

Gas Hydraulic (recoverable) stroke (mm)	Deformation (non recoverable) stroke (mm)	Sentry™ 800kN and 1500kN Range	Maximum Force Rating	
			800kN	1200kN
70	0		L300D	M300D
70	160		L316D	M316D
70	230		L323D	M323D
100	0		L400D	M400D
100	160		L416D	M416D
100	230		L423D	M423D
125	0		L500D	M500D
125	160		L516D	M516D
125	230		L523D	M523D

Buff			Draft			Crash		Operating Temperature	Clamp Options	
Gas Hydraulic Fully Customisable			Gas Hydraulic			Deformation Tube			Diameter	Profiles
Stroke	Pre Load	Force	Stroke	Pre Load	Max Force	Stroke	Force			Customer Specific
70mm	40kN Min	800kN Max	25mm	130kN	800kN Max	160mm	400kN Min 900kN Max	+40°C -40°C	Ø140mm	
100mm	450kN Max					230mm			Ø155mm	
125mm									Ø170mm	

Classified under UN ADR, IMDG & IATA regulations as: UN3164 Articles, pressurised, Pneumatic or Hydraulic 2.2.

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## Sentry™ Coupler Energy Absorber

For light rail and metro applications  
Buff, draft and crash



The rail industry is focused on improving passenger protection by introducing demanding crash worthiness standards such as EN15227 and ASME-RT-1.

Operators need to manage tight project budgets and reduce life cycle costs.

Oleo has developed the Sentry™ range of standard products that enable lower project costs per train coupling system by reducing the variety and complexity.

The Sentry™ range also offers higher coupling speeds, significant weight savings and reduced life cycle costs.

### Product details

- 3 functions in 1 standard modular unit – Buff, Draft and Crash.
- Gas hydraulic buffer
- Deformation tube
- Draft technology
- Fully customisable force/stroke characteristics at no extra cost.
- Integral anti-rotation system.
- All units tested by Oleo with validated mathematical models in accordance with EN15227. Plug in elements 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.

### Product advantages

Oleo's Sentry Device enables:

- Lower price per Train Set
- Lower Life Cycle Costs
- Weight saving
- 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

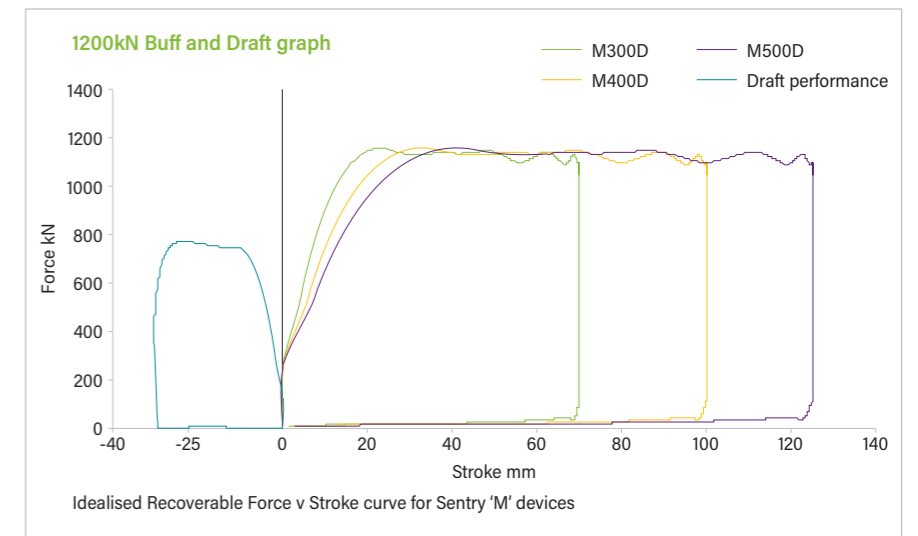
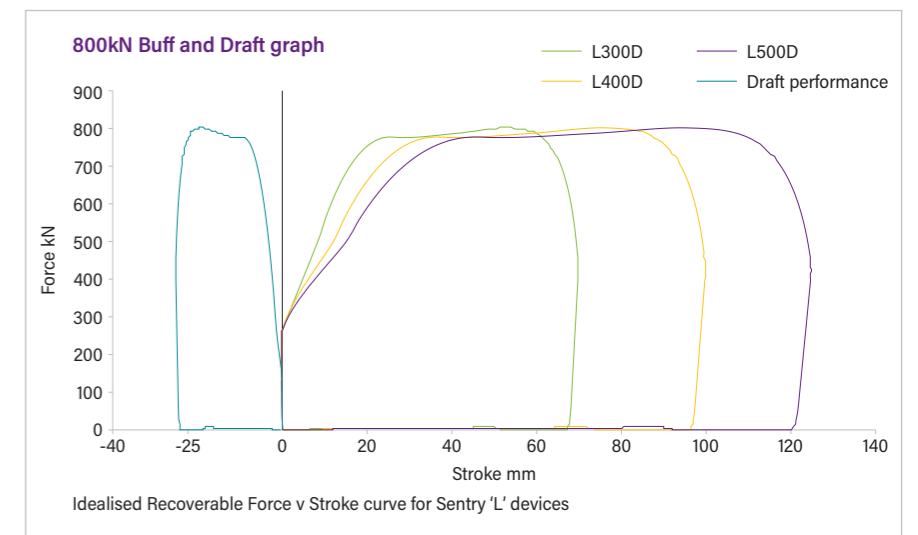
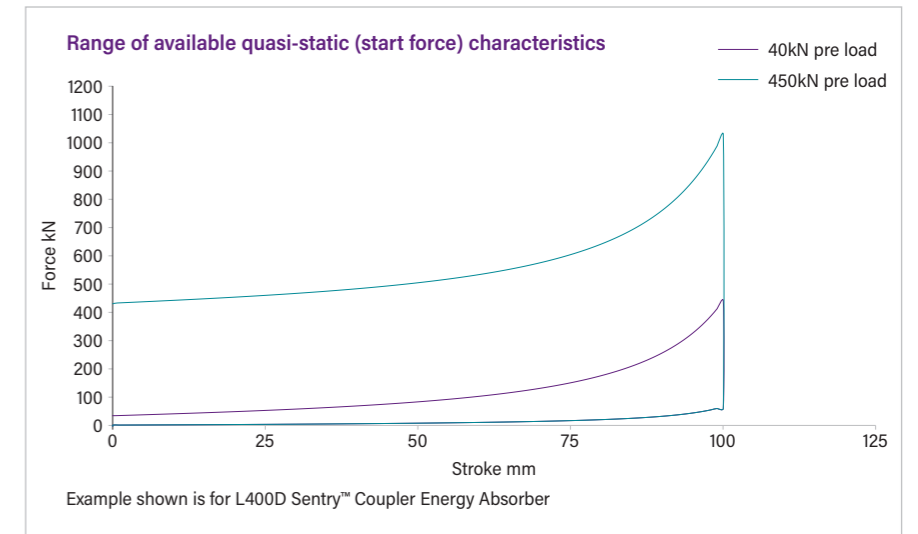
Mainline



## Example Train Configurations

Sentry 800kN		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	1	Sentry Coupler - Front	L416D	340_150_70e															
Empty Vehicle Weight (AW0)	33T	Sentry Coupler - Intermediate	0	0	8.50	8.50	8.50	8.25	17.75	17.00	16.25	16.00	-	-	-	-			
Passenger Weight (AW3)	16T	Oleo Anti Climber - Front	0	0															
Vehicle Strength	400kN	Oleo Anti Climber - Intermediate	0	0															
Number of vehicles	4	Sentry Coupler - Front	L316D	466_84_70a															
Empty Vehicle Weight (AW0)	36T	Sentry Coupler - Intermediate	L323D	466_84_70b	8.00	7.75	7.50	7.50	14.75	14.00	13.25	12.75	28.25	27.00	25.75	25.00			
Passenger Weight (AW3)	18T	Oleo Anti Climber - Front	AB40-90	900-800															
Vehicle Strength	800kN	Oleo Anti Climber - Intermediate	AL25-10	100-500															
Number of vehicles	5	Sentry Coupler - Front	L523D	466_100_125a															
Empty Vehicle Weight (AW0)	24T	Sentry Coupler - Intermediate	L416D	466_100_100a	10.25	10.25	10.00	10.00	18.25	17.00	17.00	16.75	28.74	27.50	26.25	25.00			
Passenger Weight (AW3)	12T	Oleo Anti Climber - Front	AF40-60	700-800															
Vehicle Strength	800kN	Oleo Anti Climber - Intermediate	-	-															
Number of vehicles	6	Sentry Coupler - Front	L300D	340_150_70a															
Empty Vehicle Weight (AW0)	47T	Sentry Coupler - Intermediate	L300D	340_150_70a	7.50	7.25	7.00	7.00	-	-	-	-	28.50	27.25	26.25	25.00			
Passenger Weight (AW3)	24T	Oleo Anti Climber - Front	AB50-70	700-1000															
Vehicle Strength	800kN	Oleo Anti Climber - Intermediate	AF45-50	500-900															
Number of vehicles	6	Sentry Coupler - Front	L416D	466_67_100b															
Empty Vehicle Weight (AW0)	24T	Sentry Coupler - Intermediate	L423D	466_67_100a	11.00	10.75	10.50	10.50	18.50	17.50	16.25	16.25	27.50	26.25	25.25	25.00			
Passenger Weight (AW3)	12T	Oleo Anti Climber - Front	AB40-60	600-800															
Vehicle Strength	800kN	Oleo Anti Climber - Intermediate	AL30-10	100-600															
Number of vehicles	8	Sentry Coupler - Front	L516D	466_83_125b															
Empty Vehicle Weight (AW0)	24T	Sentry Coupler - Intermediate	L523D	466_83_125a	12.75	12.50	12.50	12.00	19.25	18.25	17.50	16.75	28.00	27.00	26.00	25.00			
Passenger Weight (AW3)	12T	Oleo Anti Climber - Front	AF40-70	700-800															
Vehicle Strength	800kN	Oleo Anti Climber - Intermediate	AL30-30	300-600															

Sentry 1200kN		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	4	Sentry Coupler - Front	M323D	466_84_70a																
Empty Vehicle Weight (AW0)	40T	Sentry Coupler - Intermediate	M316D	466_84_70b	9.75	9.50	9.25	9.25	18.25	17.50	16.25	16.00	27.75	26.50	25.50	25.00				
Passenger Weight (AW3)	20T	Oleo Anti Climber - Front	AF60-70	700-1200																
Vehicle Strength	1200kN	Oleo Anti Climber - Intermediate	-	-																
Number of vehicles	10	Sentry Coupler - Front	C154	466_67_100g																
Empty Vehicle Weight (AW0)	28T	Sentry Coupler - Intermediate	C154	466_67_100h	12.00	11.75	11.50	11.00	18.75	17.75	17.00	16.75	28.00	26.75	25.75	25.00				
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	Sentry Coupler - Front	C155	466_67_125a																
Empty Vehicle Weight (AW0)	24T	Sentry Coupler - Intermediate	C155	466_67_125b	16.00	15.75	15.25	15.00	-	-	-	-	28.75	27.50	26.25	25.00				
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	Sentry Coupler - Front	C156	466_67_150c																
Empty Vehicle Weight (AW0)	59T	Sentry Coupler - Intermediate	C156	466_67_150d	15.75	15.50	15.25	15.00	-	-	-	-	27.50	26.25	25.00	25.00				
Passenger Weight (AW3)	30T	Oleo Anti Climber - Front	AF100-90	700-1000																
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	AF80-10	500-900																
Number of vehicles	11	Sentry Coupler - Front	C157	466_67_175a																
Empty Vehicle Weight (AW0)	59T	Sentry Coupler - Intermediate	C157	466_67_175b	14.00	13.75	13.50	13.50	20.50	19.75	18.75	18.75	27.50	26.50	25.50	25.00				
Passenger Weight (AW3)	30T	Oleo Anti Climber - Front	AB100-40	400-2000																
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	AB80-30	300-1600																
Number of vehicles	8	Sentry Coupler - Front	C158	466_67_200a																
Empty Vehicle Weight (AW0)	50T	Sentry Coupler - Intermediate	C158	466_67_200b	11.00	10.75	10.25	9.25	17.75	16.50	16.00	16.00	28.00	27.00	25.75	25.00				
Passenger Weight (AW3)	25T	Oleo Anti Climber - Front	AB100-90	700-800																
Vehicle Strength	1500kN	Oleo Anti Climber - Intermediate	AB80-10	300-600																



**Notes and assumptions**  
 EN15227 collision speeds for design scenario #1 (identical train units impacting) for:  
 C-II (Metro) and CIII (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 loaded 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 stroke of Sentry device).

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 100% (AW0)  
 Effective Passenger Mass 50%

