

LEADING THE WORLD IN ENERGY ABSORPTION



# ELEVATOR

## Safety Buffers





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# Keeping People Safe

Oleo leads the world in energy absorption in many critical applications, often as the last line of protection for people and equipment.

Every day millions of people around the world rely on Oleo to provide their safety.

It is our responsibility to ensure all international standards for the industries we supply are adhered to, but we strive for more than that - to enable our partners to provide the safest energy absorption solutions remains a core principle.

Our mission is clearly and simply to keep people safe.



**OLEO PROVIDES ELEVATOR PASSENGER SAFETY IN THE WORLDS MOST ICONIC BUILDINGS**



# The Elevator Industry

The elevator industry is constantly developing all over the world, from small passenger lifts to high mass freight elevators, low speed applications covering a few floors to ultra high speed systems moving swiftly to the penthouse.

Elevators form the core of the transport system for many modern structures and with building sizes and passenger volumes increasing, the need for elevators to handle more people, travelling over increasing distances and moving at higher speeds, whilst ensuring safety is maintained at the highest levels has never been greater.

Oleo elevator buffers are designed to protect people and equipment from forces generated by an impact resulting from equipment failure or operator error.

Irrespective of your requirements, Oleo has a complete range of globally certified buffers to suit elevators operating with wide mass ranges at almost any speed. By choosing Oleo, your elevator system can benefit from ultimate protection with buffers that offer lightweight construction, extreme durability and minimum life-cycle costs.





## Research and Development

Our purpose is to provide the highest levels of protection in order to keep people safe. We pride ourselves on being innovative in response to both industry standards and customer demands. Continuous investment in research and development, state of the art technology and modern manufacturing processes has made Oleo leading experts in energy absorption.

All buffers are tested and validated internally prior to obtaining accreditation from the relevant standards authorities. Our independent test facility is accredited to ISO 17025 and offers state of the art test rigs and diagnostic equipment to ensure the most accurate performance data is obtained during arduous test programmes.



## Simulation

Complex mathematical algorithms developed by our dedicated simulations team are used in combination with FEA modelling and CFD software enabling Oleo to develop products with optimised performance characteristics that ensure maximum passenger safety. Moreover, our ability to simulate buffer performance in conjunction with other elevator components allows us to work closely with elevator manufacturers to ensure the ultimate level of protection for equipment and passengers.



## Consultancy

Consultancy is a growing part of our business. We regularly undertake projects to produce bespoke energy absorption solutions for customers including design, analysis and testing services.

Our experience, simulation and test facilities enable Oleo to offer partnership opportunities for elevator manufacturers who wish to benefit from our profound knowledge and expertise.



**GLOBAL PRESENCE, LOCAL SUPPORT**



## Global Presence

The elevator industry is a global business, but a local presence is required to ensure the highest levels of customer satisfaction and reduce the total elevator cost.

Oleo has manufacturing sites and distribution centres in various strategic locations around the world to ensure products are available quickly and at competitive prices.



**WORLDWIDE COMPLIANCE**



## Global Certification

Documentation and certification form an important part of customers' requirements in the elevator industry. To make life simple Oleo products are available with all the necessary documents required to ensure a smooth transition from order to installation.

For applications in Europe, North America, China, Russia or Korea, Oleo can offer certified products to meet your needs.



**EASY, ONLINE ORDERING**



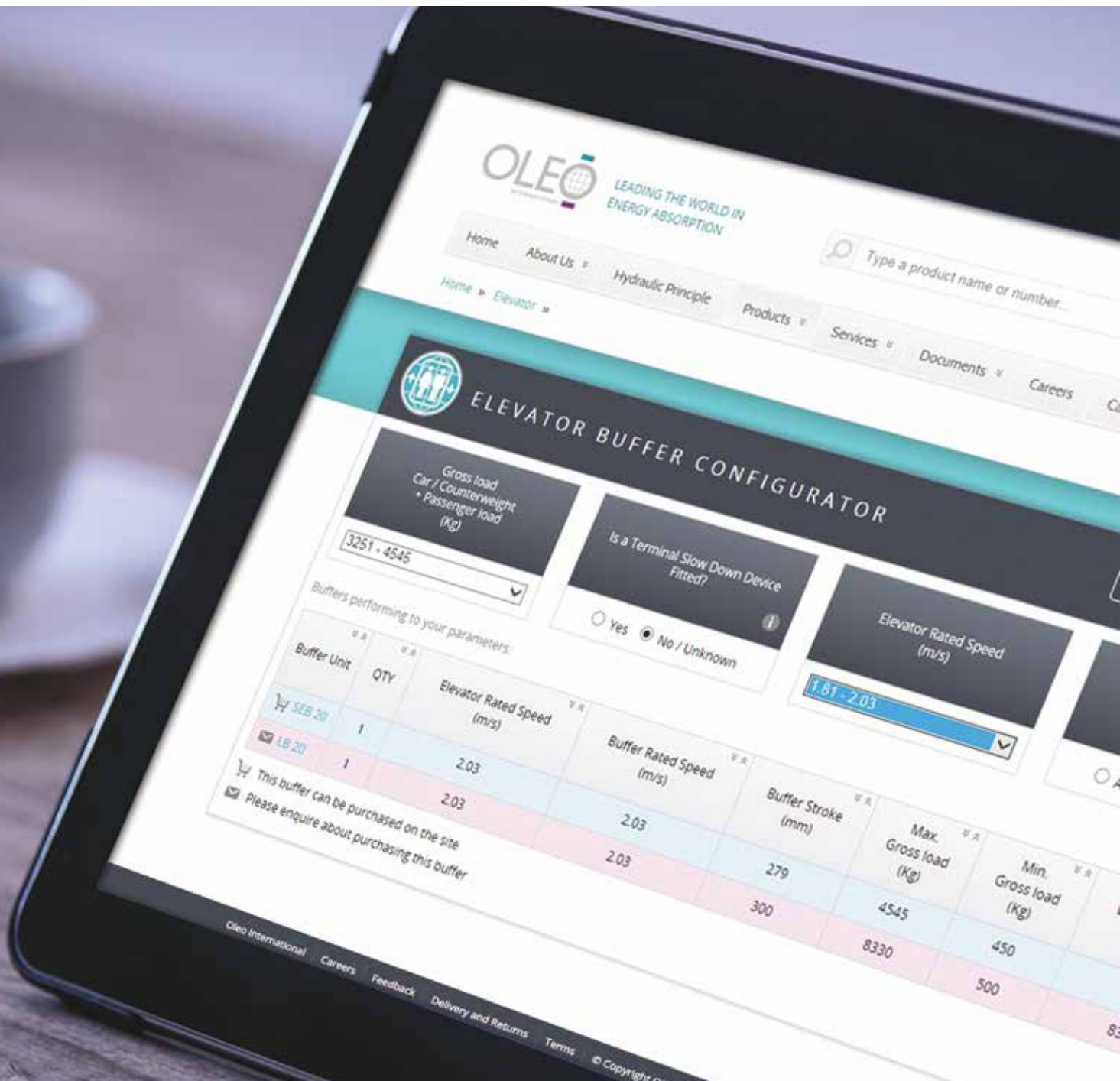
## E-commerce

Convenience at your fingertips – placing orders for elevator buffers has never been easier!

Our online configurator allows the selection of the ideal unit to suit your requirements and the ability to purchase buffers with a quick delivery.

“ Products selected using Oleo's Configurator can be purchased immediately using our E-Commerce platform on the Oleo website.

Giving you what you want, when you want it. ”



CONVENIENCE AT YOUR FINGERTIPS

KEEPING PEOPLE SAFE



## Elevator Safety

Elevator buffers are safety devices which are required to be mounted at the base of an elevator shaft underneath the elevator car or counterweight. As with any safety device, elevator buffers have to meet detailed specifications in order to satisfy international standards.

Since the very early days of elevators, a variety of safety systems have been employed to ensure that the elevator will not free fall. The purpose of elevator buffers is to provide protection against the malfunction of an elevator control system resulting in the lift continuing to travel past the lowest stop to the base of the elevator shaft.

The most important aspect of the global standards is the manner in which the buffers must bring an impacting elevator car to rest. There are differences between the various technical standards however all employ the same basic performance criteria.

Although freefall is not a realistic event for an elevator, the specification and code requirements are based on the assumption of freefall as this is worst case scenario.

Our hydraulic buffers are classified as 'energy dissipation buffers' and they dissipate the energy from an impact in the form of heat during the travel of the buffer. This type of buffer can be used for all rated speeds, but are generally used for speeds of 1.0m/s or over.

The buffers are specified for installation in accordance with the rated speed and mass of the elevator.

### **Buffer performance criteria - energy dissipation buffers**

Performance criteria in all the standards is governed by two underlying rules which state that the buffer must arrest a freefalling mass travelling at 115% of the rated speed of the elevator:

- With an average deceleration not exceeding 1g.
- Without exceeding a deceleration of 2.5g for a time period greater than 0.04 seconds.

A further requirement states that the buffer stroke must be at least as great as the free fall distance required to reach 115% of the rated elevator velocity. It is this requirement that dictates the stroke and subsequently the installation height of elevator buffers. Due to customer demands, Oleo elevator buffers do not deviate far from the minimum stroke requirement.





# Oleo Buffer Performance

The minimum stroke for an elevator buffer is specified (within EN81-20 and ASME A17.1), as the necessary distance to bring an impacting mass, travelling at 115% of the buffer's rated speed, to rest with a uniform deceleration of 1g. However, this is only true if the buffer exerts a constant retardation force over its entire stroke.

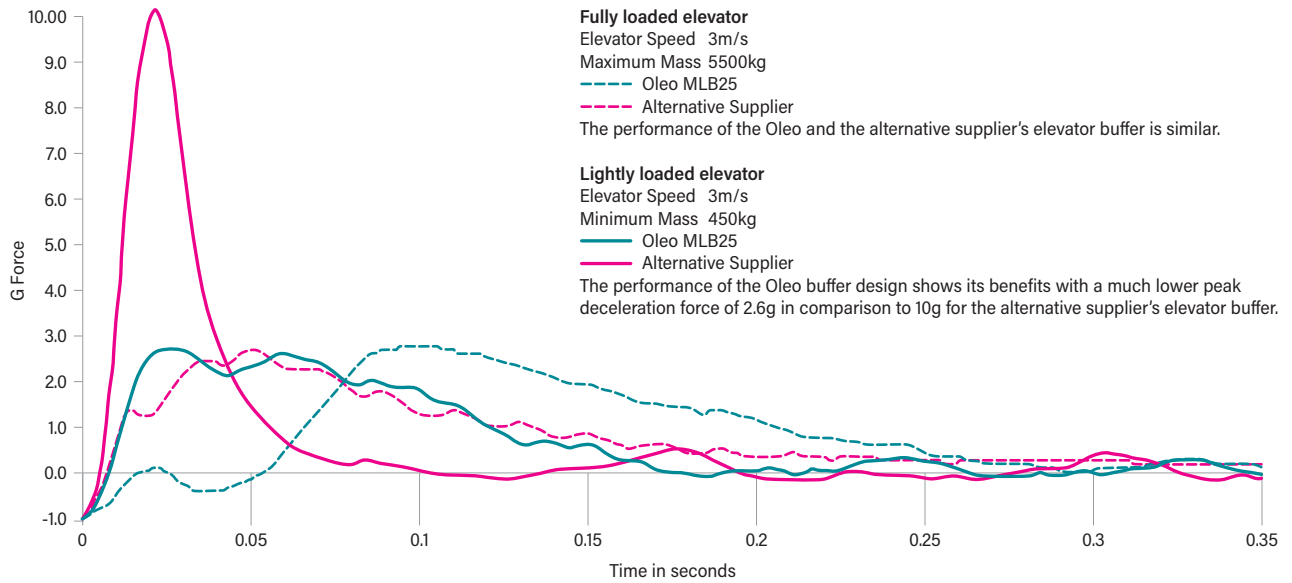
A hydraulic buffer can be designed to closely match this idealised performance. This is achieved by precise control of hydraulic oil flow across an orifice throughout the buffer stroke. However, this can only be achieved for one specific impact mass. The same

performance is not achievable for the range of elevator masses that are encountered in the real world where the elevator car mass varies with passenger load.

In the elevator application, where there is a need to protect passenger safety, it is important to try to minimise the deceleration experienced during stopping. This can be easily resolved when the elevator is fully loaded but at low loads the same retardation force will slow the elevator more quickly and therefore initially result in higher deceleration for the passenger.



THE BURJ KHALIFA TOWERS OVER DOWNTOWN DUBAI



The graph above compares test data from two hydraulic buffers that both meet the elevator code specification requirement being used to stop an elevator car travelling at 3m/s. This shows the g-force that will be experienced by passengers travelling in fully and lightly loaded conditions.

Oleo units incorporate special metering designs that allow the energy to be dissipated in a controlled fashion.

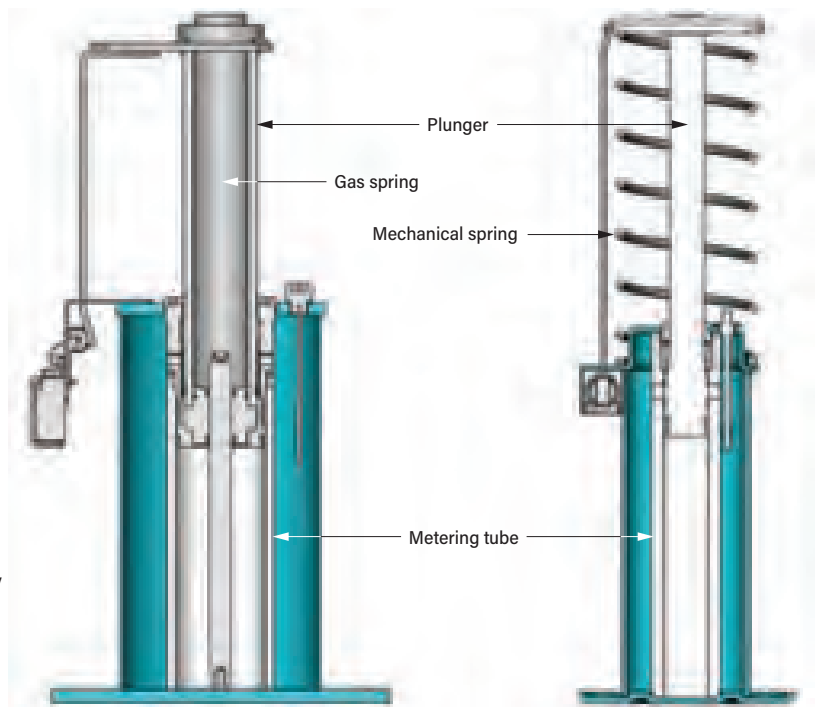
In both load conditions both buffers keep the average deceleration below 1g and do not allow 2.5g for more than 40 milliseconds and therefore are both fully compliant with elevator code specification requirements.

The limiting of peak deceleration force is not required by any elevator code or industry specification.

Alternative buffers achieve the average 1g criterion by an initial period of high deceleration followed by extending the final stages as the elevator is coming to rest. The other key elevator buffer specification requires that passengers do not experience more than 2.5g for more than 40 milliseconds but within this period g-forces are not limited (for energy dissipation buffers). However, as illustrated above, in certain conditions

very high instantaneous g-forces occur and the effects on elevator passengers are unproven.

Oleo has an overall passenger safety aware approach and seeks to avoid the passenger discomfort that may arise from instantaneous deceleration that may even exceed 10g in some circumstances. Many years of in-house testing and the development of mathematical algorithms that accurately simulate the performance of hydraulic buffers enable Oleo to provide buffers with unsurpassed energy absorption performance.



Oleo refine the metering design to ensure energy is absorbed evenly through an impact.



# Passenger/Residential Elevators

Passenger elevators are commonly found in low rise residential buildings, normally operating at low speed with low passenger loads.

Elevators operating in residential buildings often transport very few passengers meaning the performance of the safety devices at low mass is critical. We design our buffers around the concept of protecting the equipment in an emergency situation, irrespective of mass, keeping g-forces to a minimum and ensuring optimum passenger safety.



TYPICAL PASSENGER ELEVATOR



# Express Elevators



ONE WORLD TRADE CENTER

With buildings getting ever taller, express elevators are in increasing demand. These elevators are designed to move people quickly from the ground floor directly to the sky lobby, observation deck or penthouse apartment.

In recent years the industry has seen huge leaps in the velocity of these elevators and Oleo has been involved in enabling this trend by offering ultra high speed, telescopic buffer technology.



# Commercial Elevators

Service elevators are primarily found in commercial buildings such as office and mixed use structures, industrial and large residential buildings.

They are similar in design to passenger elevators with regard to ride comfort but need to operate at higher capacities and often faster speeds. Service elevators can have more than one elevator car working in a single shaft to improve people flow through a large building, thus increasing the working mass of a single shaft.

Shopping malls, airports, stadiums, office blocks and convention centres are all typical locations to find service elevators, where it is essential to move large amounts of people quickly and efficiently.

Oleo has a full range of buffers covering all the speed and load requirements of service elevators.



**A TYPICAL COMMERCIAL ELEVATOR USED IN HOSPITALS**

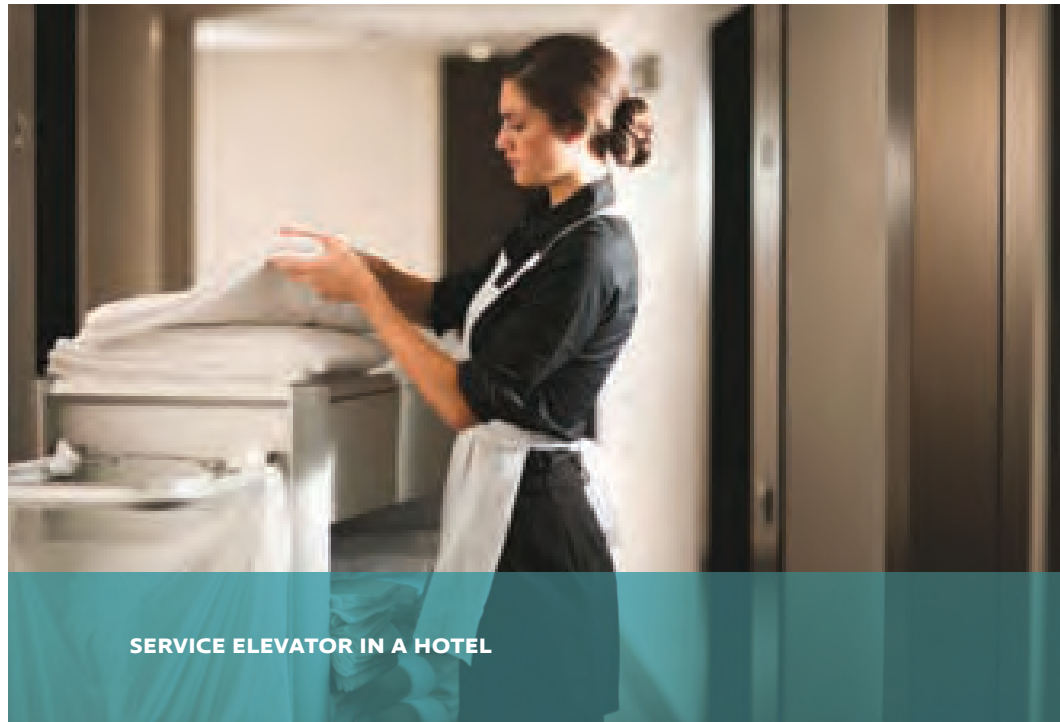




## Freight/Service Elevators

Freight elevators are typically heavy duty elevators, designed for very high masses, meaning they are strong in structure, moving at slow speed. Primarily these elevators are used in commercial buildings including offices, retail, hotel, public transportation and airport facilities.

Oleo elevator buffers are employed as safety devices to limit the damage to stock and freight being carried in these elevators, should there be a system malfunction or failure.



SERVICE ELEVATOR IN A HOTEL



## Vehicle Elevators



AUTOMATED CAR PARKING SYSTEM

Vehicle elevators are fast becoming a popular choice in heavily populated areas and high end residential complexes.

The lifts are designed to move vehicles safely and efficiently. Once again, due to the potential masses and speeds involved, Oleo buffers are often considered the ideal choice for this application.

For years Oleo has offered the ultimate protection for elevator passengers and we now do the same for their prize possessions!



## Modernisation

After many years in operation your elevator may require replacing or modernising. This can be a challenging process to install a new elevator system which has to satisfy the latest legal requirements whilst increasing carrying capacity, and improving comfort and efficiency at higher speeds.

Oleo can help you by offering solutions to replace your current buffers in order to allow improved speed and capacity of the lifts, helping the end customer to increase the efficiency of people flow in their building.



UPGRADES AND REFURBISHMENT



# Special Applications

There are, of course, many other applications where external or non-standard requirements have to be considered and these have a significant bearing on the design and potential performance of the buffer.

In the case of some drop tower rides, Oleo elevator buffers are used in an emergency event should the ride fail during normal operation, in which case it is able to absorb this extra energy in the same controlled manner as an everyday elevator.



**TOWER OF TERROR**



**INDUSTRIAL APPLICATIONS**

Oleo is also able to customise designs in order to meet extremely aggressive service conditions. Examples include the "explosion-proof" and "outdoor" specifications which are both non-standard buffers that incorporate specially customised parts in order to meet the demands of their intended application.

Some examples of special applications include amusement rides, outdoor industrial applications, marine vessels and the mining industry.

Typically, where harsher environmental conditions have to be considered for the elevator design and its components.



**MARINE VESSELS**

Buffer Unit	Elevator Rated Speed (m/s)	Max Test Speed - 115% (m/s)	A17.1 Reduced Stroke (m/s)	Stroke (m) Min.	Mass Range (Kg)		Extended Height (m) Max.	Compressed Height (m) Min.	Weight (No Oil) (Kg)	Oil Volume (Litres)	Weight (With Oil) (Kg)	Return Spring Type Mechanical or Gas	Fixing Bolts Recommended Size	Certification					Manufactured				Distribution Centers	
					Min.	Max.								ASME	EN81	GB1588	KC	EAC	UK	China	India	USA		Germany
LSB10	1.000	1.150	1.470	0.0734	380	3250	0.2222	0.1459	3.529	0.45	3.925	Mech	M10	✓	✓	✓	✓	✓		•	•	•	•	
MLB13	1.300	1.495	1.880	0.1213	450	5500	0.4103	0.2754	9.281	1.02	10.10	Gas	M12	✓	✓	✓	✓	✓		•				
LSB16	1.600	1.840	2.270	0.1735	450	3250	0.4855	0.3069	6.565	0.88	7.339	Mech	M12	✓	✓	✓	✓	✓		•	•		•	
SEB16	1.600	1.840	2.260	0.1730	450	4545	0.5400	0.3508	11.78	1.45	13.06	Gas	M12	✓	✓	✓	✓	✓	•	•		•	•	
MLB16	1.600	1.840	2.260	0.1743	450	5500	0.5323	0.3444	11.15	1.41	12.39	Gas	M12	✓	✓	✓	✓	✓		•				
LB16	1.600	1.840	2.450	0.2032	500	8330	0.6166	0.3973	25.54	4.62	29.31	Gas	M16	✓	✓	✓	✓	✓	•	•		•		
LSB18	1.800	2.070	2.550	0.2195	450	3250	0.5775	0.3529	7.482	1.03	8.726	Mech	M12	✓	✓	✓	✓	✓		•	•		•	
SEB18	1.800	2.070	2.540	0.2190	450	4545	0.6430	0.4078	13.26	1.77	14.82	Gas	M12	✓	✓	✓	✓	✓	•	•		•	•	
MLB18	1.800	2.070	2.540	0.2203	450	5500	0.6343	0.4004	12.67	1.74	14.01	Gas	M12	✓	✓	✓	✓	✓		•				
LB18	1.800	2.070	2.710	0.2489	500	8330	0.7229	0.4563	28.12	5.58	33.03	Gas	M16	✓	✓	✓	✓	✓	•	•		•		
SEB20	2.032	2.337	2.870	0.2790	450	4545	0.7770	0.4818	15.28	2.20	17.22	Gas	M12	✓	✓	✓	✓	✓	•	•		•	•	
MLB20	2.030	2.334	2.870	0.2803	450	5500	0.7823	0.4884	15.02	2.18	16.94	Gas	M12	✓	✓	✓	✓	✓		•				
LB20	2.032	2.337	2.980	0.2999	500	8330	0.8389	0.5213	30.96	6.64	36.80	Gas	M16	✓	✓	✓	✓	✓	•	•		•		
SEB25	2.540	2.920	3.590	0.4350	450	4545	1.1260	0.6748	20.45	3.30	23.35	Gas	M12	✓	✓	✓	✓	✓	•	•		•	•	
MLB25	2.540	2.921	3.590	0.4363	450	5500	1.1643	0.7144	21.05	3.32	23.97	Gas	M12	✓	✓	✓	✓	✓		•				
LB25	2.540	2.920	4.530	0.4619	500	8330	1.2109	0.7313	40.14	10.0	48.94	Gas	M16	✓	✓	✓	✓	✓	•	•		•		
MLB32	3.150	3.622	5.490	0.6803	450	5500	1.7305	1.0340	29.72	5.19	34.29	Gas	M12	✓	✓	✓	✓	✓		•				
LB32	3.150	3.622	5.570	0.6989	700	8330	1.7059	0.9893	54.93	20.0	72.53	Gas	M16	✓	✓	✓	✓	✓	•	•		•		
MLB35	3.560	4.094	6.260	0.8809	600	5500	2.1079	1.2093	61.45	19.5	78.61	Gas	M16	✓	✓	✓	✓	✓		•				
LB35	3.560	4.094	6.260	0.8809	1000	8330	2.1079	1.2093	65.46	24.5	87.02	Gas	M16	✓	✓	✓	✓	✓	•	•		•		
MLB40	4.060	4.669	7.120	1.1409	600	5500	2.6929	1.5343	75.66	25.0	97.66	Gas	M16	✓	✓	✓	✓	✓		•				
LB40	4.064	4.674	7.120	1.1409	1000	8330	2.6929	1.5343	80.69	31.5	108.4	Gas	M16	✓	✓	✓	✓	✓	•	•		•		
LB50	5.080	5.842	8.850	1.7410	1500	7500	4.2144	2.4395	202.6	27.8	227.1	Gas	M20	✓	✓	✓	✓	✓	•					
LB55	5.588	6.426	9.730	2.1100	1250	7500	5.0374	2.8935	235.2	33.3	264.5	Gas	M20	✓	✓	✓	✓	✓	•					
HSL58**	5.850	6.728	10.220	2.3420	4000	10000	4.9655	2.5225	779.0	98.0	865.2	Gas	M22						•					
LB60	6.096	7.010	10.590	2.5050	1500	10000	6.1796	3.5975	458.1	73.0	522.3	Gas	M20	✓	✓	✓	✓	✓	•					
HSL72	7.250	8.338	12.740	3.6448	4000	10000	7.4147	3.6752	1249	144	1376	Gas	M22		✓	✓			•					
HSL87**	8.700	10.005	15.210	5.1920	4000	10000	10.2950	5.1835	1450	207	1632	Gas	M22						•					
HSL101**	10.100	11.615	17.650	6.9730	5500	8000	12.5500	4.1830	3000	275	3242	Gas	M22						•					
HSL115	11.550	13.282	20.230	9.1264	5500	8000	14.9119	5.7011	3497	490	3928	Gas	M22		✓	✓			•					

While we have made every effort to ensure that the information in this brochure is up to date and accurate, we do not accept responsibility for your reliance on the information contained herein. Please contact Oleo to obtain a controlled drawing. \*\*These buffers are in development, contact Oleo to discuss your requirements.





# Range Overview Imperial

Buffer Unit	*Elevator Rated Speed (m/s)	Elevator Rated Speed (fpm)	Max Test Speed - 115% (fpm)	A17.1 Reduced Stroke (fpm)	Stroke (in) Min.	Mass Range (lbs)		Extended Height (in) Max.	Compressed Height (in) Min.	Weight (No Oil) (lbs)	Oil Volume (US Gallons)	Weight (With Oil) (lbs)	Return Spring Type Mechanical or Gas	Fixing Bolts Recommended Size	Certification					Manufactured				Distribution Centers	
						Min.	Max.								ASME	EN81	GB7588	KC	EAC	UK	China	India	USA		Germany
LSB10	1.000	200	230	289	2.890	838	7165	8.748	5.744	7.78	0.12	8.65	Mech	3/8"	✓	✓	✓	✓	✓		•	•	•	•	
MLB13	1.300	256	294	370	4.776	992	12125	16.154	10.843	20.46	0.27	23.61	Gas	1/2"	✓	✓	✓	✓	✓		•				
LSB16	1.600	315	362	447	6.831	992	7165	19.114	12.083	14.47	0.23	16.18	Mech	1/2"	✓	✓	✓	✓	✓		•	•		•	
SEB16	1.600	315	362	445	6.811	992	10020	21.260	13.811	25.97	0.38	28.78	Gas	1/2"	✓	✓	✓	✓	✓	•	•		•	•	
MLB16	1.600	315	362	445	6.862	992	10020	20.957	13.559	24.58	0.37	27.32	Gas	1/2"	✓	✓	✓	✓	✓		•				
LB16	1.600	315	362	482	8.000	1102	18365	24.276	15.642	56.31	1.22	64.61	Gas	5/8"	✓	✓	✓	✓	✓	•	•		•		
LSB18	1.800	354	407	502	8.642	992	7165	22.736	13.894	16.49	0.27	19.24	Mech	1/2"	✓	✓	✓	✓	✓		•	•		•	
SEB18	1.800	354	407	500	8.622	992	10020	25.315	16.055	29.23	0.47	32.67	Gas	1/2"	✓	✓	✓	✓	✓	•	•		•	•	
MLB18	1.800	354	407	500	8.673	992	12125	24.972	15.764	27.93	0.46	30.89	Gas	1/2"	✓	✓	✓	✓	✓		•				
LB18	1.800	354	407	533	9.799	1102	18365	28.461	17.965	61.99	1.47	72.82	Gas	5/8"	✓	✓	✓	✓	✓	•	•		•		
SEB20	2.032	400	460	565	10.984	992	10020	30.591	18.969	33.69	0.58	37.95	Gas	1/2"	✓	✓	✓	✓	✓	•	•		•	•	
MLB20	2.030	400	460	565	11.035	992	12125	30.799	19.228	33.11	0.58	37.34	Gas	1/2"	✓	✓	✓	✓	✓		•				
LB20	2.032	400	460	587	11.807	1102	18365	33.028	20.524	68.26	1.75	81.14	Gas	5/8"	✓	✓	✓	✓	✓	•	•		•		
SEB25	2.540	500	575	707	17.126	992	10020	44.331	26.567	45.08	0.87	51.49	Gas	1/2"	✓	✓	✓	✓	✓	•	•		•	•	
MLB25	2.540	500	575	707	17.177	992	12125	45.839	28.126	46.41	0.88	52.85	Gas	1/2"	✓	✓	✓	✓	✓		•				
LB25	2.540	500	575	892	18.185	1102	18365	47.673	28.791	88.49	2.64	107.9	Gas	5/8"	✓	✓	✓	✓	✓	•	•		•		
MLB32	3.150	620	713	1081	26.783	992	12125	68.130	40.709	65.52	1.37	75.59	Gas	1/2"	✓	✓	✓	✓	✓		•				
LB32	3.150	620	713	1096	27.516	1543	18365	67.161	38.949	121.1	5.28	159.9	Gas	5/8"	✓	✓	✓	✓	✓	•	•		•		
MLB35	3.560	701	806	1232	34.681	1323	12125	82.988	47.610	135.5	5.15	173.3	Gas	5/8"	✓	✓	✓	✓	✓		•				
LB35	3.560	701	806	1232	34.681	2205	18365	82.988	47.610	144.3	6.47	191.8	Gas	5/8"	✓	✓	✓	✓	✓	•	•		•		
MLB40	4.060	799	919	1402	44.917	1323	12125	106.020	60.406	166.8	6.60	215.3	Gas	5/8"	✓	✓	✓	✓	✓		•				
LB40	4.064	800	920	1402	44.917	2205	18365	106.020	60.406	177.9	8.32	239.0	Gas	5/8"	✓	✓	✓	✓	✓	•	•		•		
LB50	5.080	1000	1150	1742	68.543	3307	16535	165.921	96.043	446.7	7.34	500.6	Gas	3/4"	✓	✓	✓	✓	✓	•					
LB55	5.588	1100	1265	1915	83.071	2756	16535	198.323	113.917	518.5	8.80	583.1	Gas	3/4"	✓	✓	✓	✓	✓	•					
HSL58**	5.850	1152	1324	2012	92.205	8818	22046	195.492	99.311	1717	25.89	1908	Gas	7/8"						•					
LB60	6.096	1200	1380	2085	98.622	3307	22046	243.291	141.634	1010	19.28	1152	Gas	3/4"	✓	✓	✓	✓	✓	•					
HSL72	7.250	1427	1641	2508	143.496	8818	22046	291.917	144.693	2754	38.04	3033	Gas	7/8"		✓	✓			•					
HSL87**	8.700	1713	1969	2994	204.409	8818	22046	405.315	204.075	3197	54.68	3598	Gas	7/8"						•					
HSL101**	10.100	1988	2286	3474	274.528	12125	17637	494.094	164.685	6614	72.65	7147	Gas	7/8"						•					
HSL115	11.550	2274	2615	3982	359.307	12125	17637	587.083	224.453	7710	129.44	8660	Gas	7/8"		✓	✓			•					

While we have made every effort to ensure that the information in this brochure is up to date and accurate, we do not accept responsibility for your reliance on the information contained herein. Please contact Oleo to obtain a controlled drawing.  
 \*Rated Speeds are certified in metric as shown - the ratings shown in fpm are conversions from the metric figures. Refer to ASME A17.1/CSA B-44:2017 for certified rated speeds. \*\*These buffers are in development, contact Oleo to discuss your requirements.

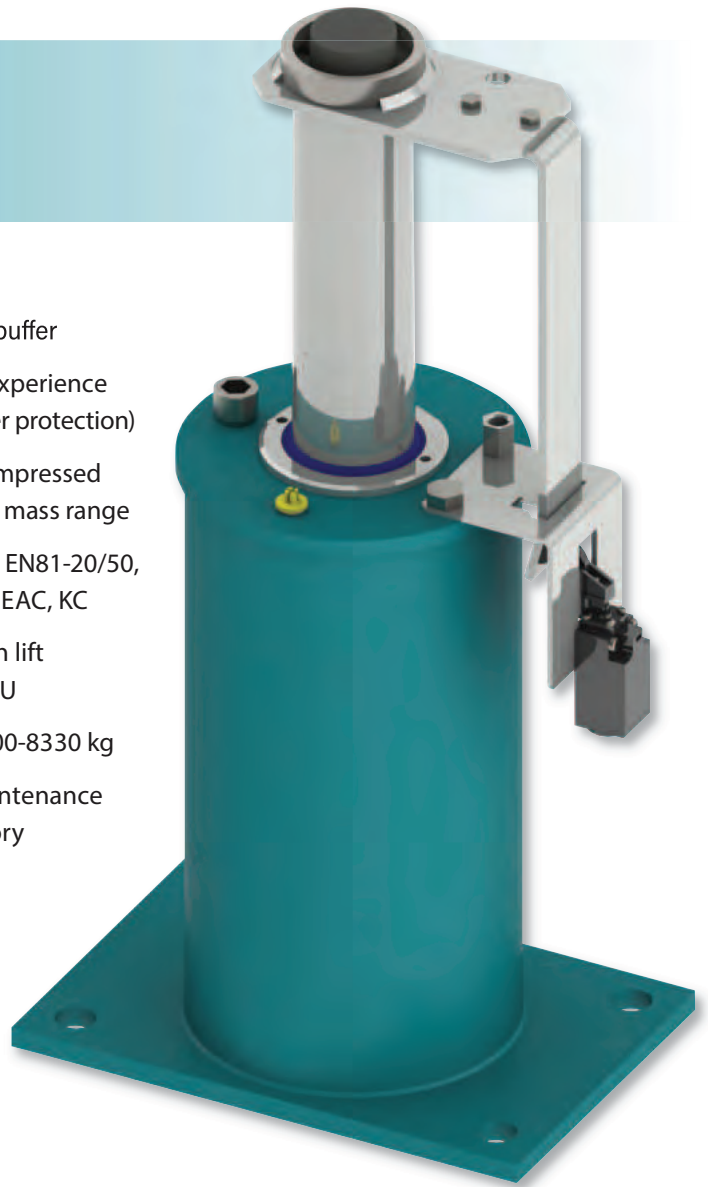
The LB buffer range incorporates gas spring technology to provide a premium and robust passenger safety solution for medium to high speed, high mass elevators.

The units are designed and manufactured according to strict engineering principles and are universally approved and globally certified.

LB buffers can be shipped in a compressed condition to save space and reduce transportation costs. The units have been installed into thousands of landmark buildings since they were introduced more than 30 years ago.

### Product features

- Energy dissipation buffer
- Minimum G-force experience (increased passenger protection)
- Lowest possible compressed height for specified mass range
- Globally certified to EN81-20/50, ASME17.1, GB7588, EAC, KC
- Fully compliant with lift directive 2014/33/EU
- Wide mass range 500-8330 kg
- Self contained, maintenance free (except statutory inspections) unit
- Gas spring return
- All supporting documentation available online



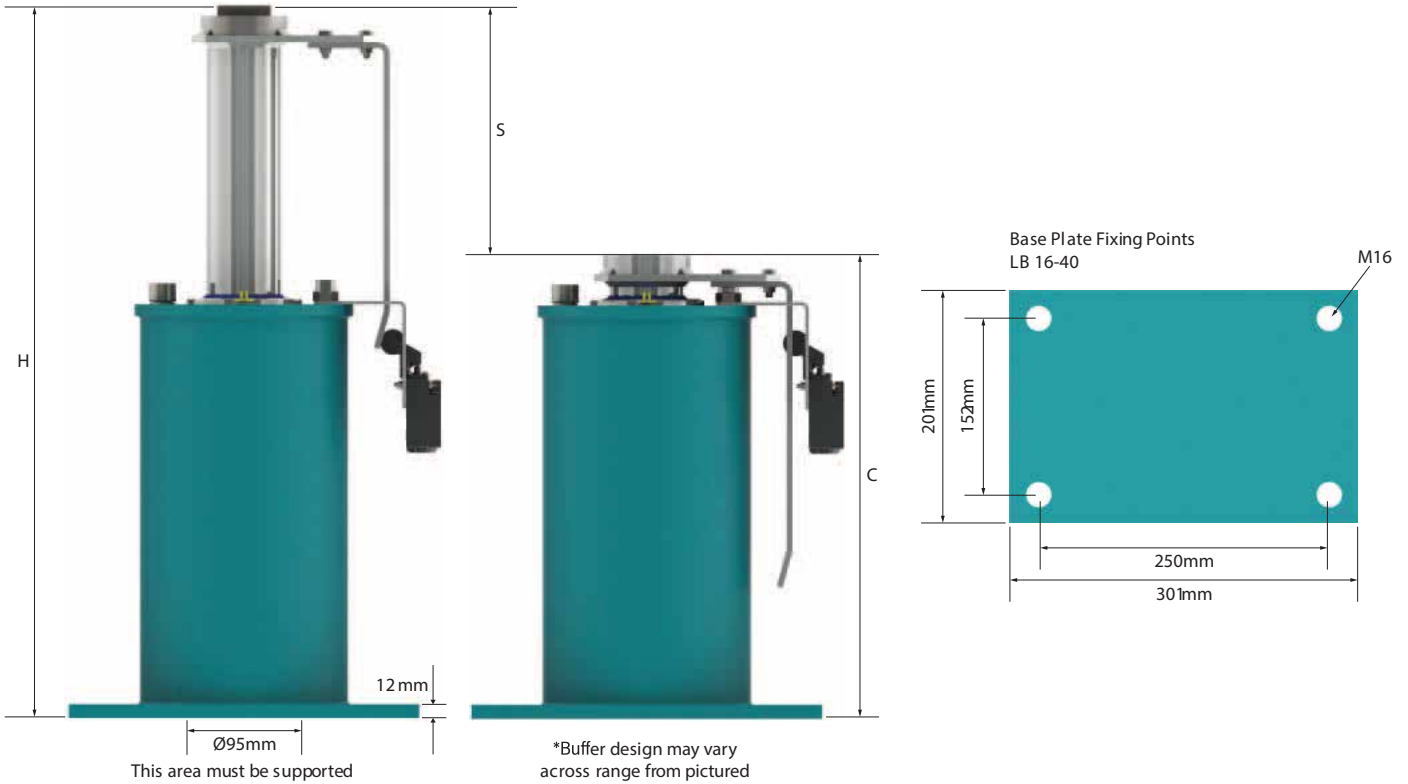
Model		LB 16	LB 18	LB 20	LB 25	LB 32	LB 35	LB 40
Rated speed	m/s	1.600	1.800	2.032	2.540	3.150	3.560	4.064
Impact mass range	Kg	500-8330	500-8330	500-8330	500-8330	700-8330	1000- 8330	1000-8330

- Passenger
- Express
- Commercial
- Modernisation
- Freight
- Vehicle
- Special Applications

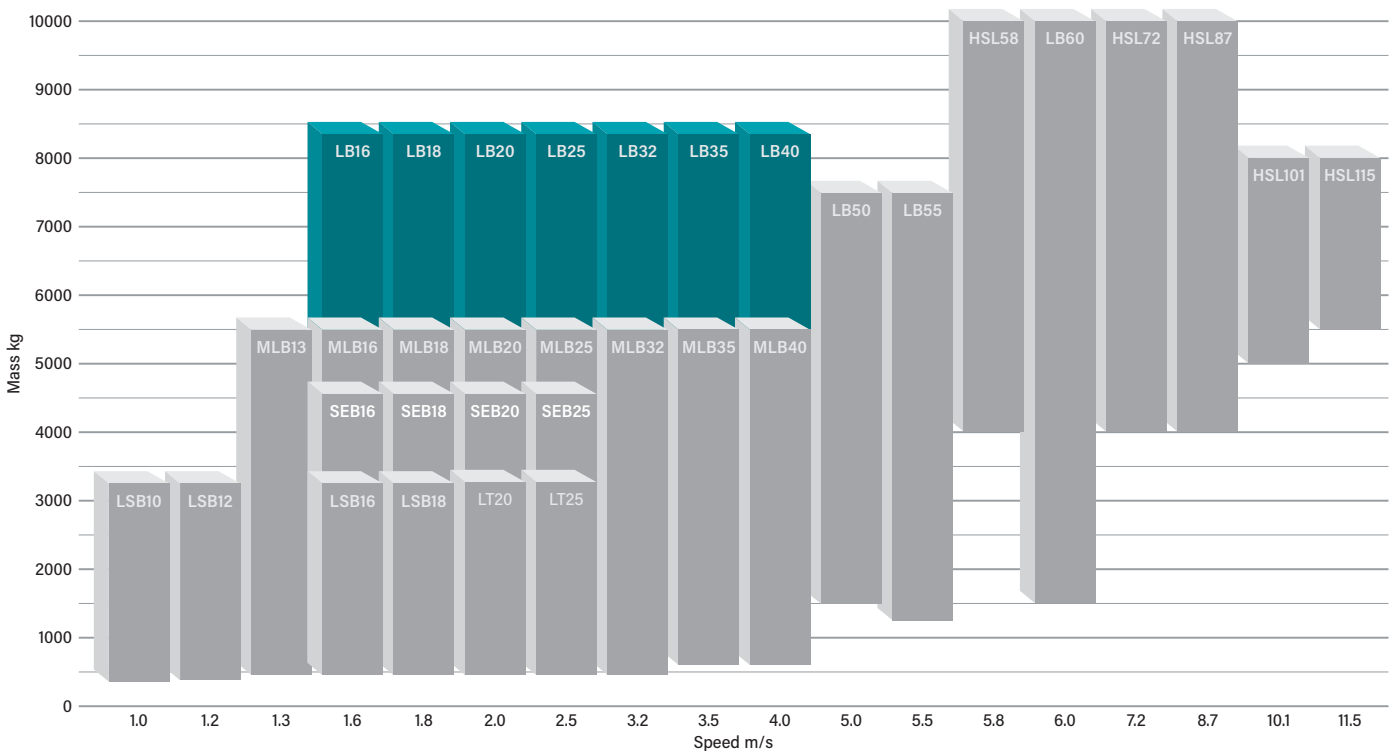


Model		LB 16	LB 18	LB 20	LB 25	LB 32	LB 35	LB 40
Stroke 'S' (min.)	m	0.2032	0.2489	0.2999	0.4619	0.6989	0.8809	1.1409
Height 'H' max. (extended)**	m	0.6166	0.7229	0.8389	1.2109	1.7059	2.1079	2.6929
Height 'C' min. (compressed)**	m	0.3973	0.4563	0.5213	0.7313	0.9893	1.2093	1.5343
Weight no oil (dry)	Kg	25.54	28.12	30.96	40.14	54.93	65.46	80.69
Oil volume	Litres	4.62	5.58	6.64	10.00	20.00	24.50	31.50

\*\*The max and min figures provided take account of the extremes of the tolerance to provide absolute maximum and absolute minimum dimensions.



## Range Overview



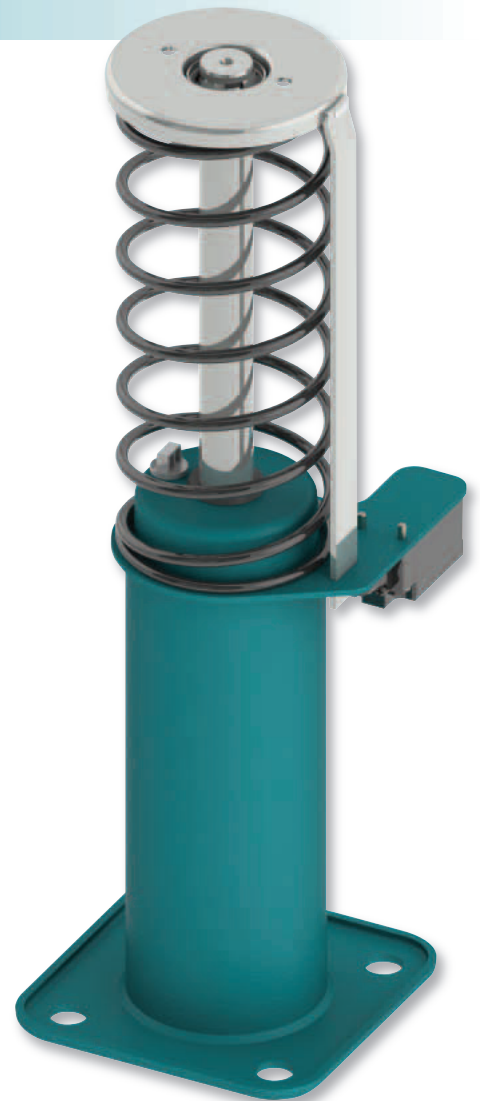
The LSB range incorporates a mechanical return spring with proven oil dissipation technology to ensure a reliable safety solution for low speed, low mass passenger elevators.

The buffers are designed and manufactured according to strict engineering standards and are universally approved and globally certified.

Our LSB units are smaller and weigh considerably less than many alternatives and they can be supplied oil filled which reduces the cost of logistics, saves time and reduces the risk of errors during installation.

### Product features

- Quick & Easy installation
- Energy dissipation buffer
- Minimum G-force experience (increased passenger protection)
- Lowest possible compressed height for specified mass range
- Globally certified to EN81-20/50, ASME17.1, GB7588, EAC, KC
- Fully compliant with lift directive 2014/33/EU
- Wide mass range 380-3250 Kg
- Self contained, maintenance free (except statutory inspections) unit
- Lightweight
- Mechanical spring return
- All supporting documentation available online



Model		LSB 10	LSB 16	LSB 18
Rated speed	m/s	1.000	1.600	1.800
Impact mass range	Kg	380-3250	450-3250	450-3250

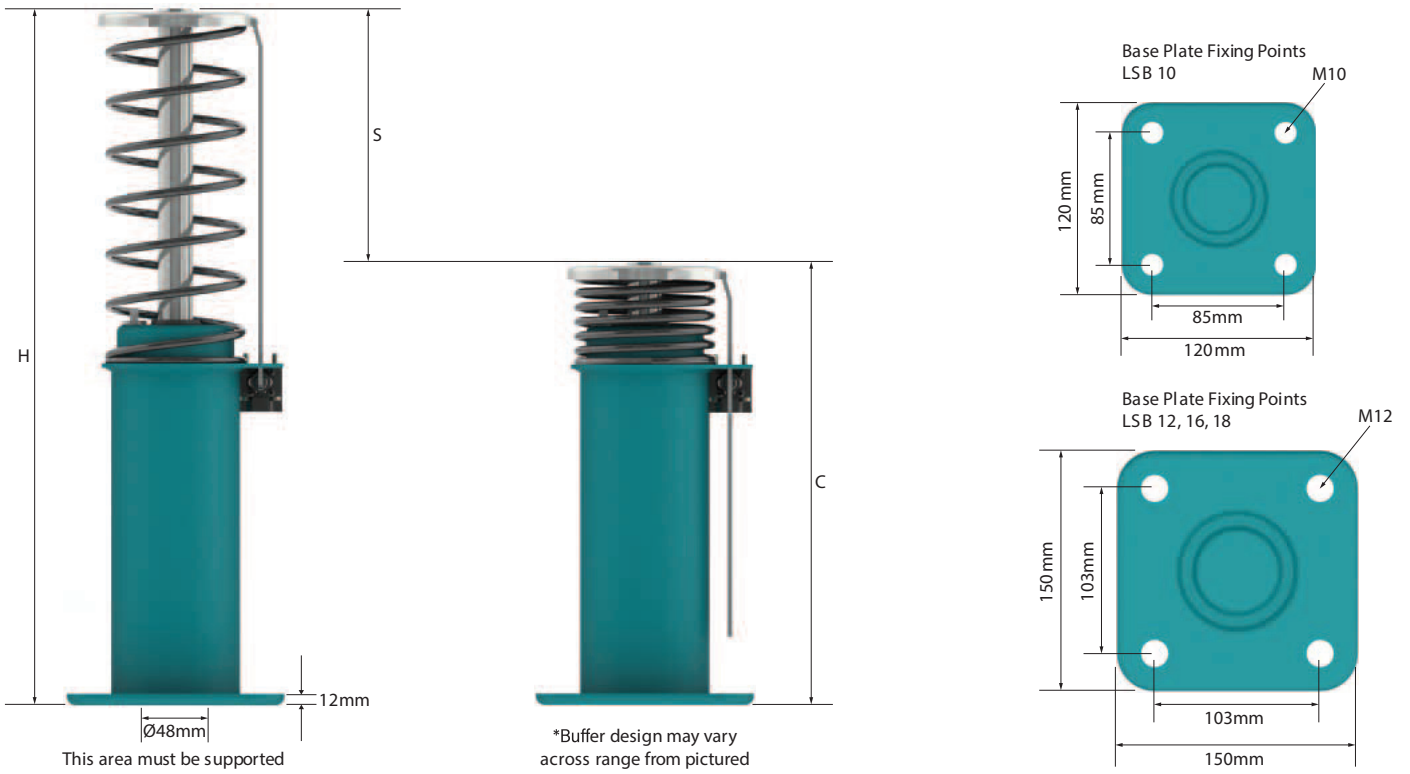
- Passenger**
- Express
- Commercial
- Modernisation**
- Freight
- Vehicle
- Special Applications



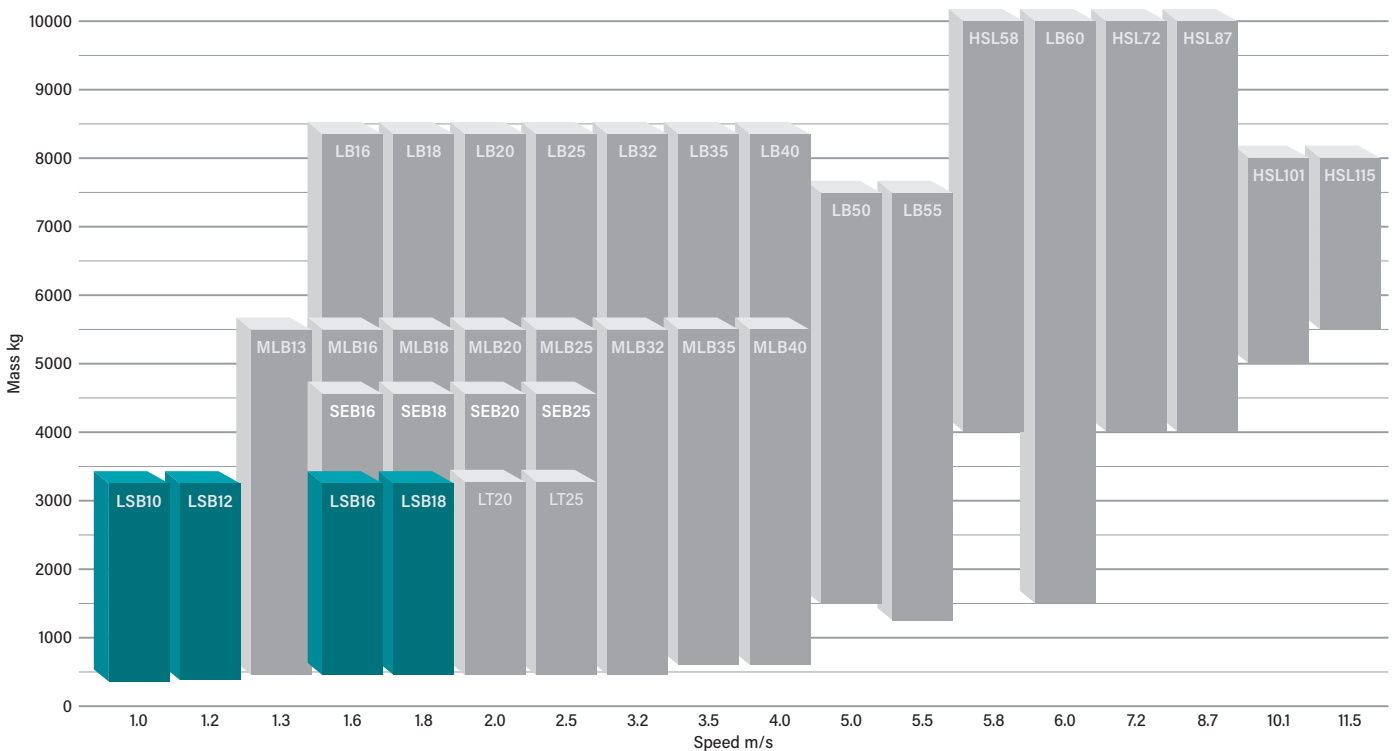


Model		LSB 10	LSB 16	LSB 18
Stroke 'S' (min.)	m	0.0734	0.1735	0.2195
Height 'H' max. (extended)**	m	0.2222	0.4855	0.5775
Height 'C' min. (compressed)**	m	0.1459	0.3069	0.3529
Weight no oil (dry)	Kg	3.529	6.565	7.820
Oil volume	Litres	0.45	0.88	1.03

\*\*The max and min figures provided take account of the extremes of the tolerance to provide absolute maximum and absolute minimum dimensions.



## Range Overview



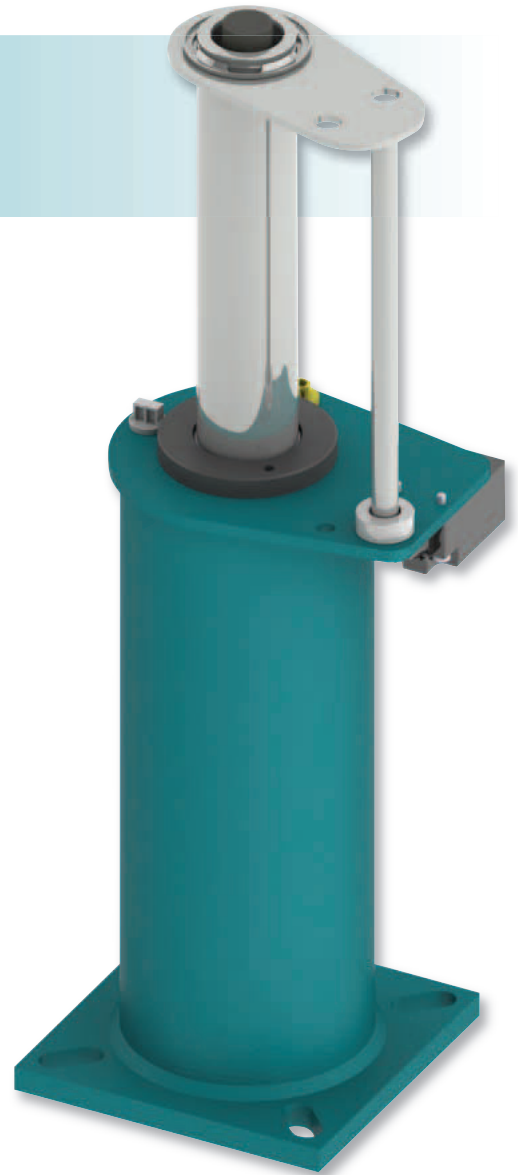
The MLB range of buffers incorporate gas spring technology and provide a premium, robust passenger safety solution for low to medium speed, mid mass elevators.

The MLB buffers are designed and manufactured according to strict engineering principles and are universally approved and globally certified.

Our MLB buffers are smaller and weigh considerably less than many alternatives. Moreover, the MLB13-32 units can be supplied oil filled which reduces the cost of logistics, saves time and reduces the risk of errors during installation.

### Product features

- Energy dissipation buffer
- Minimum G-force experience (increased passenger protection)
- Lowest possible compressed height for specified mass range
- Globally certified to EN81-20/50, ASME17.1, GB7588, EAC, KC
- Fully compliant with lift directive 2014/33/EU
- Wide mass range 450-5500 kg
- Self contained, maintenance free (except statutory inspections) unit
- Gas spring return
- All supporting documentation available online



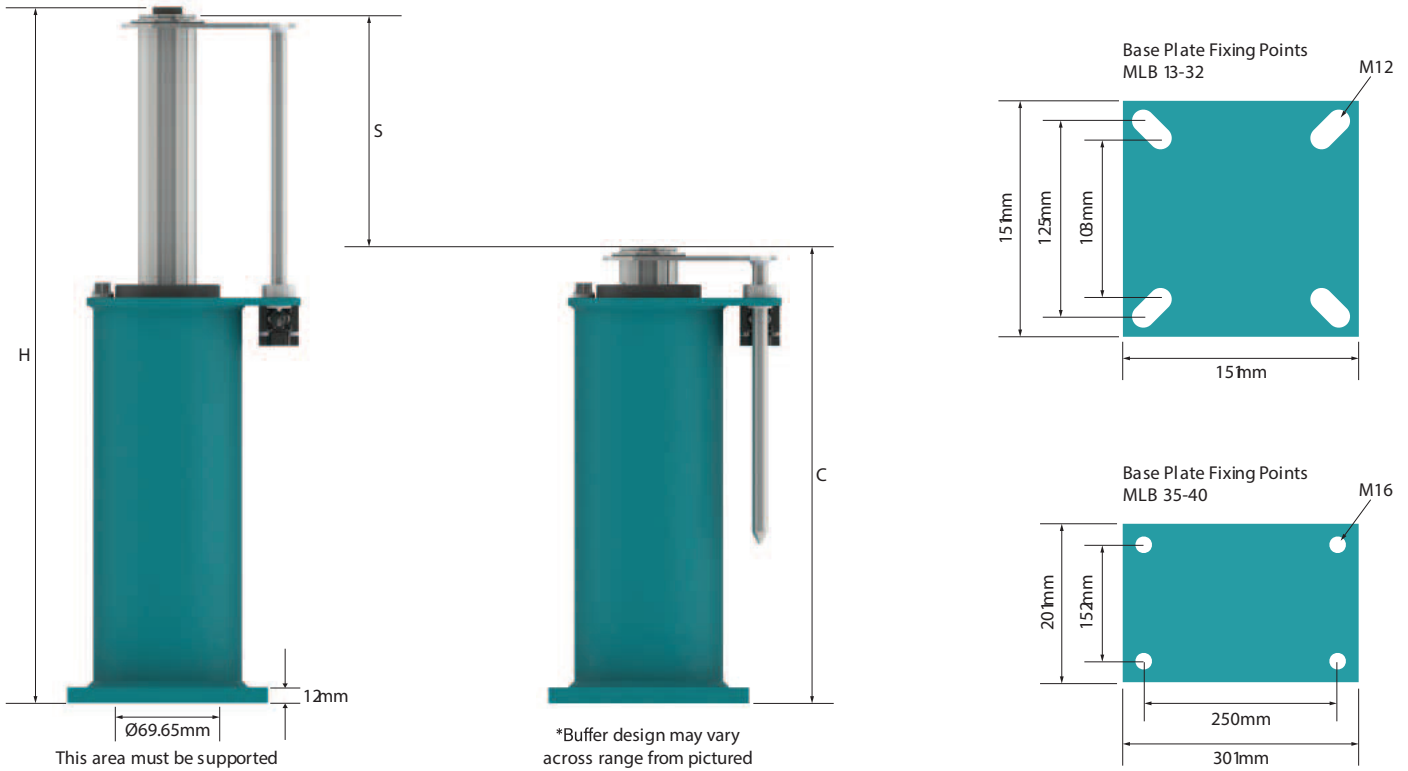
Model		MLB 13	MLB 16	MLB 18	MLB 20	MLB 25	MLB 32	MLB 35	MLB 40
Rated speed	m/s	1.300	1.600	1.800	2.030	2.540	3.150	3.560	4.060
Impact mass range	Kg	450-5500	450-5500	450-5500	450-5500	450-5500	450-5500	600-5500	600-5500

- Passenger**
- Express**
- Commercial**
- Modernisation**
- Freight**
- Vehicle**
- Special Applications**

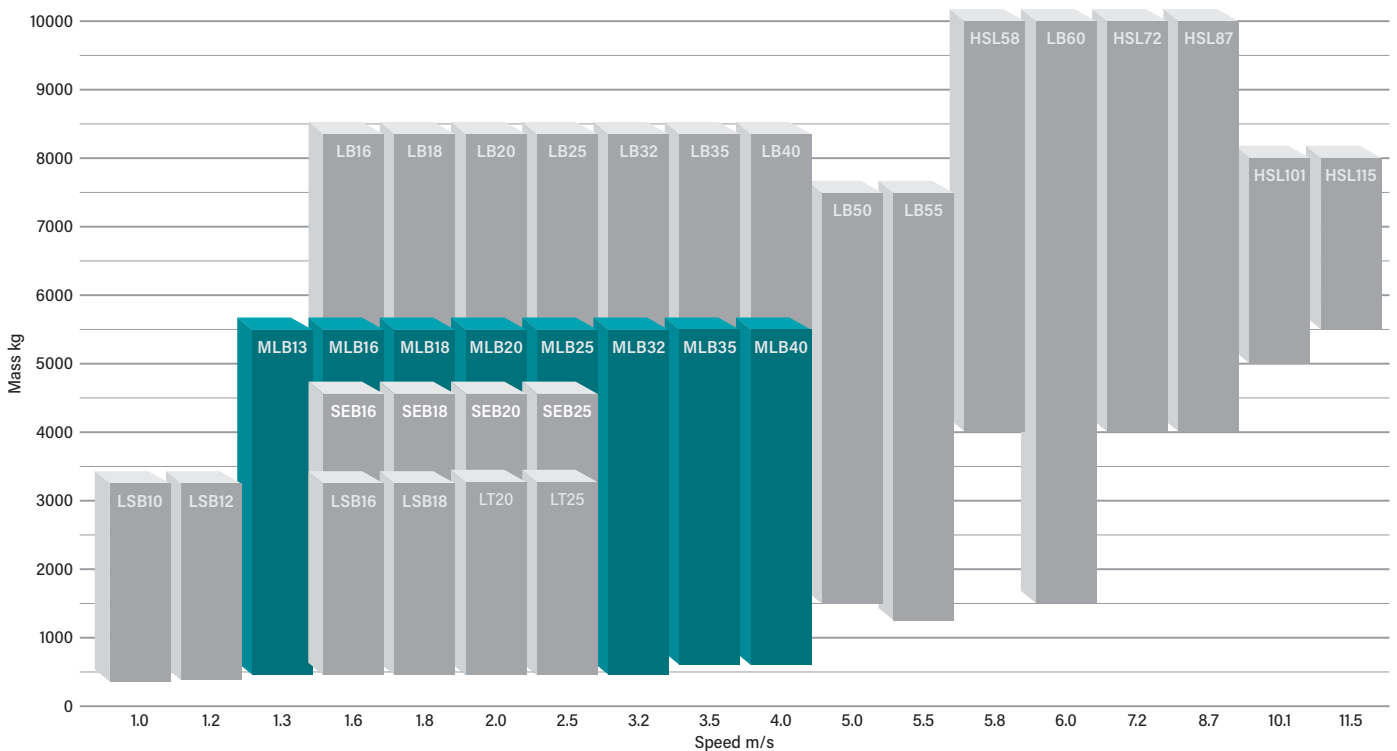


Model		MLB 13	MLB 16	MLB 18	MLB 20	MLB 25	MLB 32	MLB 35	MLB 40
Stroke 'S' (min.)	m	0.1213	0.1743	0.2203	0.2803	0.4363	0.6803	0.8809	1.1409
Height 'H' max. (extended)**	m	0.4103	0.5323	0.6343	0.7823	1.1643	1.7305	2.1079	2.6929
Height 'C' min. (compressed)**	m	0.2754	0.3444	0.4004	0.4884	0.7144	1.0340	1.2093	1.5343
Weight no oil (dry)	Kg	9.81	11.15	12.67	15.02	21.05	29.72	61.45	75.66
Oil volume	Litres	1.02	1.41	1.74	2.18	3.32	5.19	19.50	25.00

\*\*The max and min figures provided take account of the extremes of the tolerance to provide absolute maximum and absolute minimum dimensions.



## Range Overview



**SEB buffers incorporate gas spring technology to provide a premium and robust passenger safety solution for slow to medium speed elevators.**

The units are designed and manufactured according to strict engineering principles and are universally approved and globally certified.

SEB buffers can be shipped in a compressed condition which saves space and reduces transportation costs. The units can also be supplied oil filled which saves time and reduces the risk of errors during installation.

### Product features

- Quick & Easy installation
- Energy dissipation buffer
- Minimum G-force experience (increased passenger protection)
- Lowest possible compressed height for specified mass range
- Smallest space envelope possible
- Reduced weight means that shipping costs are significantly lower
- Globally certified to EN81-20/50, ASME17.1, GB7588, EAC, KC
- Fully compliant with lift directive 2014/33/EU
- Wide mass range 450-4545 Kg
- Self contained, maintenance free (except statutory inspections) unit
- Gas spring return
- All supporting documentation available online



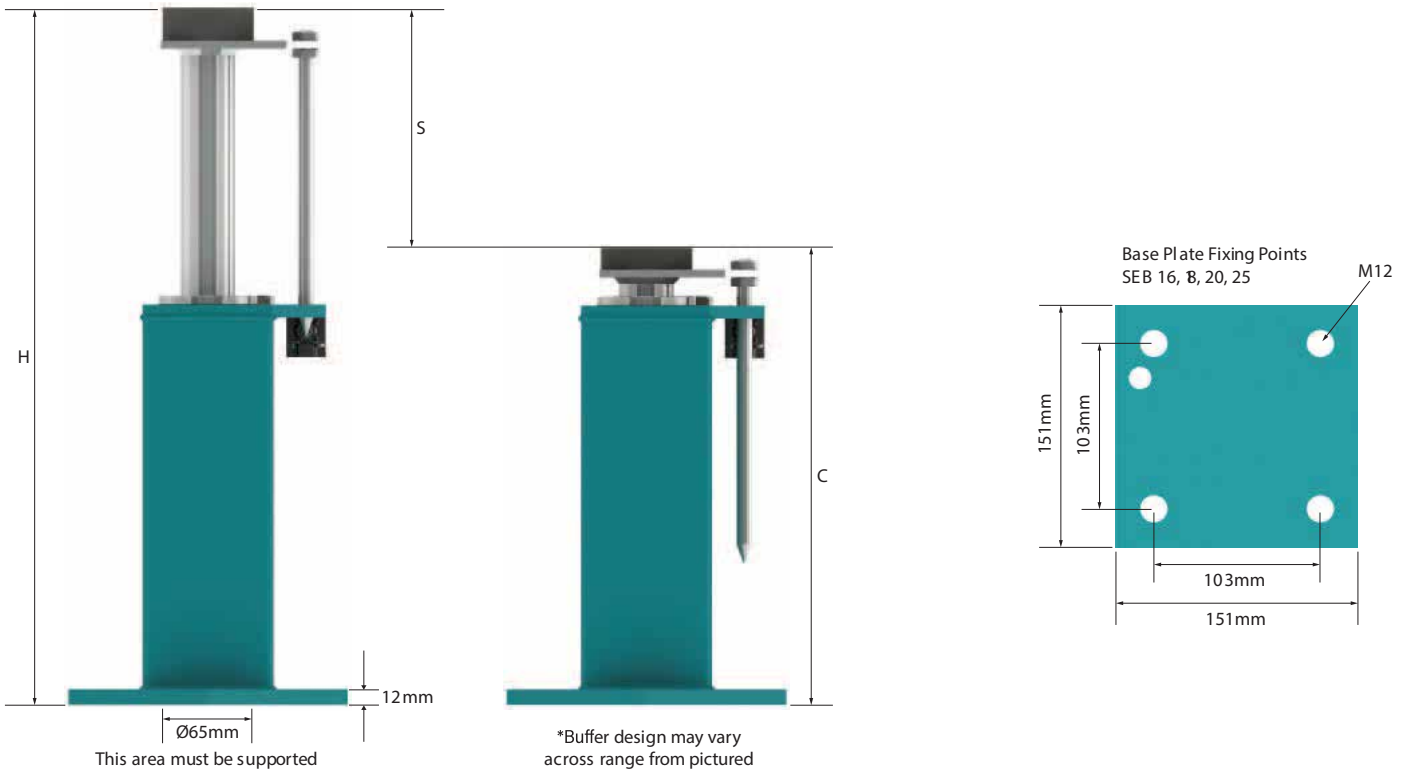
Model		SEB 16	SEB 18	SEB 20	SEB 25
Rated speed	m/s	1.600	1.800	2.032	2.540
Impact mass range	Kg	450-4545	450-4545	450-4545	450-4545

- Passenger**
- Express**
- Commercial**
- Modernisation**
- Freight**
- Vehicle**
- Special Applications**

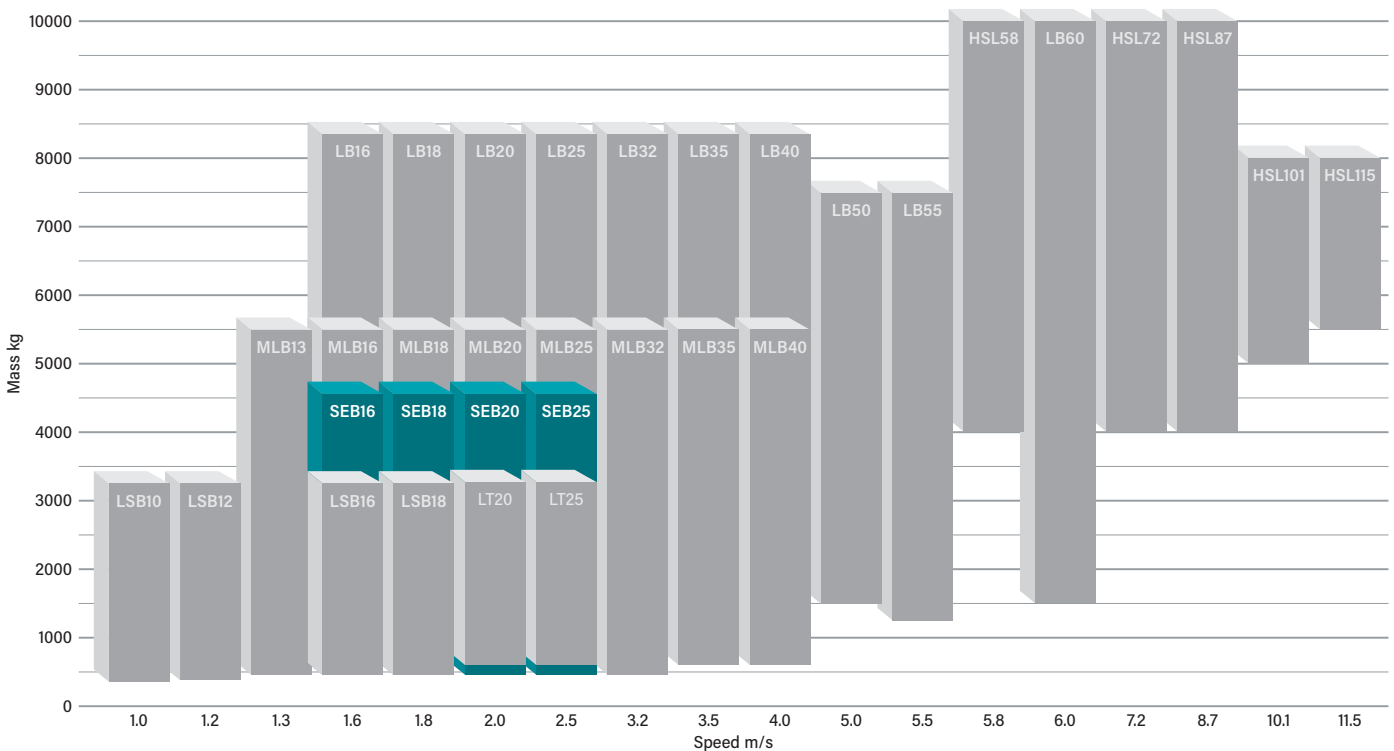


Model		SEB 16	SEB 18	SEB 20	SEB 25
Stroke 'S' (min.)	m	0.1730	0.2190	0.2790	0.4350
Height 'H' max. (extended)**	m	0.5400	0.6430	0.7770	1.1260
Height 'C' min. (compressed)**	m	0.3508	0.4078	0.4818	0.6748
Weight no oil (dry)	Kg	11.78	13.26	15.28	20.45
Oil volume	Litres	1.45	1.77	2.20	3.30

\*\*The max and min figures provided take account of the extremes of the tolerance to provide absolute maximum and absolute minimum dimensions.



## Range Overview





The Oleo XLB range of gas hydraulic buffers is designed specifically for high rise buildings where elevator speeds reach up to 10m/s (using approved speed limiting devices).

The Oleo principle of designing self contained, maintenance free (other than statutory inspections) buffers is applied to the XLB range and ensures an easy installation process and the best safety buffer solution throughout the service life of the elevator.

The units are designed and manufactured according to strict engineering principles and are universally approved and globally certified.

### Product features

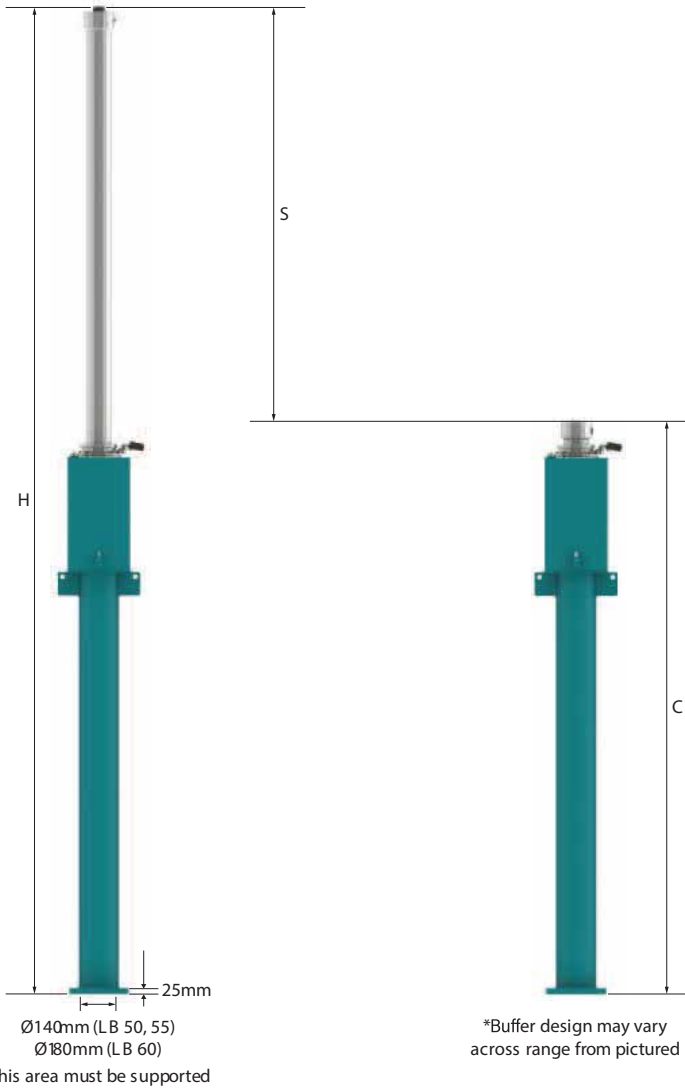
- Energy dissipation buffer
- Minimum G-force experience (increased passenger protection)
- Lowest possible compressed height for specified mass range
- Globally certified to EN81-20/50, ASME17.1, GB7588, EAC, KC
- Fully compliant with lift directive 2014/33/EU
- Wide mass range 1250-10000 kg
- Self contained, maintenance free (except statutory inspections) unit
- Gas spring return
- All supporting documentation available online



Model		LB 50	LB 55	LB 60
Rated speed	m/s	5.080	5.588	6.096
Impact mass range	Kg	1500-7500	1250-7500	1500-10000

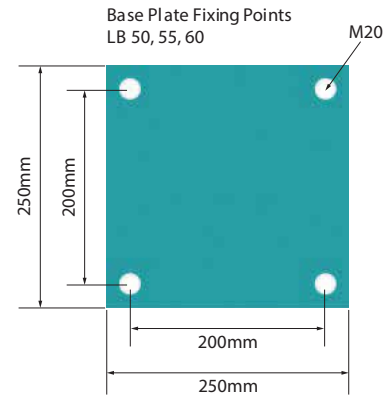
- Passenger**
- Express**
- Commercial**
- Modernisation**
- Freight**
- Vehicle**
- Special Applications**



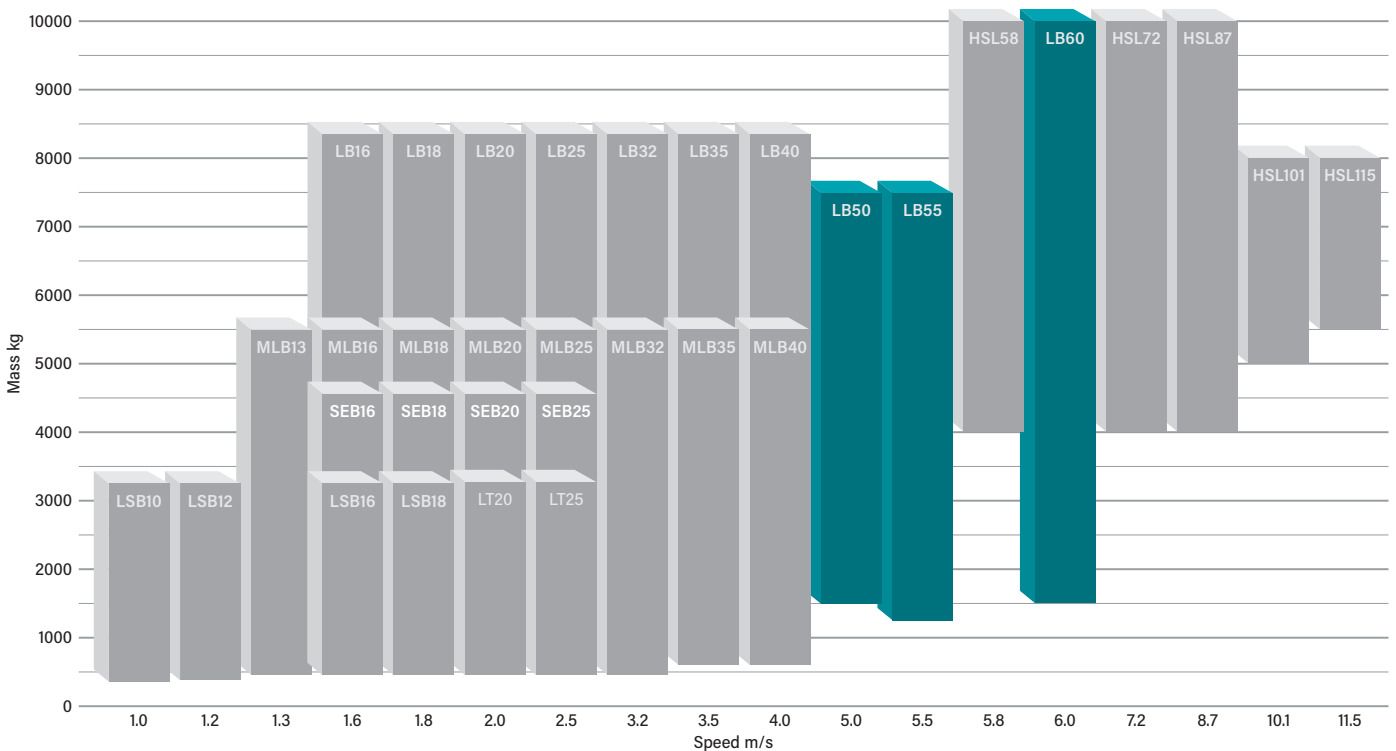


Model		LB 50	LB 55	LB 60
Stroke 'S' (min.)	m	1.7410	2.1100	2.5050
Height 'H' max. (extended)**	m	4.2144	5.0374	6.1796
Height 'C' min. (compressed)**	m	2.4395	2.8935	3.5975
Weight no oil (dry)	Kg	202.6	235.2	458.1
Oil volume	Litres	27.80	33.30	73.00

\*\*The max and min figures provided take account of the extremes of the tolerance to provide absolute maximum and absolute minimum dimensions.



## Range Overview



The HSL range of units was developed for ultra high speed elevators that are designed for the world's tallest and most prestigious buildings. The range is suitable for elevators travelling up to and in excess of 20m/s (using approved speed limiting devices) and the buffers utilise a telescopic design to ensure space at the top and bottom of the elevator shaft can be used effectively.

The more compact design also makes the units ideal for use in premium modernisation projects where elevators with higher speeds are installed into buildings where space restrictions from the original installation remain in place.








The units are designed and manufactured according to Oleo's strict engineering principles and are approved and can be specifically certified to suit each project location.

### Product features

- Energy dissipation buffer
- Minimum G-force experience (increased passenger protection)
- Lowest possible compressed height for specified mass range
- Fully compliant with lift directive 2014/33/EU
- Wide mass range 4000-10000 kg
- Gas spring return
- Multistage telescopic dissipation system
- Minimum possible extended height
- All supporting documentation available online



Model		HSL 58	HSL 72	HSL 87	HSL 101	HSL 115
Rated speed	m/s	5.850	7.250	8.700	10.101	11.550
Impact mass range	Kg	4000-10000	4000-10000	4000-10000	5000-8000	5500-8000

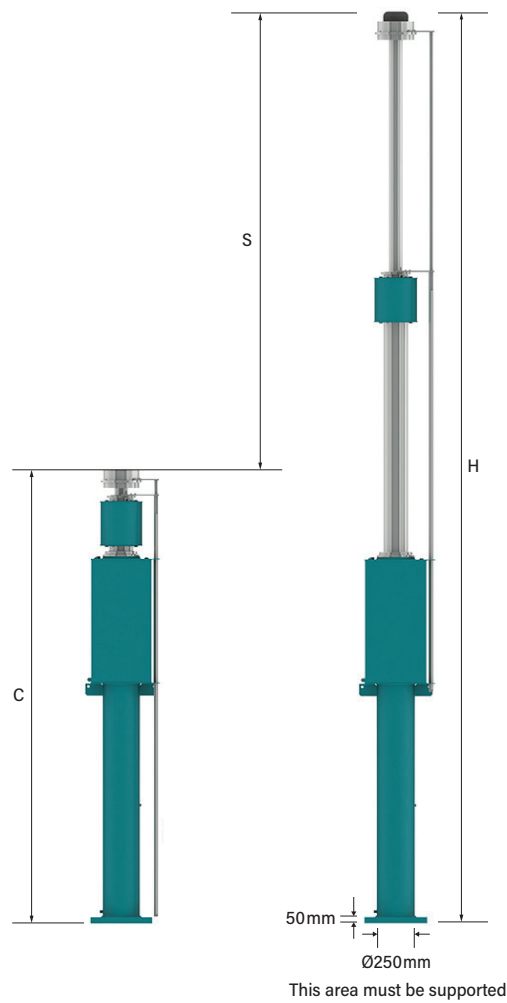
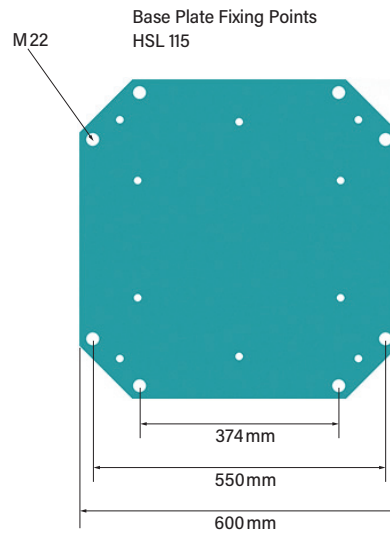
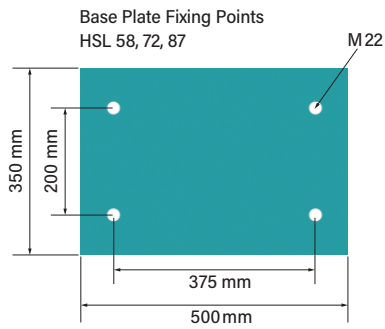
- Passenger 
- Express 
- Commercial 
- Modernisation 
- Freight 
- Vehicle 
- Special Applications 



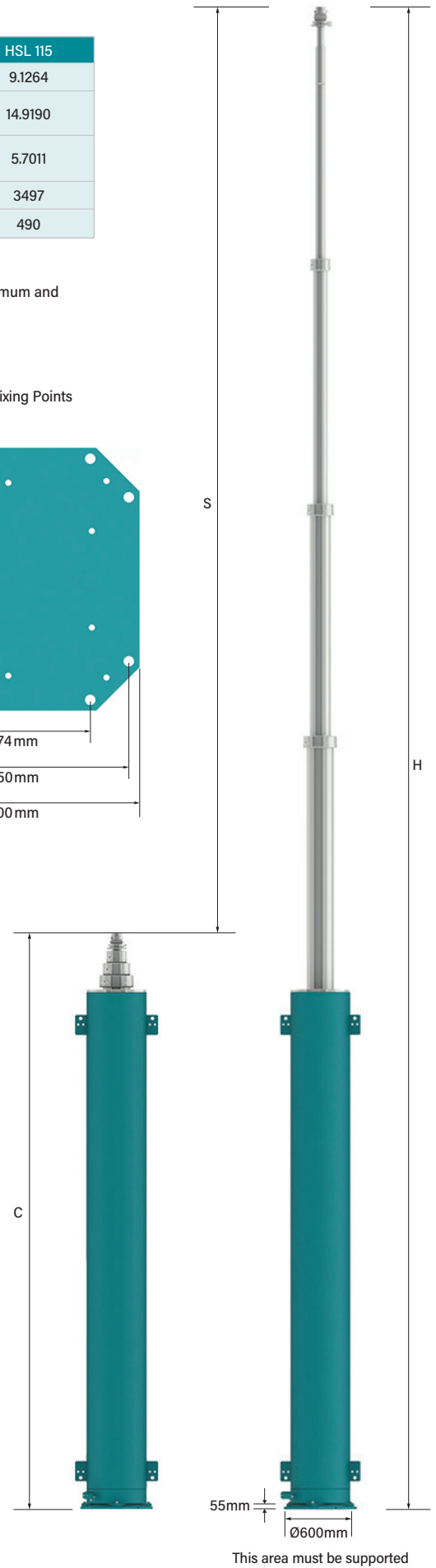
Model		HSL 58	HSL 72	HSL 87	HSL 101	HSL 115
Stroke 'S' (min.)	m	2.3420	3.6448	5.1920	6.9730	9.1264
Height 'H' max. (extended)**	m	4.9655	7.4147	10.2950	12.5700	14.9190
Height 'C' min. (compressed)**	m	2.5225	3.6725	5.1835	4.1830	5.7011
Weight no oil (dry)	Kg	779	1249	1450	3000	3497
Oil volume	Litres	98	144	207	275	490

\*Buffer design may vary across range from pictured

\*\*The max and min figures provided take account of the extremes of the tolerance to provide absolute maximum and absolute minimum dimensions.



HSL 72



HSL 115



LEADING THE WORLD IN ENERGY ABSORPTION

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