Gas Hydraulic Coupler Capsule

2500kN Range

Rail

Majority of impact energy absorbed

Almost no recoil energy

Standard range

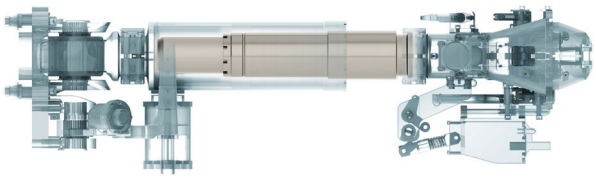
Shorter project lead times

Standard unit
Customisable performance
& pre-load

Gas Hydraulic - 2500kN

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 Train™ simulation software.



Product Details

- 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:

- Maximum recoverable force rating of 2,500kN.
- Lower Life Cycle Costs.
- Faster Coupling Speeds.
- Reduced Potential Impact Damage.
- Increased Passenger Protection
- Performance optimisation at no cost with pre loads ranging from 50kN 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

Gas Hydraulic Coupler Capsule Example Train Configurations - 2500kN Range

Main Line & High Speed 2500kN Range		Description	Unit Code	Recoverable Coupling Speed Km/h				Coupler Deformation Speed Km/h				Maximum Collision Speed Km/h			
				AWO	AW1	AW2	AW3	AWO	AW1	AW2	AW3	AWO	AW1	AW2	AW3
Number of Vehicles	5	Oleo Gas Hydraulic – Front	C225	12.5	12.0	11.8	11.8	17.5	17.3	16.8	16.8	37.8	37.0	36.3	36.0
Empty Vehicle Weight (AW0)	55T	Oleo Gas Hydraulic – Intermediate	C225												
Passenger Weight (AW3)	10T	Oleo Anti Climber – Front	AB 70-300												
Vehicle Strength	3000kN	Oleo Anti Climber – Intermediate	AB 40-260												
Number of Vehicles	12	Oleo Gas Hydraulic – Front	C425	18.3	17.5	17.0	16.5	25.5	24.5	24.0	23.5	42.3	40.8	39.8	36.0
Empty Vehicle Weight (AW0)	40T	Oleo Gas Hydraulic – Intermediate	C425												
Passenger Weight (AW3)	15T	Oleo Anti Climber – Front	AF 50-300												
Vehicle Strength	3000kN	Oleo Anti Climber – Intermediate	AF 60-260												
Number of Vehicles	10	Oleo Gas Hydraulic – Front	C525	18.8	18.3	17.8	17.8	23.8	23.0	22.5	22.3	38.5	37.5	36.8	36.0
Empty Vehicle Weight (AW0)	44T	Oleo Gas Hydraulic – Intermediate	C525												
Passenger Weight (AW3)	12T	Oleo Anti Climber – Front	AB 100-300												
Vehicle Strength	3000kN	Oleo Anti Climber – Intermediate	AB 60-260												
Number of Vehicles	8	Oleo Gas Hydraulic – Front	C625	23.5	22.0	20.8	20.3	35.0	33.5	32.3	30.5	41.5	39.8	38.3	36.0
Empty Vehicle Weight (AW0)	30T	Oleo Gas Hydraulic – Intermediate	C625												
Passenger Weight (AW3)	14T	Oleo Anti Climber – Front	AF 40-300												
Vehicle Strength	3000kN	Oleo Anti Climber – Intermediate	AF 10-260												
Number of Vehicles	9	Oleo Gas Hydraulic – Front	C725	21.3	20.8	20.5	20.3	28.0	27.0	26.0	25.5	41.3	40.0	38.5	36.00
Empty Vehicle Weight (AW0)	42T	Oleo Gas Hydraulic – Intermediate	C725												
Passenger Weight (AW3)	18T	Oleo Anti Climber – Front	AB 60-300												
Vehicle Strength	3000kN	Oleo Anti Climber – Intermediate	AB 60-260												
Number of Vehicles	10	Oleo Gas Hydraulic – Front	C825	20.0	19.5	19.0	18.8	28.3	27.3	26.3	26.0	38.5	37.5	36.5	36.0
Empty Vehicle Weight (AW0)	50T	Oleo Gas Hydraulic – Intermediate	C825												
Passenger Weight (AW3)	20T	Oleo Anti Climber – Front	AB 70-300												
Vehicle Strength	3000kN	Oleo Anti Climber – Intermediate	AB 30-260												

Notes and assumptions

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 CIII (Tram vehicles, peri-urban tram) is 25km/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 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.

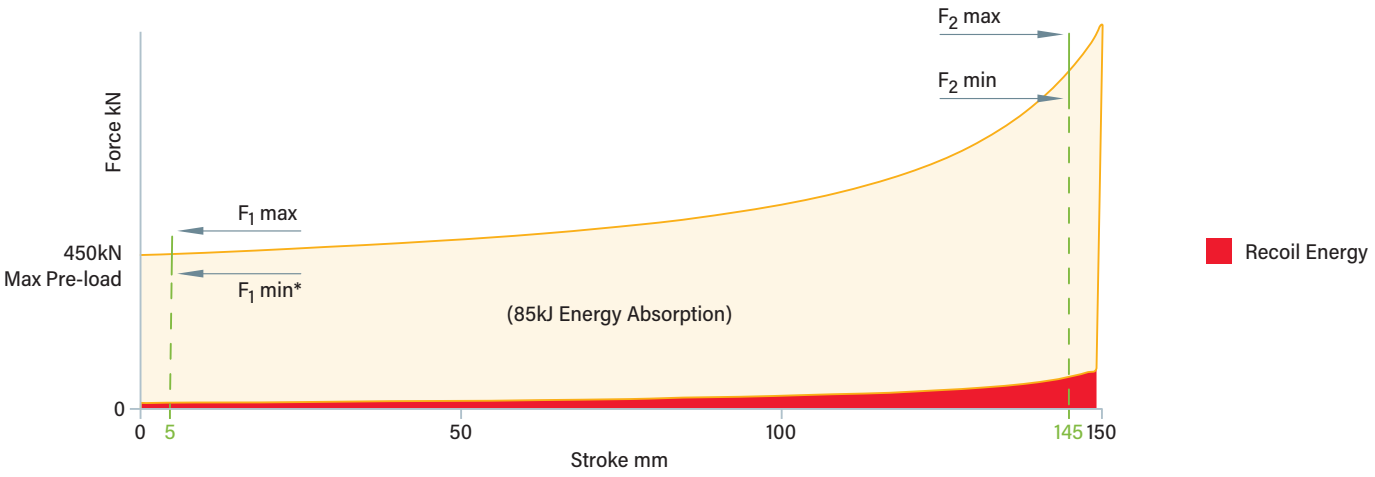
Assumptions made in example simulations:

Effective vehicle mass (AW0) = 100%

Effective passenger mass = 50%

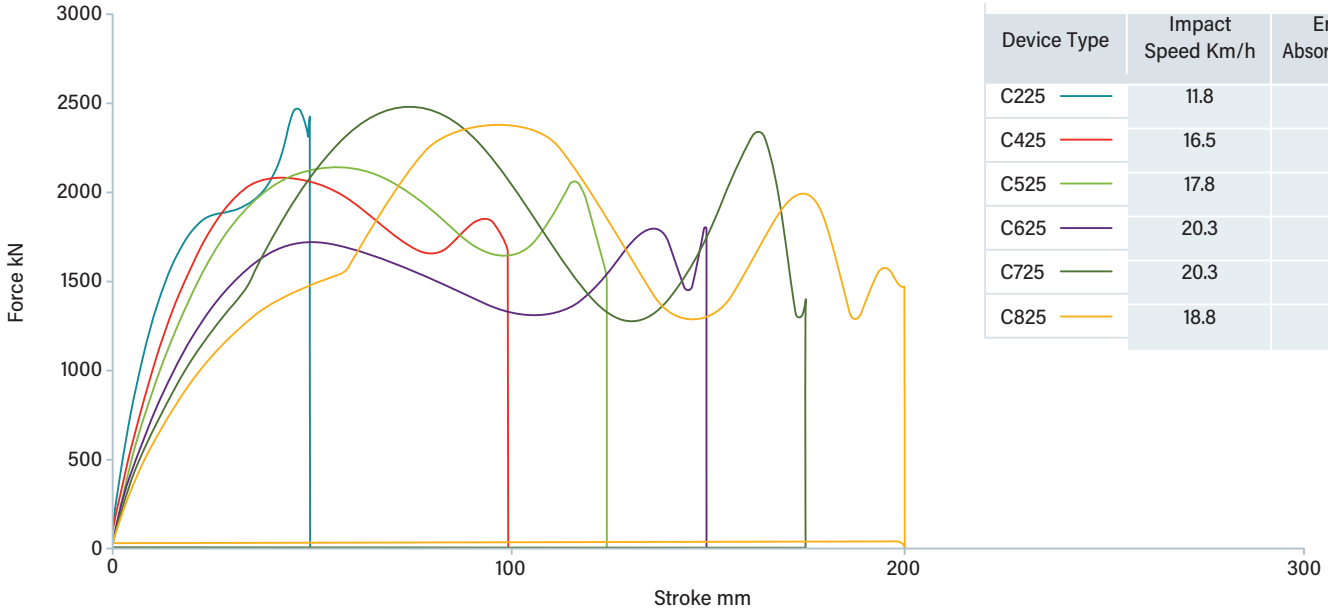
Gas Hydraulic Coupler Capsule Example Train Configurations - 2500kN Range

Range of available quasi-static characteristics at 4mm/sec



Example shown is for C625 Gas Hydraulic Capsule

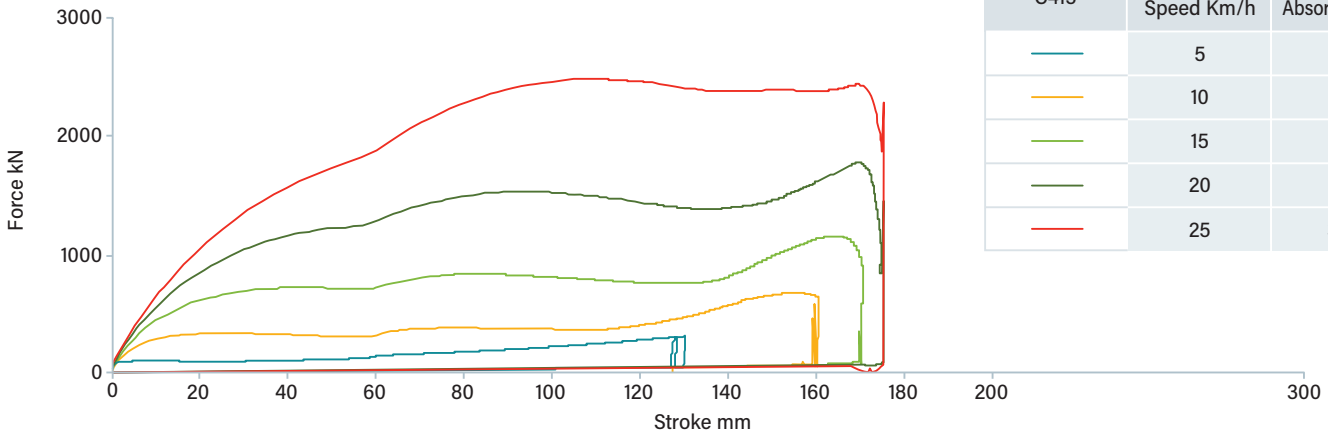
2500 kN Main Line and High Speed examples – Recoverable Coupling Speed (AW3)



Device Type	Impact Speed Km/h	Energy Absorption (kJ)
C225	11.8	84
C425	16.5	168
C525	17.8	215
C625	20.3	211
C725	20.3	298
C825	18.8	321

Example taken from Main Line & High Speed table for each unit code
Force v Stroke characteristics are shown for front coupler at the Recoverable Coupling Speed under AW3 mass

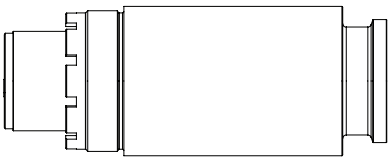
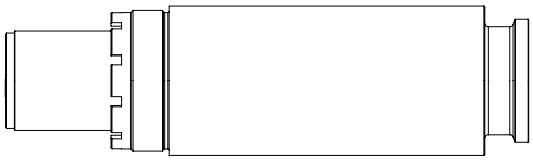
OLEO Gas Hydraulic performance at different impact speeds



C415	Impact Speed Km/h	Energy Absorption (kJ)
	5	17
	10	54
	15	122
	20	218
	25	336

Example shown is C825 Gas Hydraulic Capsule
Impact speeds are of 6 car rake impacting 6 car rake
Force v Stroke characteristics are shown for front coupler only at each speed

Gas Hydraulic Coupler Capsule Specification - 2500kN Range

Gas Hydraulic (recoverable) Stroke (mm)	Oleo Gas Hydraulic Coupler Capsule Range	Maximum Force Rating 2500kN	Energy Absorption (kJ)
50		C225	119
100		C425	237.5
125		C525	297
150		C625	356
175		C725	415.5
200		C825	475

Gas Hydraulic Fully Customiseable			Operating Temperature
Stroke	Pre Load	Force	
50mm 100mm 125mm 150mm 175mm 200mm	50kN Min 450kN Max	Up to 2500kN	+60°C -40°C

Unit Pre-Load	Allowable Static Movement (mm)					
	C215	C415	C515	C615	C715	C815
50kN	3.0	3.0	3.0	3.0	3.0	3.0
100kN	3.0	3.0	3.0	3.0	3.0	3.0
150kN	3.0	3.0	3.0	3.0	3.0	3.0
200kN	3.0	3.0	3.0	3.0	3.0	3.5
250kN	3.0	3.0	3.0	3.0	3.5	3.5
300kN	3.0	3.0	3.5	3.5	4.0	4.0
350kN	3.0	3.5	3.5	4.0	4.0	4.5
400kN	3.0	3.5	4.0	4.0	4.5	5.0
450kN	3.0	3.5	4.0	4.5	5.0	5.5

Oleo gas hydraulic coupler capsules provide a high start force and guarantees minimal static movement when the gas hydraulic device is installed into the coupler. The static start force will protect against high draft and snatch loading in normal train running conditions. This can remove the need for heavy draft springs, thereby reducing weight and cost of the complete coupler system.

OLEO INTERNATIONAL

LEADING THE WORLD IN ENERGY ABSORPTION

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2015