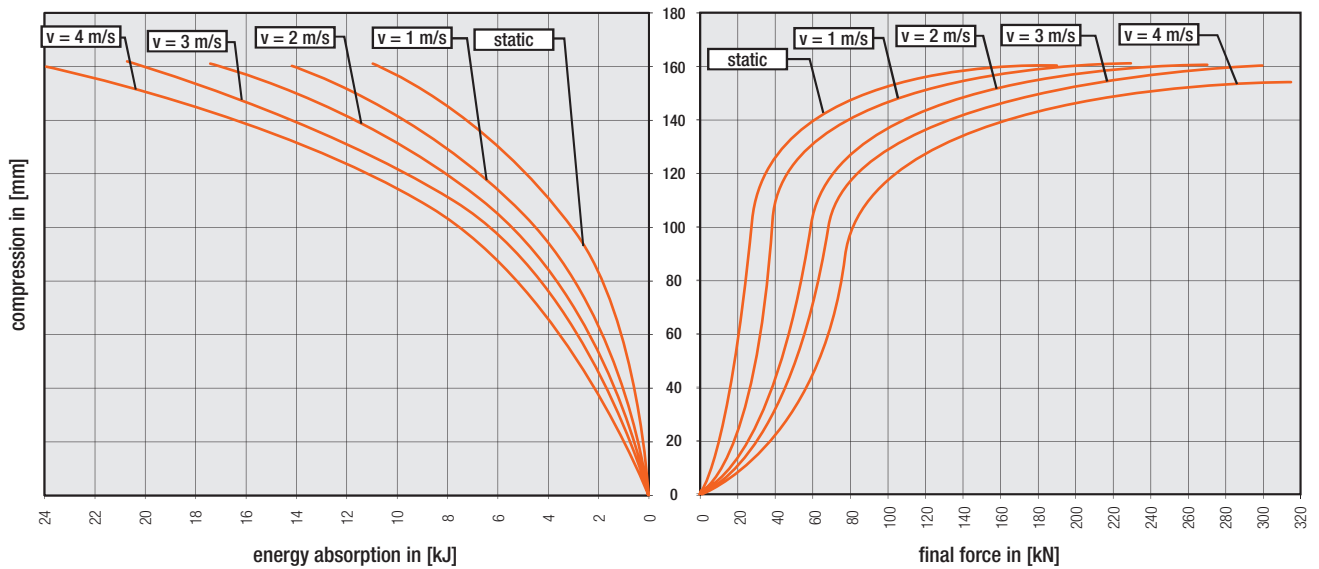


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160 x 240 Energy Absorption / Final Force

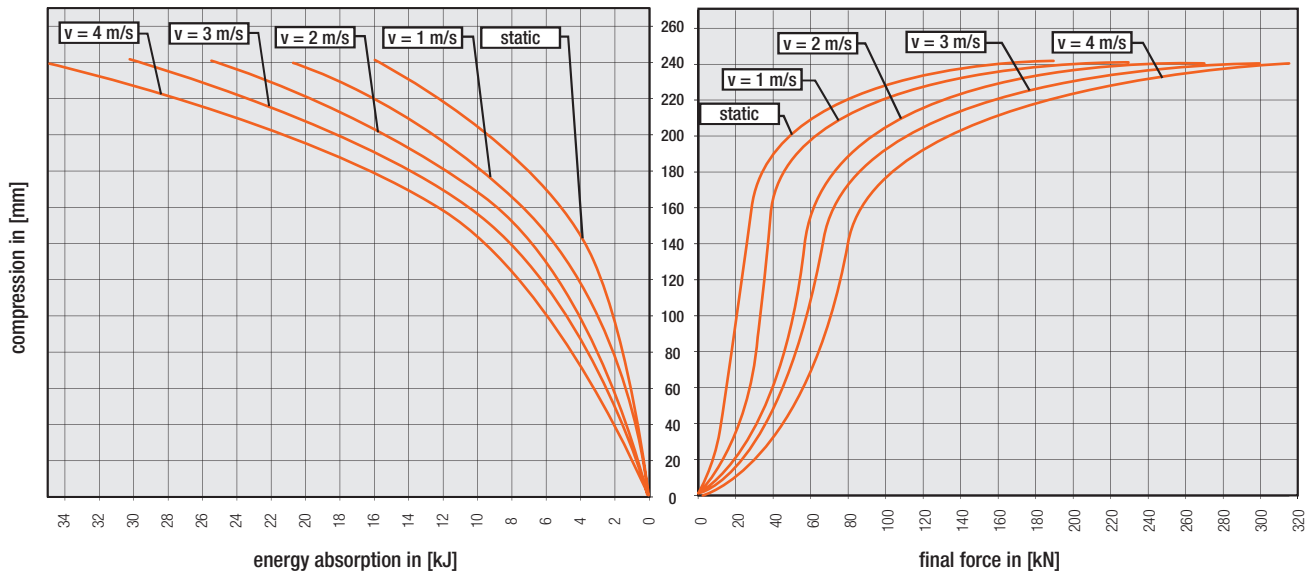


200 x 200 Energy Absorption / Final Force

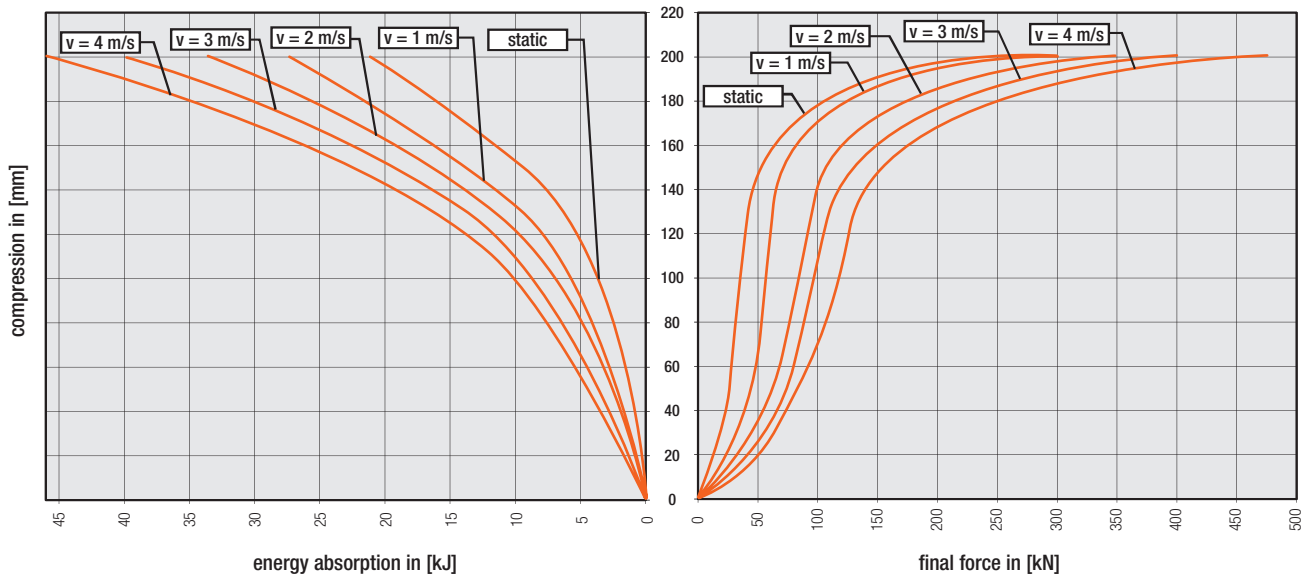


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200 x 300 Energy Absorption / Final Force

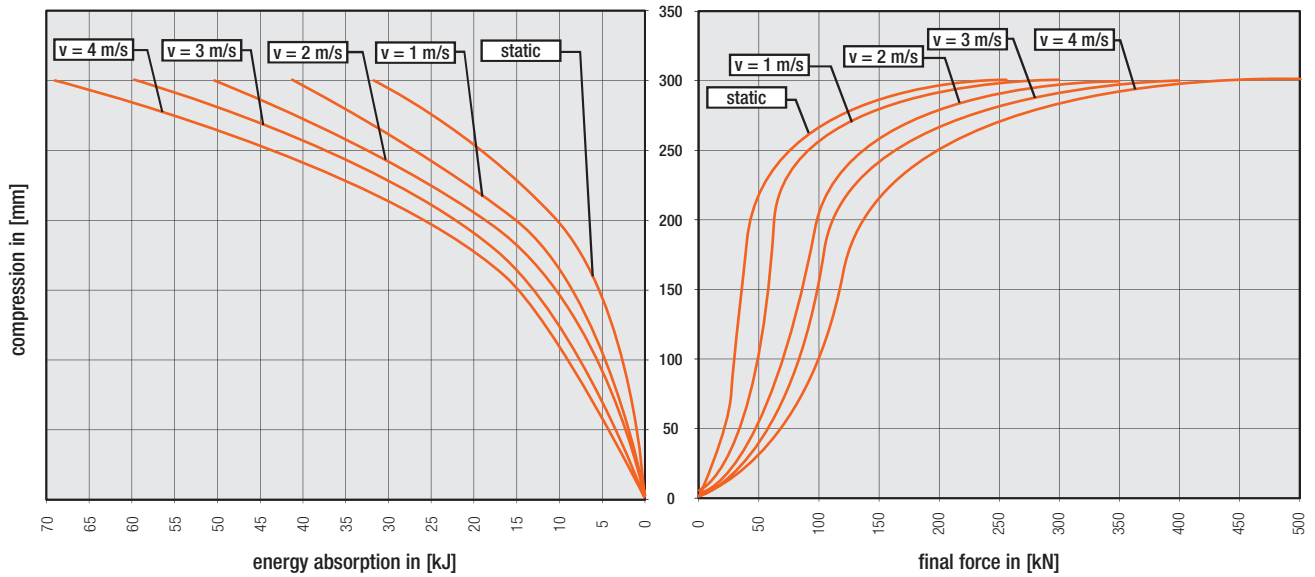


250 x 250 Energy Absorption / Final Force

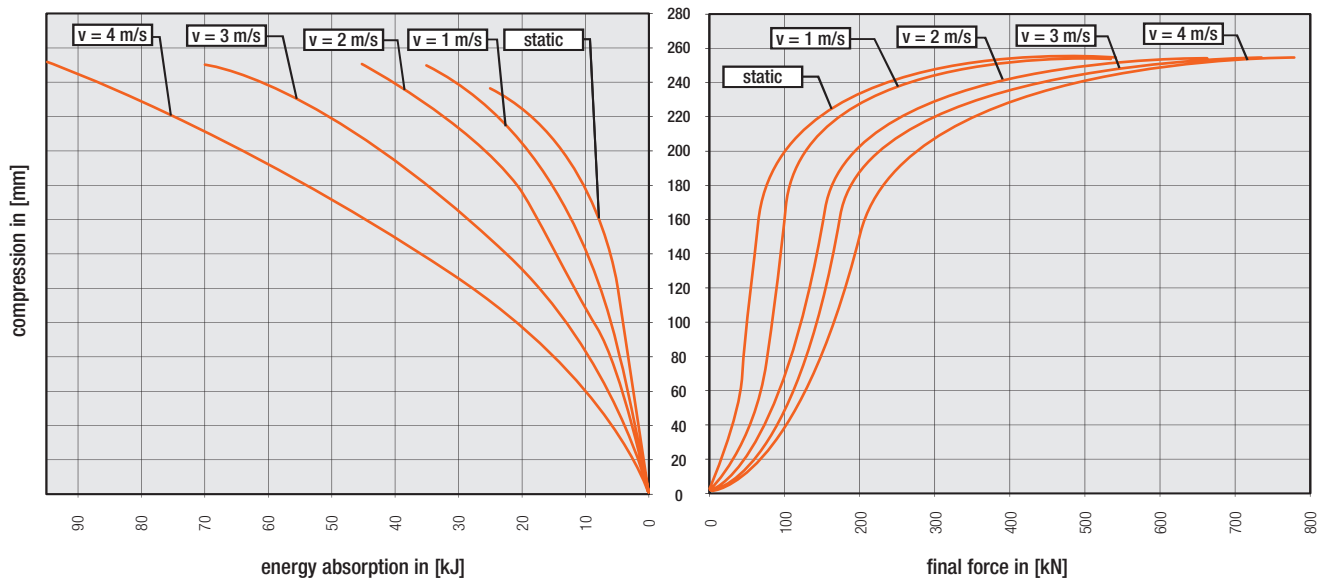


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250 x 375 Energy Absorption / Final Force

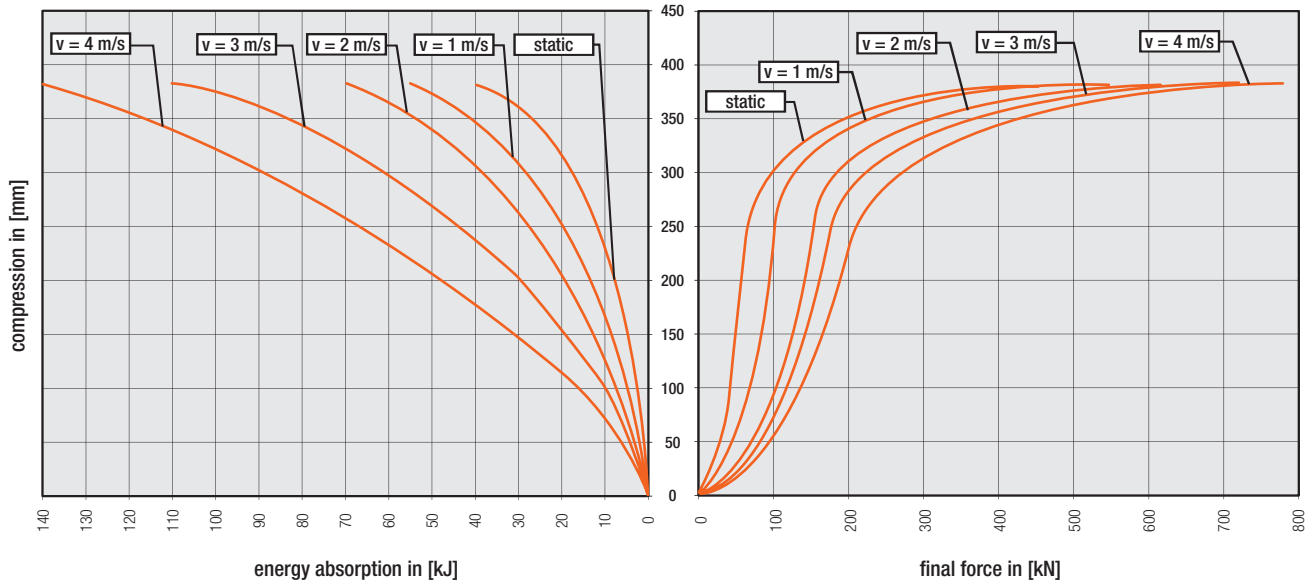


315 x 315 Energy Absorption / Final Force

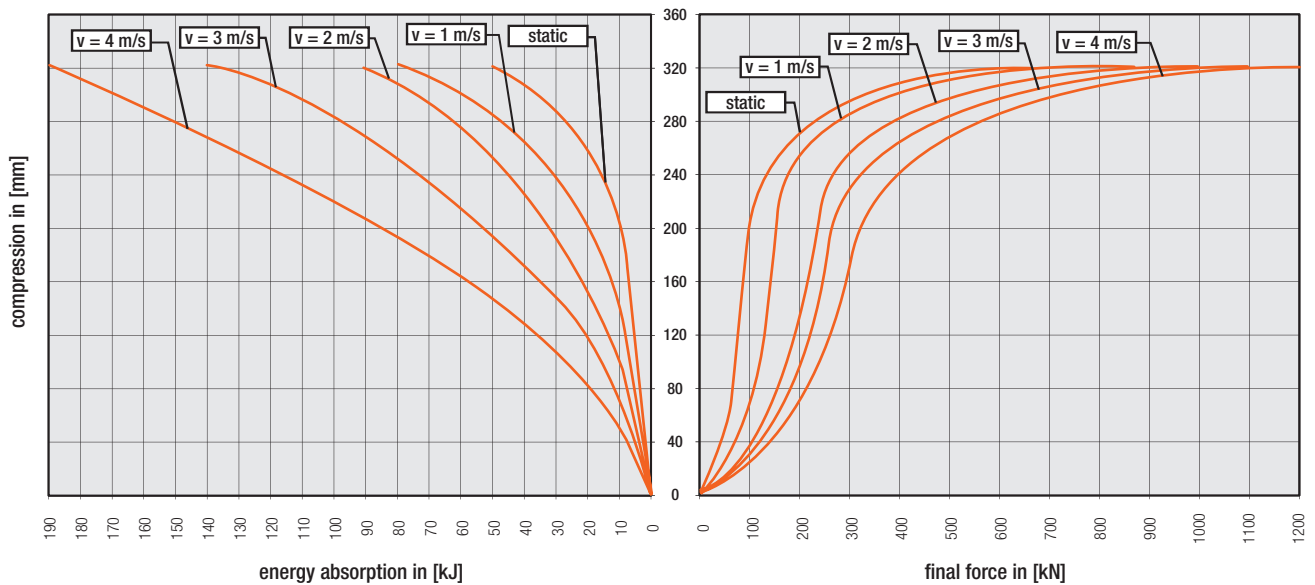


Cellular Buffers Program 0180

315 x 475 Energy Absorption / Final Force

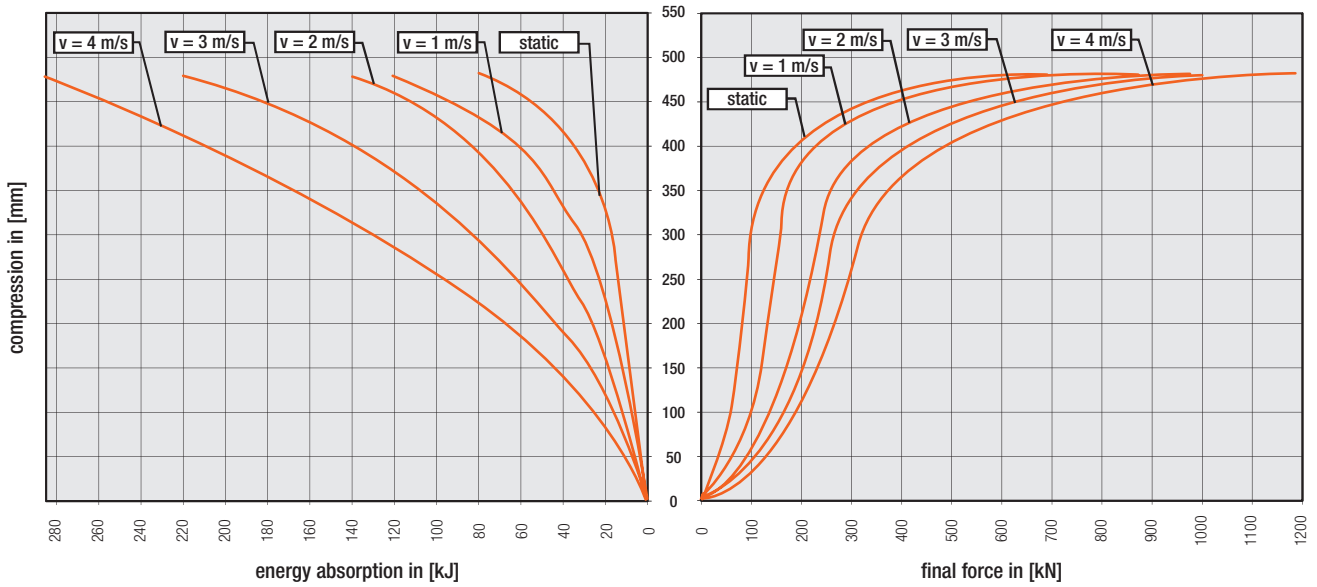


400 x 400 Energy Absorption / Final Force

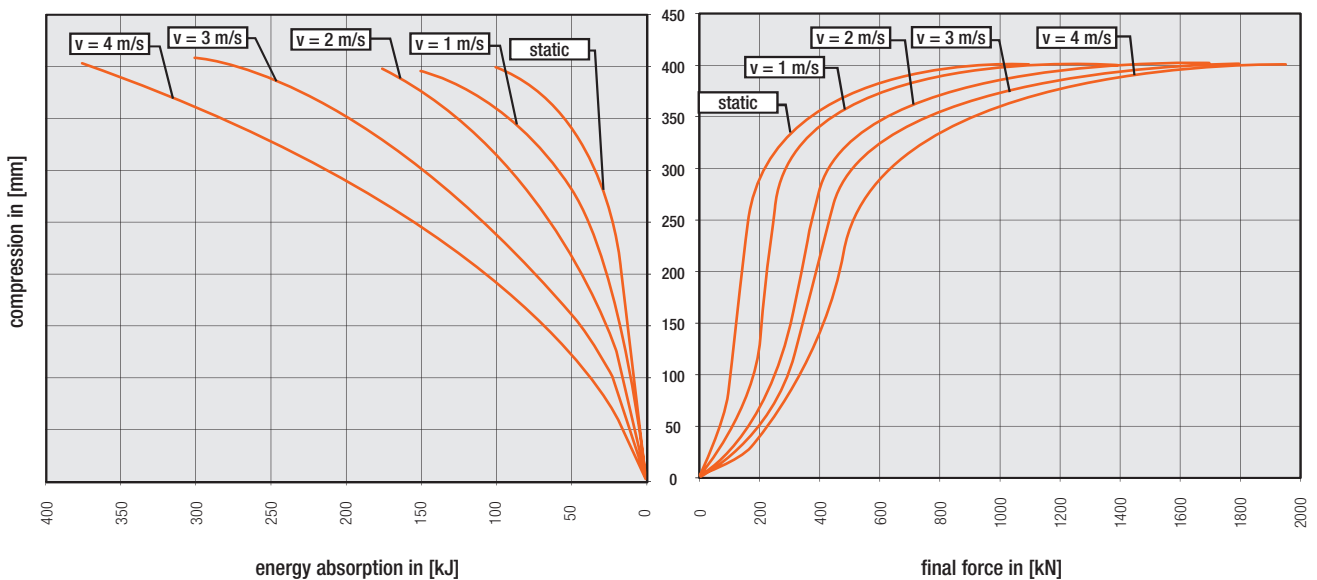


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400 x 600 Energy Absorption / Final Force



500 x 500 Energy Absorption / Final Force



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