







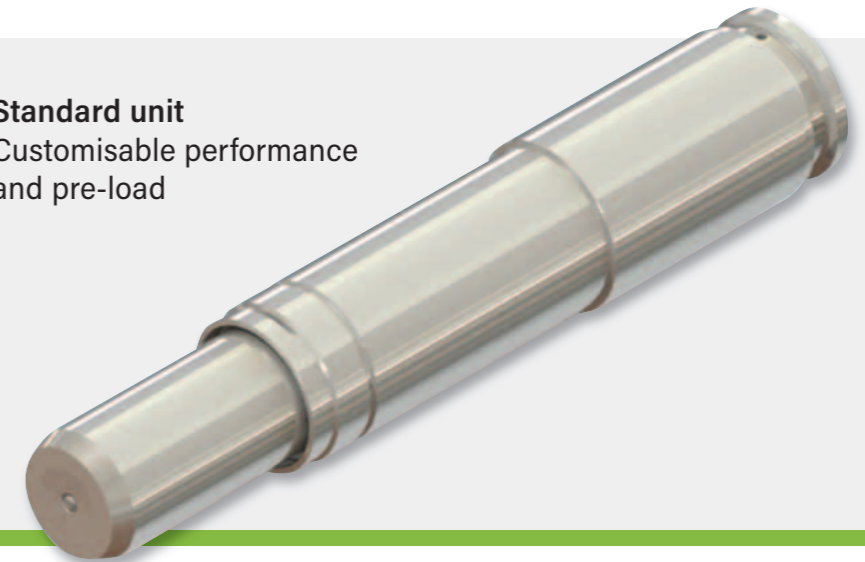
Gas Hydraulic (recoverable) stroke (mm)	Oleo Gas Hydraulic Coupler Capsule Range	Maximum Force Rating
		1500kN
50		C152
100		C154
125		C155
150		C156
175		C157
200		C158

Gas Hydraulic Fully Customisable			Operating Temperature	Clamp Options		
Stroke	Pre Load	Force		Diameters	Additional Length	Profiles
50mm			+40°C -40°C	Ø140mm Ø155mm Ø170mm	50mm 100mm	Customer Specific
100mm						
125mm	40kN Min	Up to 1500kN				
150mm	450kN Max					
175mm						
200mm						



## Gas Hydraulic Coupler Capsule 1500kN Range

**Standard unit**  
Customisable performance and pre-load



The Oleo gas hydraulic unit possesses unique features that enable its characteristics to change according to operational needs. The majority of the impact energy is absorbed within the unit and the already low recoil force is damped by the reverse flow of oil.

The rail market requires lower costs with shorter lead times for delivering projects. Oleo has produced a range of standard gas hydraulic capsules delivering lower cost and shorter lead time solutions.

The main structure of the capsule is made standard, whilst maintaining Oleo's unique ability to optimise the performance of the capsule at no extra cost, using Oleo 1D Rail simulation software.

### Product detail






- New standard range of Oleo Gas Hydraulic capsules.
- Fully customisable force/stroke characteristics at no extra cost.
- Standard fixed length and design per stroke.
- Available strokes 50, 100, 125, 150, 175 and 200mm.
- No movement below specified pre-load.
- All units are tested by Oleo with validated mathematical models in accordance with EN15227. Available for Radioss and LS-Dyna finite element software.
- The system used by Oleo for the mathematical modelling of crash scenarios is approved by a European Rail Authority as being accurate, appropriate and properly controlled.
- Reduced manufacturing lead-time.
- Standard clamp profiles available.

### Product advantages

Oleo's Gas Hydraulic Devices enable:

- Lower Life Cycle Costs
- Faster Coupling Speeds
- Reduced Potential Impact Damage
- Increased Passenger Protection
- Performance optimisation at no cost with pre loads ranging from 40kN to 450kN.
- Higher recoverable energy absorption than any alternative solution
- Maintenance free between major train overhaul periods.

### Applications

- Metro** 
- Light Rail** 
- Locomotive & Freight** 
- High Speed** 
- Mainline** 



## Example Train Configurations

Metro	Description	Unit Code	1D Rail Reference	Recoverable Coupling Speed Km/h				Coupler Deformation Speed Km/h				Maximum Collision Speed Km/h				
				AW0	AW1	AW2	AW3	AW0	AW1	AW2	AW3	AW0	AW1	AW2	AW3	
Number of vehicles	6	Oleo Gas Hydraulic - Front	C152	466_94_50a												
Empty Vehicle Weight (AW0)	16T	Oleo Gas Hydraulic - Intermediate	C152	466_94_50b	16.00	15.75	15.25	15.00	22.50	21.50	20.50	20.25	29.25	28.25	27.00	25.00
Passenger Weight (AW3)	8T	Oleo Anti Climber - Front	AF75-20	200-1500												
Vehicle Strength	1400kN	Oleo Anti Climber - Intermediate	-	-												
Number of vehicles	6	Oleo Gas Hydraulic - Front	C154	466_84_100a												
Empty Vehicle Weight (AW0)	24T	Oleo Gas Hydraulic - Intermediate	C154	466_84_100b	18.25	17.75	17.00	16.75	23.50	22.25	21.50	21.00	29.25	27.75	26.50	25.00
Passenger Weight (AW3)	12T	Oleo Anti Climber - Front	AF75-30	300-1500												
Vehicle Strength	1200kN	Oleo Anti Climber - Intermediate	-	-												
Number of vehicles	6	Oleo Gas Hydraulic - Front	C155	466_84_125a												
Empty Vehicle Weight (AW0)	28T	Oleo Gas Hydraulic - Intermediate	C155	466_84_125b	17.00	16.75	16.50	16.25	22.50	21.50	20.50	20.25	28.25	27.00	26.00	25.00
Passenger Weight (AW3)	14T	Oleo Anti Climber - Front	AF75-30	300-1500												
Vehicle Strength	1200kN	Oleo Anti Climber - Intermediate	-	-												
Number of vehicles	6	Oleo Gas Hydraulic - Front	C156	466_67_150e												
Empty Vehicle Weight (AW0)	32T	Oleo Gas Hydraulic - Intermediate	C156	466_67_150f	18.00	17.50	17.25	17.00	22.75	21.50	20.50	20.25	28.00	26.75	25.75	25.00
Passenger Weight (AW3)	16T	Oleo Anti Climber - Front	AB75-30	300-1500												
Vehicle Strength	1200kN	Oleo Anti Climber - Intermediate	-	-												
Number of vehicles	6	Oleo Gas Hydraulic - Front	C157	466_84_175a												
Empty Vehicle Weight (AW0)	32T	Oleo Gas Hydraulic - Intermediate	C157	466_84_175b	19.00	18.75	18.25	18.00	24.00	23.00	22.00	21.50	29.25	28.00	27.00	25.00
Passenger Weight (AW3)	16T	Oleo Anti Climber - Front	AB75-30	300-1500												
Vehicle Strength	1400kN	Oleo Anti Climber - Intermediate	-	-												
Number of vehicles	6	Oleo Gas Hydraulic - Front	C158	466_84_200a												
Empty Vehicle Weight (AW0)	32T	Oleo Gas Hydraulic - Intermediate	C158	466_84_200b	20.25	19.75	19.25	18.75	25.50	24.25	23.25	22.75	30.50	29.25	28.00	25.00
Passenger Weight (AW3)	16T	Oleo Anti Climber - Front	AF75-30	300-150												
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	-	-												

Main Line & High Speed	Description	Unit Code	1D Rail Reference	Recoverable Coupling Speed Km/h				Coupler Deformation Speed Km/h				Maximum Collision Speed Km/h				
				AW0	AW1	AW2	AW3	AW0	AW1	AW2	AW3	AW0	AW1	AW2	AW3	
Number of vehicles	6	Oleo Gas Hydraulic - Front	C215	466_67_50a												
Empty Vehicle Weight (AW0)	36T	Oleo Gas Hydraulic - Intermediate	C215	466_67_50b	10.75	10.50	9.75	9.5	15.75	15.00	14.25	14.00	42.00	40.25	38.50	36.00
Passenger Weight (AW3)	18T	Oleo Anti Climber - Front	AB100-70	700-2000												
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	AF80-40	400-1600												
Number of vehicles	10	Oleo Gas Hydraulic - Front	C415	466_67_100g												
Empty Vehicle Weight (AW0)	28T	Oleo Gas Hydraulic - Intermediate	C415	466_67_100h	14.00	13.50	13.00	12.25	22.75	21.50	20.50	20.25	42.00	40.25	38.75	36.00
Passenger Weight (AW3)	14T	Oleo Anti Climber - Front	AF100-90	900-2000												
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	AF80-10	100-1600												
Number of vehicles	15	Oleo Gas Hydraulic - Front	C515	466_67_125a												
Empty Vehicle Weight (AW0)	24T	Oleo Gas Hydraulic - Intermediate	C515	466_67_125b	19.75	18.75	17.75	17.50	31.75	22.50	21.50	21.00	43.25	41.25	39.75	36.00
Passenger Weight (AW3)	12T	Oleo Anti Climber - Front	AB100-50	500-2000												
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	AB80-50	500-1600												
Number of vehicles	6	Oleo Gas Hydraulic - Front	C615	466_67_150c												
Empty Vehicle Weight (AW0)	59T	Oleo Gas Hydraulic - Intermediate	C615	466_67_150d	13.25	12.75	11.75	11.50	23.50	22.75	22.00	21.75	39.25	37.75	36.25	36.00
Passenger Weight (AW3)	30T	Oleo Anti Climber - Front	AF100-90	900-2000												
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	AF80-10	100-1600												
Number of vehicles	11	Oleo Gas Hydraulic - Front	C715	466_67_175a												
Empty Vehicle Weight (AW0)	30T	Oleo Gas Hydraulic - Intermediate	C715	466_67_175b	19.25	18.75	18.50	18.25	24.25	23.25	22.25	21.75	41.25	39.50	38.00	36.00
Passenger Weight (AW3)	15T	Oleo Anti Climber - Front	AB100-40	400-2000												
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	AB80-30	300-1600												
Number of vehicles	8	Oleo Gas Hydraulic - Front	C815	466_67_200a												
Empty Vehicle Weight (AW0)	50T	Oleo Gas Hydraulic - Intermediate	C815	466_67_200b	16.50	15.75	15.25	14.75	20.50	19.50	18.75	18.25	42.00	40.00	38.50	36.00
Passenger Weight (AW3)	25T	Oleo Anti Climber - Front	AB100-90	900-2000												
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	AB80-10	100-1600												

**Notes**  
 EN15227 collision speeds for design scenario #1 (identical train units impacting) for:  
 C-I (Locomotives, coaches and fixed train units) is 36km/h.  
 C-II (Metro) and C-III (Tram vehicles, peri-urban tram) is 25km/h.  
 C-IV (Tramway vehicles) is 15km/h.

Car weight designations:  
 AW0 - empty car weight  
 AW1 - weight with seated passenger load  
 AW2 - weight with average peak-hour passenger load  
 AW3 - crush loading weight

Recoverable Coupling Speed - maximum speed in which two identical trains are coupled together with no damage to the coupler (i.e. Gas Hydraulic stroke only).

Coupler Deformation Speed - maximum speed in which two identical trains are coupled together with only controlled damage to coupler (i.e. Gas Hydraulic + Deformation tube stroke).

Maximum Collision Speed - maximum speed in which two identical trains are impacted with controlled damage to only coupler and anti-climber. No damage to car body structure.

**Assumptions made in example simulations:**  
 Effective vehicle mass (AW0) = 100%  
 Effective passenger mass = 50%

