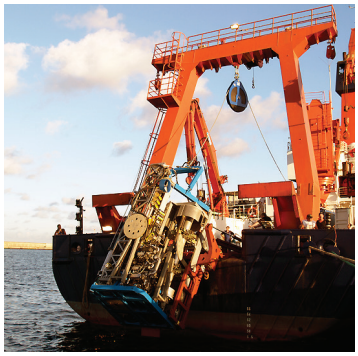

Lightraulics® Composite Hydraulic Cylinders

For working pressures up to 700 bar

hefel technik
sehen & bewegen

Parker

ENGINEERING YOUR SUCCESS.

WARNING – USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Offer of Sale

Please contact your Parker representation for a detailed 'Offer of Sale'.

hefel technik

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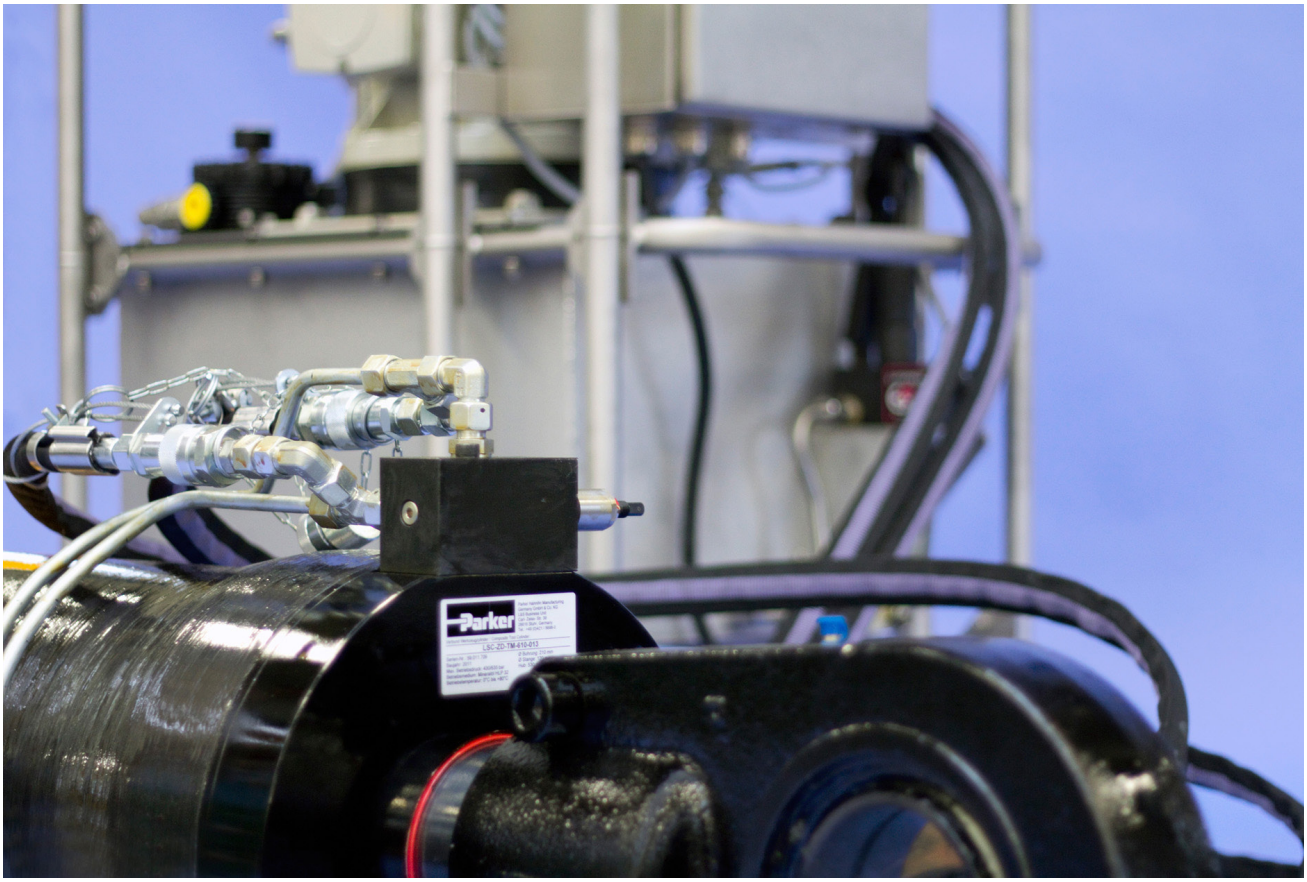
Composite Hydraulics From Parker Technology You Can Trust

High pressure hydraulic products require high strength structural components. Traditionally, high strength steels have been used for typical mobile and industrial applications, while more expensive lower density alloys were used where reduced weight was critical. The introduction of carbon fibre composite materials opened up new possibilities for the design of lightweight, high strength components.

Conventional composite designs use the composite material as a reinforcement to lighten steel components. The Parker Lightraulics® series include the classical composite design as well as high-end technologies with pure composite cylinder barrels for further weight benefits.

With longstanding experience in the development of composite materials, Parker is engineering hydraulic lightweight cylinders for a wide range of applications since 1996. The Lightraulics® products offer significant weight savings combined with exceptional burst and fatigue strengths. Tested over thousands of cycles, the standard cylinder ranges are designed for operating pressures up to either 380 bar or 700 bar.

In addition to various standard series, custom designs are available to order with working pressures up to 700 bar.



A

The Composite Advantage

- **High strength and stiffness at low weight**
  The strength to weight ratio of Parker's composite material is typically twice that of steel.
- **Superior fatigue life**
  Parker's composite products offer superior fatigue performance to that of lightweight alloys such as titanium, aluminium and magnesium.
- **High corrosion resistance**
  Carbon, glass and aramid fibre as well as the resin material do not corrode. This leads to a long product life associated with time and cost savings on maintenance.

Typical characteristics of cylinder barrel materials

Characteristics	Parker Composite	Aluminium Alloys	Standard Steels
Density (g/cm³)	1.6	2.8	7.85
Tensile strength (MPa)	> 1000	max. 500	max. 550
Fatigue performance	***	*	**
Corrosion resistance	***	**	*

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Higher Performance

Composite hydraulic cylinders deliver weight savings of up to 60%, saving energy and increasing productivity

Lighter, stronger, faster, greener …

Weight savings of up to 60%

- Cutting fuel/electricity consumption reduces operating costs and raises efficiency
- Cutting axle load saves energy and permits greater payloads
- Allows additional features where total weight is limited
- Portability of hydraulic tools for mobile operations

Image courtesy of Marum, University Bremen

Non-magnetic

- Suitable for applications sensitive to magnetic fields

Superior corrosion resistance

- Lightraulics® composite products deliver high performance in the toughest conditions and cut maintenance time and cost

Durable & longlife products

- High fatigue performance
- Greater number of cycles at high pressure levels
- Reduced maintenance

Faster acceleration

- Reduced energy demand
- Shorter cycle times improve productivity

© Vincent Curutchet / DPPI / Macif

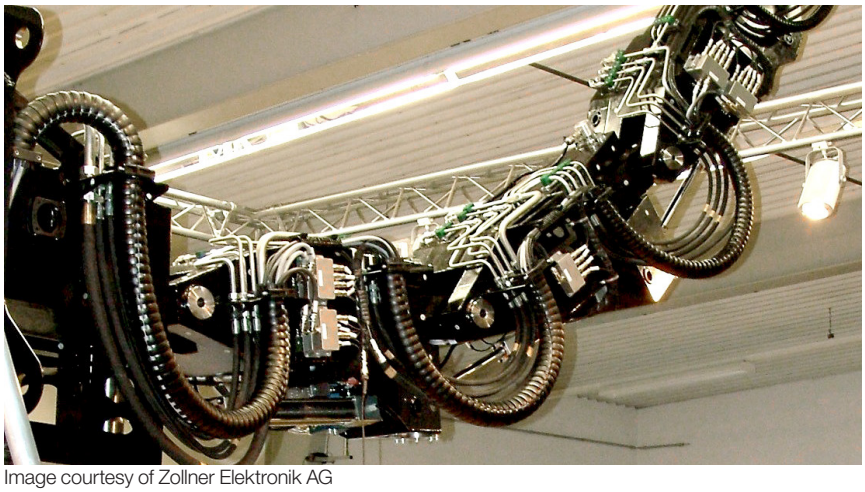

Image courtesy of Zollner Elektronik AG

Reduced vibration

- Excellent damping properties improve performance where vibration is undesirable

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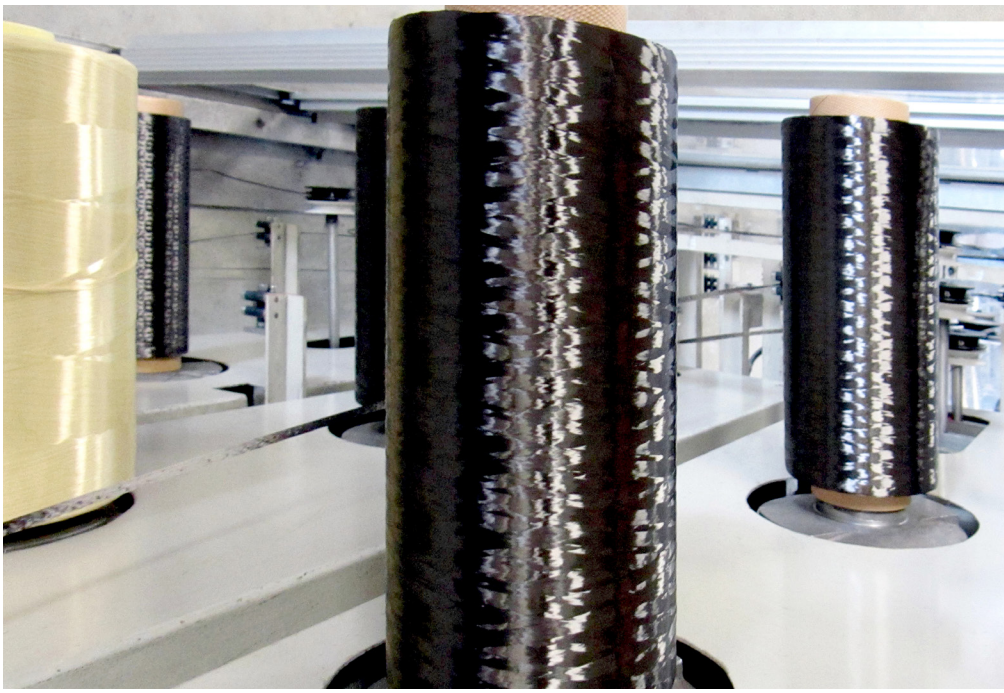
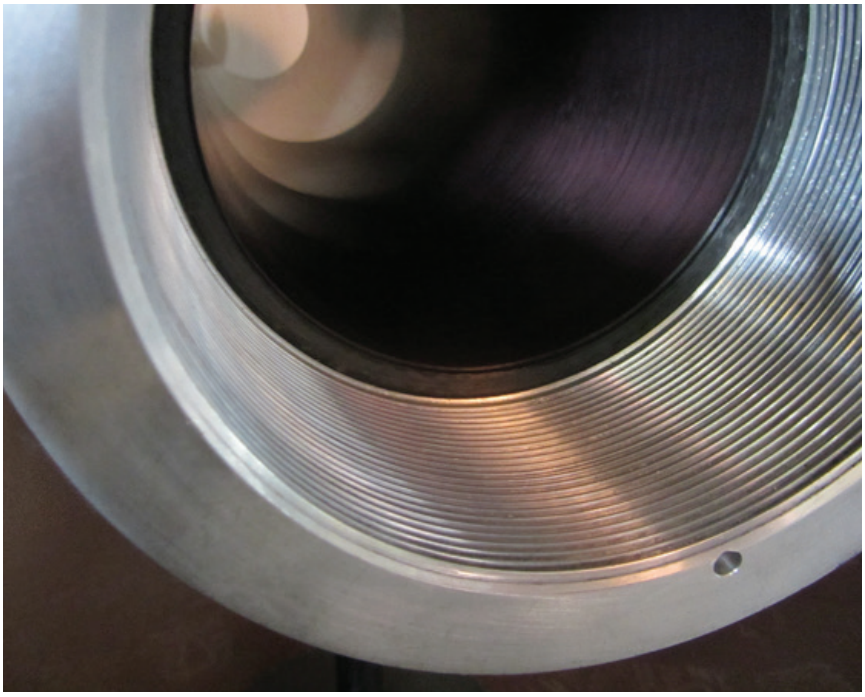
Outstanding And Proven Technology

Design, simulation and product testing of high-end performance products

Longstanding expertise in composite processing

- Carbon fibre, glass fibre, aramid fibre, epoxy resins
- Filament winding, prepreg winding
- Analytical & numerical calculation methods for anisotropic materials
- Purpose-built test equipment
- Continous research & development





◄ Leading edge technology

Parker's advanced composite products and technology are the result of an enduring commitment to research and development. Continuous investment in state-of-the-art production and testing technologies guarantees manufacturing capacity and ensures consistent product performance.

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Lightraulics® Overwrapped Cylinders

The Lightraulics® Overwrapped Cylinders contain a thin-walled metal liner with a fibre reinforced composite overwrap, delivering weight savings of up to 45% compared to standard steel designs.

▼ Metal liner
A thin-walled aluminium or steel liner acts as a diffusion barrier and carries the axial and hoop loads.

▲ Composite overwrap
The carbon fibre reinforced composite structure supports the metal liner with carrying the hoop loads.

Product Specifications

Working pressure	up to 700 bar (10150 psi)
Piston diameter	up to 250 mm
Stroke length	up to 3000 mm
Barrel material	thinwalled aluminium or steel with fibre reinforced composite overwrap
Piston material	aluminium
Piston rod material	hard chrome plated steel or stainless steel
Temperature range	-10 °C to +65 °C
Fluid medium	mineral hydraulic oil

▲ Product example

Working pressure	700 bar
Piston diameter	210 mm
Stroke	550 mm
Maximum force	1480 kN
Weight	248 kg

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General Enquiries

Lightraulics® overwrapped cylinders will be designed especially for your application. Please contact CLDE_Quote@parker.com with your specifications

We particularly welcome enquiries from customers with weight or corrosion issues in their existing hydraulic cylinder application. To help us understand your specific requirements, please include as many details about your application as possible. As a minimum we recommend providing us with the following:

- ✓ Interface Drawing of the current hydraulic cylinder design or design envelope
- ✓ Current cylinder dry mass and desired weight savings
- ✓ Environmental conditions (especially operating temperature range and corrosion resistance requirements)
- ✓ Available budget for weight reduction engineering, or a rough indication of weight-cost benefit ratio

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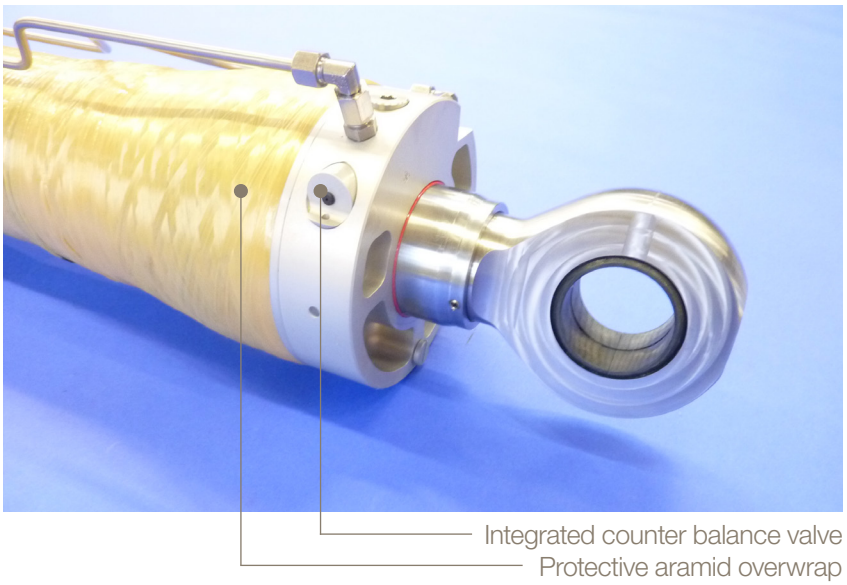
Additional Features

Customising your cylinder



Your product can additionally be equipped with optional features, for example:

- integrated valves
- stroke measurement systems
- alternative sealing systems
- protective overwraps
- ...

Exterior finishes for every application

All Lightraulics® products are available with different surface finishes:

Standard – black primed, pure carbon finish for general use.

Optional – abrasion resistant aramid fibre overwrap for harsh conditions.

Optional – clear coat or painted to customer specification.
Other cosmetic finishes on request.

For further questions on additional features, please contact CLDE_Quote@parker.com.

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Notes

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Lightraulics® Heavy Duty Cylinders

For working pressures up to 700 bar

A Revolution in Lifting

Ultra-lightweight Heavy Duty Cylinders from Parker Hannifin use Lightraulics® materials technology to transform the way in which loads are managed on-site.

In place of traditional steel lifting cylinders, which are heavy, cannot be moved without assistance and are difficult to locate accurately, Lightraulics® Heavy Duty Cylinders are built from corrosion-resistant lightweight alloys and carbon fibre composite materials.

Weighing typically between 1/3 and 1/4 of a comparable steel cylinder, they can be positioned quickly and accurately – often by a single operator.

The result: Higher productivity, a saving in time and manpower, and a reduced risk of injury.

Parker's ultra-light Composite Heavy Duty Tool Cylinders cut time on site, boost productivity, reduce the need for mechanical handling and enhance operator safety –
a win-win lifting solution.

Lightraulics® Heavy Duty Tool Cylinders for easy on-site load management are available in Roundline and Tie Rod design. To find the cylinder which fits your applications requirements, please see the table on page 25 and choose from a wide range of capacities on the following pages.

Typical Masses of Comparable Cylinders

Load tons	Stroke mm	Steel Cylinder kg	Aluminium Cylinder kg	Lightraulics® Cylinder kg
50	200	27	19	10
80	200	42	27	16
120	200	58	36	22
150	200	78	45	25
190	300	150	not available	36
220	300	180	not available	44
280	300	300	not available	57
405	300	420	not available	92

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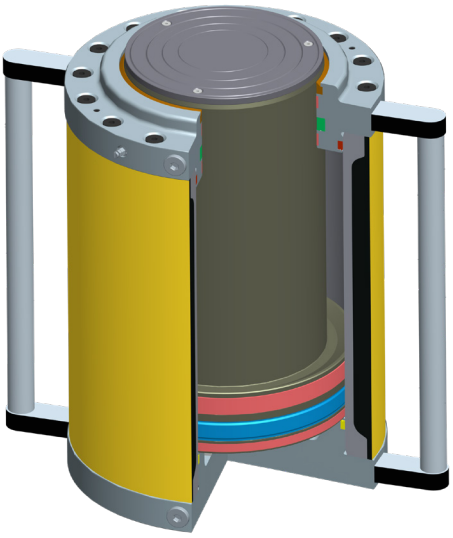
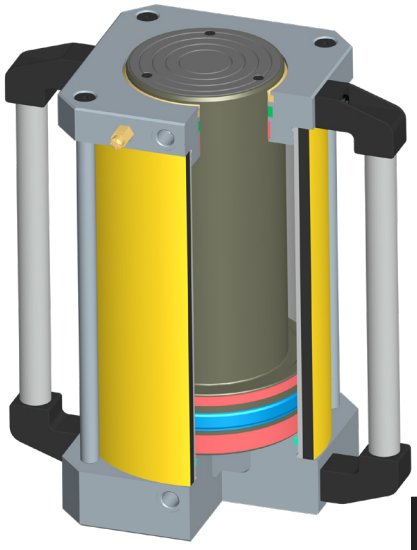


◄ Lightraulics® Heavy Duty Roundline Cylinder
with 150 bar retraction pressure
Available capacities: 150t - 535t

Lightraulics® Heavy Duty ► Tie Rod Cylinder
with 50 bar retraction pressure
Available capacities: 50t - 410t



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How to choose the best design for your application

Properties	Heavy Duty Roundline Cylinder ► p. 26	Heavy Duty Tie Rod Cylinder ► p. 30
Tonnage	150t - 535t	50t -410t
Stroke Length	150 - 300 mm	50 - 300 mm
Retraction Pressure	150 bar	50 bar
Retraction Speed	***	*
Weight saving	***	**
Outer dimensions	1.2 - 1.3 x bore Ø	1.1 - 1.2 x bore Ø

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Lightraulics® Heavy Duty Roundline Cylinders

For 700 bar working pressure

Product Specifications

Working pressure	700 bar (10,152 psi)
Retraction pressure	150 bar (2,175 psi)
Test pressure	770 bar (11,167 psi)
Stroke length	up to 300 mm
Maximum piston speed	0.3 m/s
Barrel material	thinwalled metal with composite reinforcement and abrasion protective aramid overwrap
Port size	both ports M 18x1,5
Sealing system	
– piston seal	thermoplastic polyester elastomer
– rod seal	polyurethane
– wiper seal	polyester-based
– O-rings	polyurethane
Temperature range	-10 °C to +65 °C
Fluid medium	mineral hydraulic oil

Product example ▶

Working pressure	700 bar (10,152 psi)
Retraction pressure	150 bar (2,175 psi)
Tonnage	150 t
Stroke	150 mm
Force	1496 kN
Weight	23 kg

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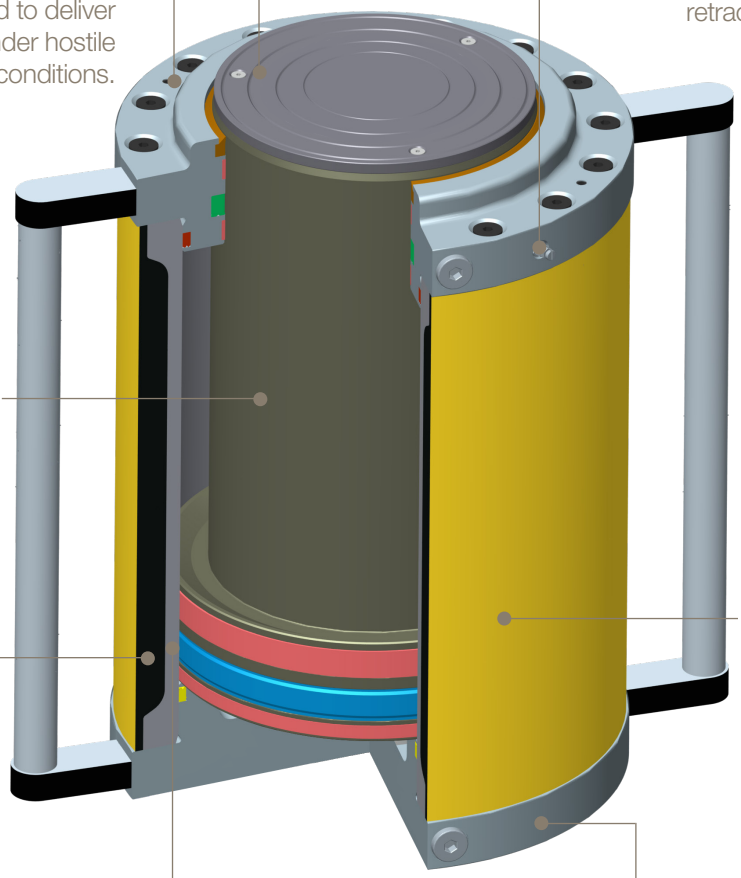

▼ Steel pressure plate
The steel pressure plate is machined from robust and hardened materials and is easily replaceable.

Lightweight gland end cap ▼
The gland end cap is machined from high grade aluminium alloy and surface treated to resist corrosion and to deliver high performance under hostile conditions.

▼ Pressure relief valve
A safety valve protects the cylinder by preventing over-pressurizing during retraction.

Aluminium piston rod ►
The low inertia lightweight piston rod permits rapid cycle times. The hard anodized rod resists wear, ensuring long life and high productivity.

◄ Aramid overwrap
The abrasion resistant aramid fibre overwrap protects the composite structure in harsh conditions.

Composite barrel ▲
With the carbon fibre reinforced composite structure working pressures up to 700 bar (10.152 psi) are possible.

▲ Liner
A thin-walled metal liner acts as a diffusion barrier and supports hoop loads. The wear resistant hard coating ensures high performance for thousands of cycles.

▲ Lightweight base end cap
The base end cap is machined from high grade aluminium alloy and surface treated to resist corrosion, even in aggressive environments.

C

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Lightraulics® Heavy Duty Roundline Cylinders - 150 bar Retraction

Performance

Tonnage	Stroke	Piston Area (cm^2)	Force (kN)	Mass (kg)
150t	150	213.8	1496	23
	200	213.8	1496	24.5
200t	150	283.5	1984	29.5
	180	283.5	1984	31
	250	283.5	1984	34.5
220t	150	314.1	2199	32
	250	314.1	2199	37
280t	150	397.6	2783	41.5
	250	397.6	2783	48
405t	150	572.5	4007	63.5
	250	572.5	4007	73.5
	300	572.5	4007	78.5
535t	150	754.7	5283	85
	250	754.7	5283	98.5

Dimensions

Tonnage	Stroke	A	B	C	D
150t	150	119	208	368	360
	200	119	208	418	360
200t	150	139	237	368	389
	180	139	237	398	389
	250	139	237	468	389
220t	150	144	247	372	399
	250	144	247	472	399
280t	150	164	280	382	432
	250	164	280	482	432
405t	150	204	335	398	487
	250	204	335	498	487
	300	204	335	548	487
535t	150	234	385	398	537
	250	234	385	498	537

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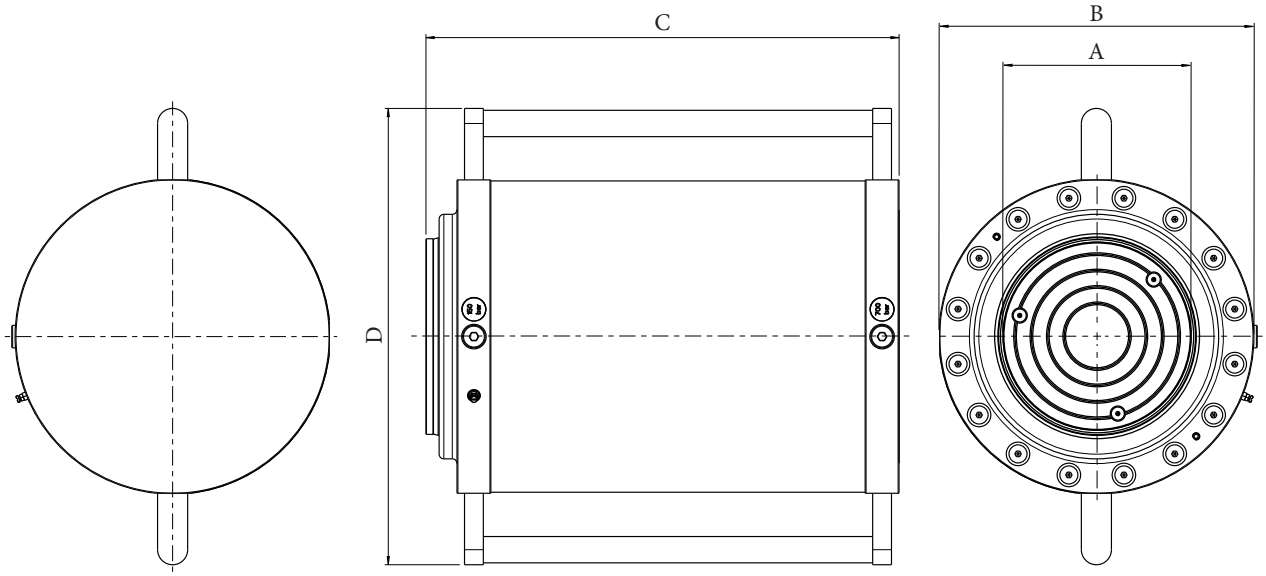

All dimensions are in millimetres unless otherwise stated. In line with our policy of continuos product improvement, specifications in this catalogue are subject to change without notice. Please enquire for exact dimensions when placing order.

C

Lightraulics® Heavy Duty Tie Rod Cylinders

For 700 bar working pressure

Product Specifications

Working pressure	700 bar (10,152 psi)
Retraction pressure	50 bar (725 psi)
Test pressure	770 bar (11,167 psi)
Stroke length	up to 300 mm
Maximum piston speed	0.3 m/s
Barrel material	thinwalled metal with composite reinforcement and abrasion protective aramid overwrap
Piston rod material	hard anodized aluminium
Tie rod material	anodized aluminium
Port size	both ports M 18x1,5
Sealing system	
– piston seal	thermoplastic polyester elastomer
– rod seal	polyurethane
– wiper seal	polyester-based
– O-rings	polyurethane
Temperature range	-10 °C to +65 °C
Fluid medium	mineral hydraulic oil

For customised specifications, please contact CLDE_Quote@parker.com with details of your application.

Product example ►

Working pressure	700 bar (10,152 psi)
Retraction pressure	50 bar (725 psi)
Tonnage	80 t
Stroke	200 mm
Force	792 kN
Weight	15.5 kg

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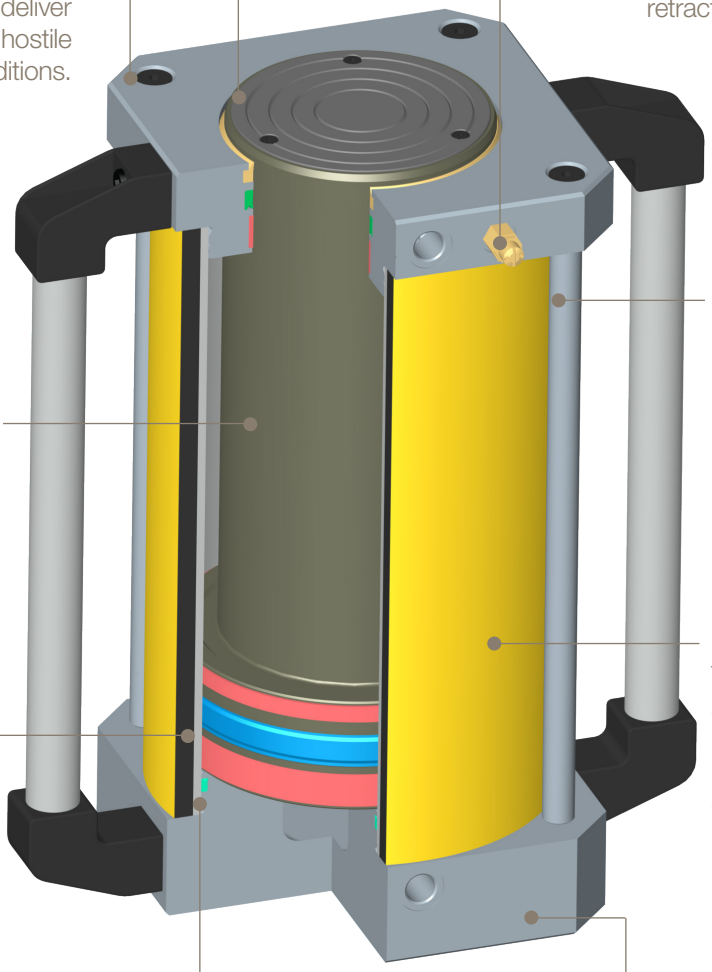

▼ Steel pressure plate
The steel pressure plate is machined from robust and hardened materials and is easily replaceable.

Lightweight gland end cap ▼
The gland end cap is machined from high grade aluminium alloy and surface treated to resist corrosion and to deliver high performance under hostile conditions.

▼ Pressure relief valve
A safety valve protects the cylinder by preventing over-pressurizing during retraction.

◄ Tie rods
The Heavy Duty Tool Cylinder is equipped with aluminium tie rods to carry the axial loads.

Aluminium piston rod ►
The low inertia lightweight piston rod permits rapid cycle times. The hard anodized rod resists wear, ensuring long life and high productivity.

◄ Aramid overwrap
The abrasion resistant aramid fibre overwrap protects the composite structure in harsh conditions.

Composite barrel ▲
With the carbon fibre reinforced composite structure working pressures up to 700 bar (10.152 psi) are possible.

▲ Liner
A thin-walled metal liner acts as a diffusion barrier and supports hoop loads. The wear resistant hard coating ensures high performance for thousands of cycles.

▲ Lightweight base end cap
The base end cap is machined from high grade aluminium alloy and surface treated to resist corrosion, even in aggressive environments.

C

Lightraulics® Heavy Duty Cylinders - 50 bar Retraction

Performance & Dimensions

Tonnage	Stroke	Piston Area (cm^2)	Force (kN)	Mass (kg)	A	B	C	D
50t	50	70.9	496	7.5	55	115	221	115[1)]
	100	70.9	496	8.5	55	115	271	115[1)]
	150	70.9	496	9	55	115	321	115[1)]
	200	70.9	496	10	55	115	371	115[1)]
	250	70.9	496	10.5	55	115	421	115[1)]
	300	70.9	496	11	55	115	471	115[1)]
80t	50	113.1	792	12	75	140	234	140[1)]
	100	113.1	792	13	75	140	284	140[1)]
	150	113.1	792	14	75	140	334	140[1)]
	200	113.1	792	15.5	75	140	384	140[1)]
	250	113.1	792	16.5	75	140	434	140[1)]
	300	113.1	792	17.5	75	140	484	140[1)]
120t	50	165.1	1156	17.5	99	165	244	165[1)]
	100	165.1	1156	19	99	165	294	165[1)]
	150	165.1	1156	21	99	165	344	165[1)]
	200	165.1	1156	22	99	165	394	165[1)]
	250	165.1	1156	23	99	165	444	165[1)]
	300	165.1	1156	25	99	165	494	165[1)]
150t	50	213.8	1497	19.5	108	190	249	346
	100	213.8	1497	21	108	190	299	346
	150	213.8	1497	24	108	190	349	346
	200	213.8	1497	25	108	190	399	346
	250	213.8	1497	27	108	190	449	346
	300	213.8	1497	29	108	190	499	346
190t	50	268.8	1882	25.5	133	215	269	371
	100	268.8	1882	27.5	133	215	319	371
	180	268.8	1882	31	133	215	399	371
	200	268.8	1882	31.5	133	215	419	371
	250	268.8	1882	34	133	215	469	371
	300	268.8	1882	36	133	215	519	371
220t	50	311	2177	29.5	143	232	269	389
	100	311	2177	33	143	232	319	389
	150	311	2177	35	143	232	369	389
	200	311	2177	38.5	143	232	419	389
	250	311	2177	41.5	143	232	469	389
	300	311	2177	44	143	232	519	389
280t	50	397.6	2783	38	163	260	279	416
	100	397.6	2783	42	163	260	329	416
	180	397.6	2783	47.5	163	260	409	416
	200	397.6	2783	49	163	260	429	416
	250	397.6	2783	53	163	260	479	416
	300	397.6	2783	56.5	163	260	529	416
405t	50	572.6	4008	49	192	324	284	480
	100	572.6	4008	54.5	192	324	334	480
	150	572.6	4008	70	192	324	384	480
	200	572.6	4008	77.5	192	324	434	480
	250	572.6	4008	83.5	192	324	484	480
	300	572.6	4008	91.5	192	324	534	480

1) Cylinder is not equipped with handle bars.

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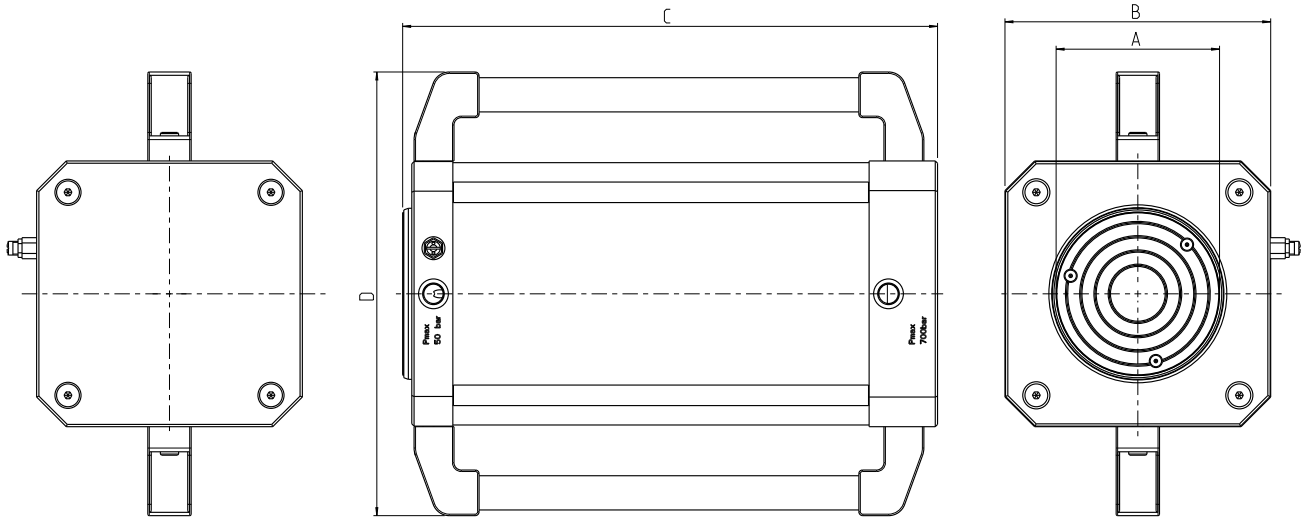
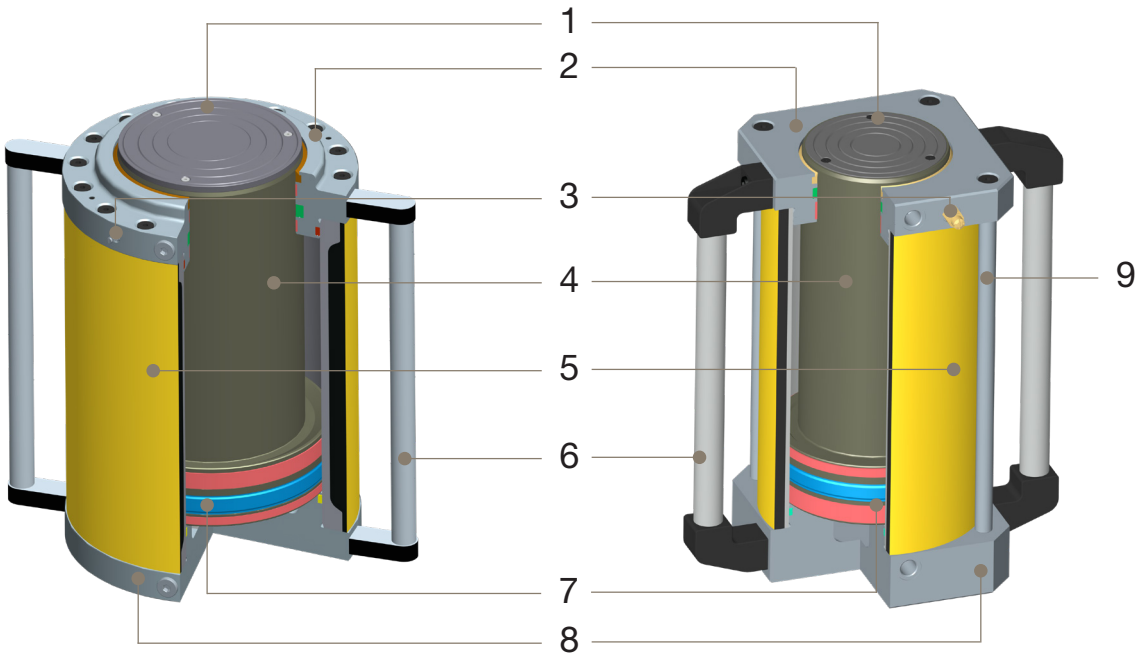


All dimensions are in millimeters unless otherwise stated. In line with our policy of continuous product improvement, specifications in this catalogue are subject to change without notice. Please enquire for exact dimensions when placing order.

C

Spare Parts

For all Lightraulics® cylinders, spare parts are available. To keep the warranty in effect, we recommend to send your cylinder to our factory for any maintenance work. If you like to enquire for a spare part for your Lightraulics® Heavy Duty Cylinder, please provide your cylinder serial number together with the type of spare part referring to the list below.



Product Type

1 - Pressure Plate
2 - Guiding End Cap
3 - Pressure Relief Valve
4 - Piston Rod
5 - Composite Cylinder Barrel
6 - Handle
7 - Seal Kit
8 - Base End Cap
9 - Tie Rod

Accessories

For further accessories like quick couplings, hoses, etc. please contact your local authorized Parker distributor.

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Order Code Lightraulics® Heavy Duty Cylinders

Please use the following order code to enquire for your Lightraulics® Heavy Duty Cylinder.

L	C						0	0	0				0	0

Cylinder Type

L	Lightraulics®

Product Type

C	Cylinder

Series Type

HDT	Heavy Duty Tie Rod
HDR	Heavy Duty Roundline

Tonnage

e.g. 150	150 t

Factory Use

000	-

Stroke in mm

e.g. 250	250 mm

Special Options

00	Standard

C

Overhaul Service

Maintaining peak performance

Parker's unique composite cylinder technology delivers continuous high performance over thousands of cycles.

To maintain the performance and to protect your investment, we offer a maintenance and overhaul service in our factory, to the same exacting standards as the original manufacturing process. Factory refurbished cylinders are covered by the same warranty terms as the original product.

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Lightraulics® Hollow Piston Cylinders

For working pressures up to 700 bar

Lightraulics® Hollow Piston Cylinders are mainly used in steel reinforced concrete construction, foundation engineering and wind turbine applications. Parker's ultra-light Hollow Piston Cylinders cut time on site, boost productivity, reduce the need for mechanical handling and enhance operator safety.
In place of traditional steel cylinders, which are heavy, cannot be moved without assistance and are difficult to locate accurately, Lightraulics® Hollow Piston Cylinders are weighing typically between 1/3 and 1/4 of a comparable steel cylinder. They are built from corrosion-resistant lightweight alloys and carbon fibre composite materials and can be positioned quick and easy – often by a single operator. The result: Higher productivity, a saving in time and manpower, and a reduced risk of injury.

Lightraulics® Hollow Piston Cylinders are available in tie rod and roundline design. All Hollow Piston Cylinder series are available in a wide range of capacities, with stroke lengths up to 350 mm. To find the series, which fits best for your application, please see the table on page 37.

Typical Masses of Comparable Tie Rod Cylinders

Load tones	Stroke mm	Steel Cylinder kg	Aluminium Cylinder kg	Lightraulics® Cylinder kg
80	250	80	44	23
120	180	88	57	25
140	250	125	75	36
170	250	185	not available	52
270	250	340	not available	69
400	250	590	not available	93

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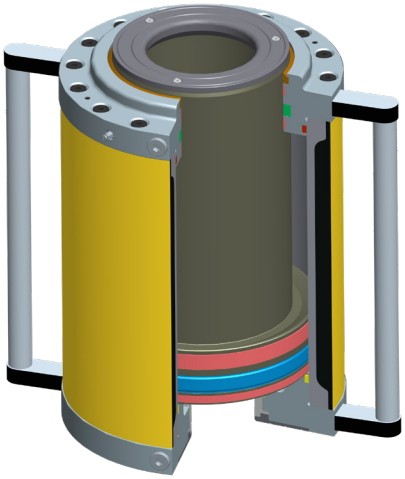
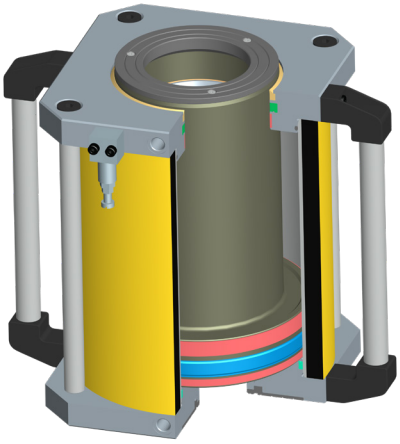
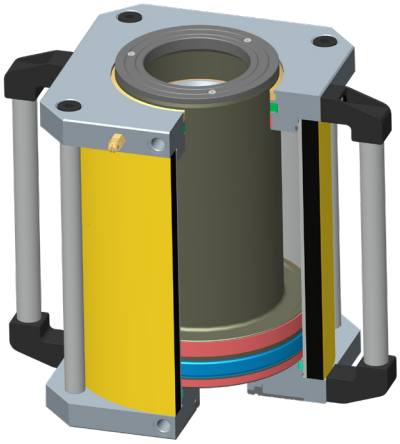


◄ Lightraulics® Hollow Piston Roundline Cylinder
with 150 bar retraction pressure
Available capacities: 100t - 500t

Lightraulics® Hollow Piston Tie Rod Cylinder ►
with 100 bar retraction pressure
Available capacities: 100t - 400t





◄ Lightraulics® Hollow Piston Tie Rod Cylinder
with 50 bar retraction pressure
Available capacities: 40t - 270t

How to choose the best design for your application

Properties	Hollow Piston Roundline Cylinders 150 bar retraction ► p. 38	Hollow Piston Tie Rod Cylinders 100 bar retraction ► p. 50	Hollow Piston Tie Rod Cylinders 50 bar retraction ► p. 46
Tonnage	100t -500t	100t -400t	40t -270t
Stroke Length	150 - 350 mm	100 - 300 mm	100 - 300 mm
Retraction Speed	***	**	*
Weight saving	***	**	***
Outer dimensions	1.6 - 1.7 x bore Ø	1.4 - 1.7 x bore Ø	1.4 - 2.0 x bore Ø
Additional attachment options	Alternative bolt pattern at top and bottom side	Alternative bolt pattern at top and bottom side	-

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Lightraulics® Hollow Piston Roundline Cylinders

For 700 bar working pressure

Product Specifications

Working pressure	700 bar (10,152 psi)
Retraction pressure	150 bar (2,175 psi)
Test pressure	770 bar (11,167 psi)
Stroke length	up to 300 mm
Maximum piston speed	0.3 m/s
Barrel material	thinwalled metal with composite reinforcement and abrasion protective aramid overwrap
Piston rod material	hard anodized aluminium
Port size	both ports M 18x1,5
Sealing system	
– piston seal	thermoplastic polyester elastomer
– rod seal	polyurethane
– wiper seal	polyester-based
– O-rings	polyurethane
Temperature range	-10 °C to +65 °C
Fluid medium	mineral hydraulic oil

For customised specifications, please contact CLDE_Quote@parker.com with details of your application.

Product example ▶

Working pressure	700 bar (10,152 psi)
Retraction pressure	150 bar (2,175 psi)
Tonnage	495 t
Passage	140 mm
Stroke	150 mm
Force	4859 kN
Weight	111.5 kg

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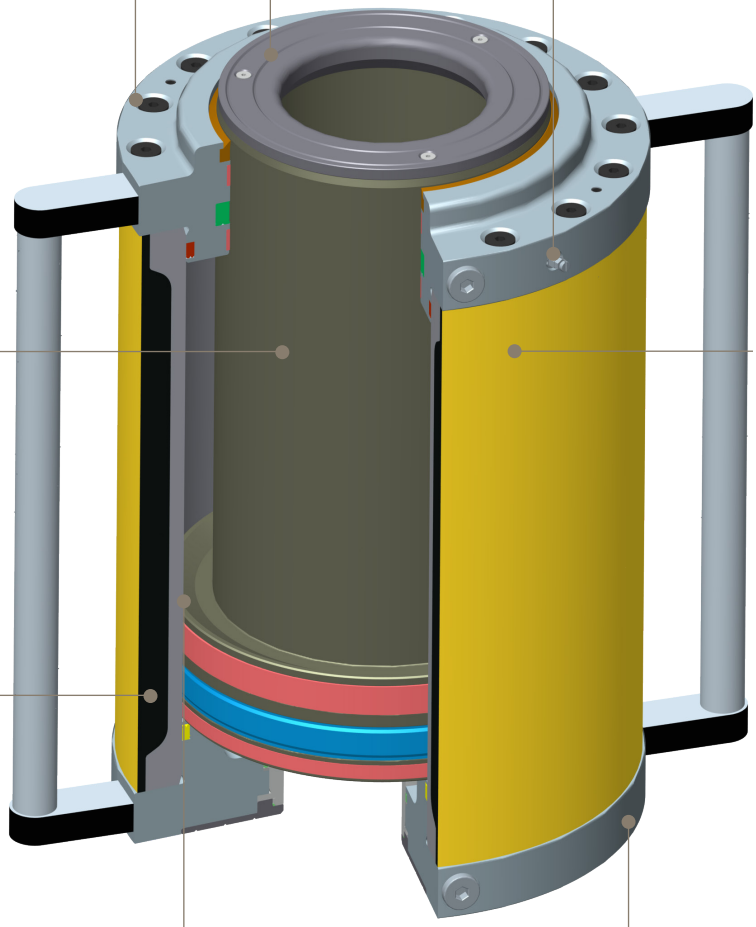
▼ Steel pressure plate
The steel pressure plate is machined from robust and hardened materials and is easily replaceable.

Lightweight gland end cap ▼
The gland end cap is machined from high grade aluminium alloy and surface treated to resist corrosion and to deliver high performance under hostile conditions.

▼ Pressure relief valve
A safety valve protects the cylinder by preventing over-pressurizing during retraction.



Lightweight hollow piston rod ►
The low inertia aluminium piston rod permits rapid cycle times. The hard anodized rod resists wear, ensuring long life and high productivity.

◄ Aramid overwrap
The abrasion resistant aramid fibre overwrap protects the composite structure in harsh conditions.

Composite barrel ▲
With the carbon fibre reinforced composite structure working pressures up to 700 bar (10.152 psi) are possible.

▲ Liner
A thin-walled metal liner acts as a diffusion barrier and supports hoop loads. The wear resistant hard coating ensures high performance for thousands of cycles.

▲ Lightweight base end cap
The base end cap is machined from high grade aluminium alloy and surface treated to resist corrosion, even in aggressive environments.

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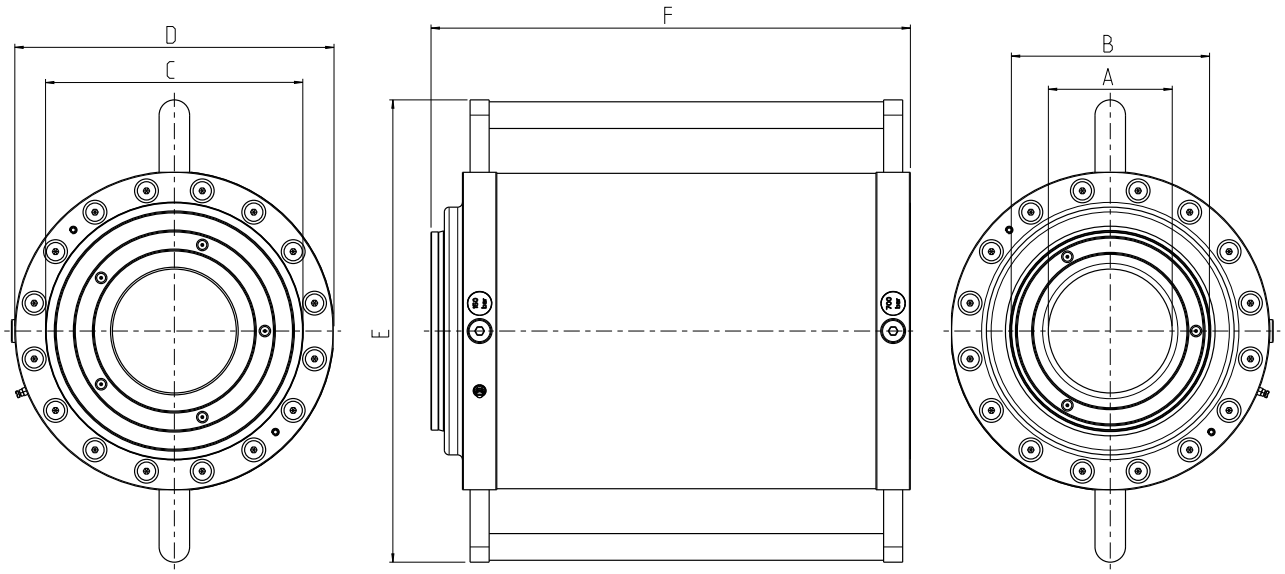
Lightraulics® Hollow Piston Roundline Cylinders - 150 bar Retraction

Performance

Tonnage	Passage	Stroke	Mass (kg)	Piston Area (cm^2)	Force (kN)
100t	83	150	24	142.9	1000
	83	200	27	142.9	1000
125t	90	150	29	179.6	1257
	90	180	30.5	179.6	1257
	90	250	34.5	179.6	1257
140t	105	150	35	201	1407
	105	250	42	201	1407
180t	110	150	47	264.8	1854
	110	250	56.5	264.8	1854
270t	130	150	68	395.8	2771
	130	250	81.5	395.8	2771
	130	300	88.5	395.8	2771
370t	145	150	90.5	527.7	3694
	145	250	108.5	527.7	3694
430t	110	150	88.5	600.8	4206

Dimensions - Standard Version

Tonnage	Passage	Stroke	A	B	C	D	E	F
100t	83	150	83	124	165	208	357	370
	83	200	83	124	165	208	357	420
125t	90	150	90	144	190	237	386	370
	90	180	90	144	190	237	386	400
	90	250	90	144	190	237	386	470
140t	105	150	105	149	200	247	397	374
	105	250	105	149	200	247	397	474
180t	110	150	110	168	225	276	426	384
	110	250	110	168	225	276	426	484
270t	130	150	130	208	270	335	485	403
	130	250	130	208	270	335	485	503
	130	300	130	208	270	335	485	553
370t	145	150	145	238	310	385	535	403
	145	250	145	238	310	385	535	503
430t	110	150	110	238	310	385	535	403



In addition to this standard version, Lightraulics® Hollow Piston Roundline Cylinders with 150 bar retraction pressure are also available with two alternative bolt patterns for additional attachment options at top and bottom side. For dimensions of this version please see pages 30.

All dimensions are in millimeters unless otherwise stated. In line with our policy of continuous product improvement, specifications in this catalogue are subject to change without notice. Please enquire for exact dimensions when placing order.

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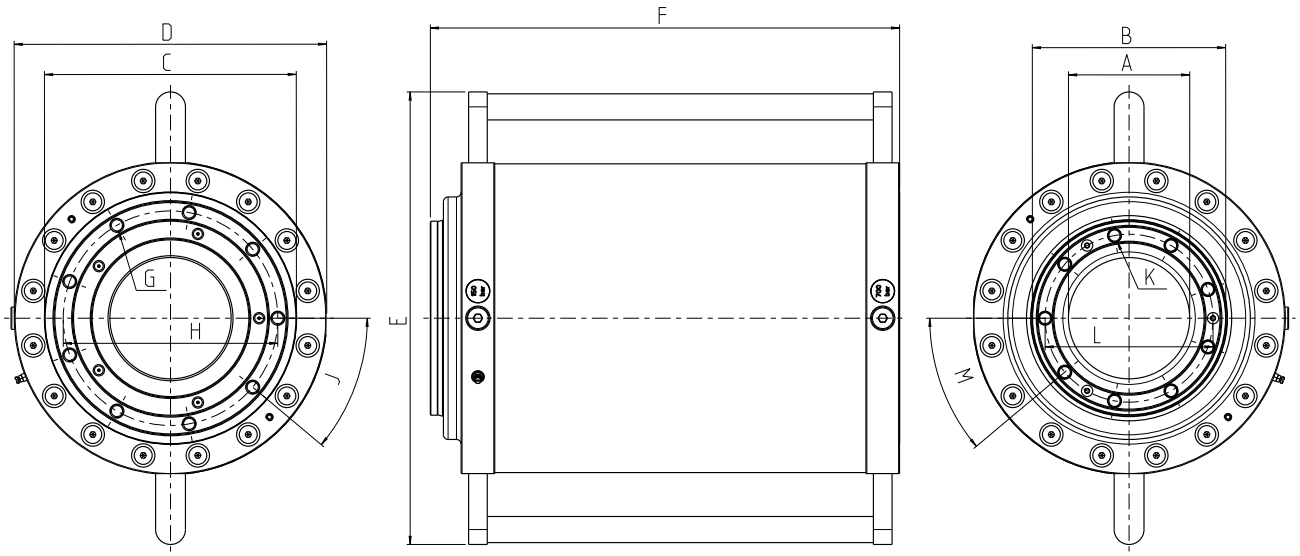
Dimensions - Alternative Bolt Pattern

For Additional Attachments at Top and Bottom Side

Tonnage	Passage	Stroke	A	B	C	D	E	F	G	H	J	K	L	M
100t	83	150	83	124	165	208	357	365	M12	142	5x72°	M8	110	12x30°
	83	200	83	124	165	208	357	415	M12	142	5x72°	M8	110	12x30°
125t	90	150	90	144	190	237	386	365	M12	165	10x36°	M8	130	15x24°
	90	180	90	144	190	237	386	395	M12	165	10x36°	M8	130	15x24°
	90	250	90	144	190	237	386	465	M12	165	10x36°	M8	130	15x24°
140t	105	150	105	149	200	251	401	369	M12	175	10x36°	M8	135	15x24°
	105	250	105	149	200	251	401	469	M12	175	10x36°	M8	135	15x24°
180t	110	150	110	168	225	280	430	379	M12	190	9x40°	M10	150	12x30°
	110	250	110	168	225	280	430	479	M12	190	9x40°	M10	150	12x30°
270t	130	150	130	208	270	335	485	395	M14	230	9x40°	M14	180	9x40°
	130	250	130	208	270	335	485	495	M14	230	9x40°	M14	180	9x40°
	130	300	130	208	270	335	485	545	M14	230	9x40°	M14	180	9x40°
370t	145	150	145	238	310	385	535	395	M16	260	9x40°	M16	205	9x40°
	145	250	145	238	310	385	535	495	M16	260	9x40°	M16	205	9x40°
430t	110	150	110	238	310	385	535	395	M16	257	9x40°	M16	190	9x40°



Note that these design variants do not include a pressure plate on the piston rod end (top side).

All dimensions are in millimeters unless otherwise stated. In line with our policy of continuous product improvement, specifications in this catalogue are subject to change without notice. Please enquire for exact dimensions when placing order.

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Notes

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Lightraulics® Hollow Piston Tie Rod Cylinders

For 700 bar working pressure

Product Specifications

Working pressure	700 bar (10,152 psi)
Retraction pressure	50 bar (725 psi) and 100 bar (1,450 psi)
Test pressure	770 bar (11,167 psi)
Stroke length	up to 300 mm
Maximum piston speed	0.3 m/s
Barrel material	thinwalled metal with composite reinforcement and abrasion protective aramid overwrap
Piston rod material	hard anodized aluminium
Tie rod material	anodized aluminium (for 50 bar retraction pressure) galvanised steel (for 100 bar rectraction pressure)
Port size	both ports M 18x1,5
Sealing system	
– piston seal	thermoplastic polyester elastomer
– rod seal	polyurethane
– wiper seal	polyester-based
– O-rings	polyurethane
Temperature range	-10 °C to +65 °C
Fluid medium	mineral hydraulic oil

For customised specifications, please contact CLDE_Quote@parker.com with details of your application.

Product example ►

Working pressure	700 bar (10,152 psi)
Retraction pressure	50 bar (725 psi)
Tonnage	140 t
Passage	105 mm
Stroke	250 mm
Force	1385 kN
Weight	35.5 kg

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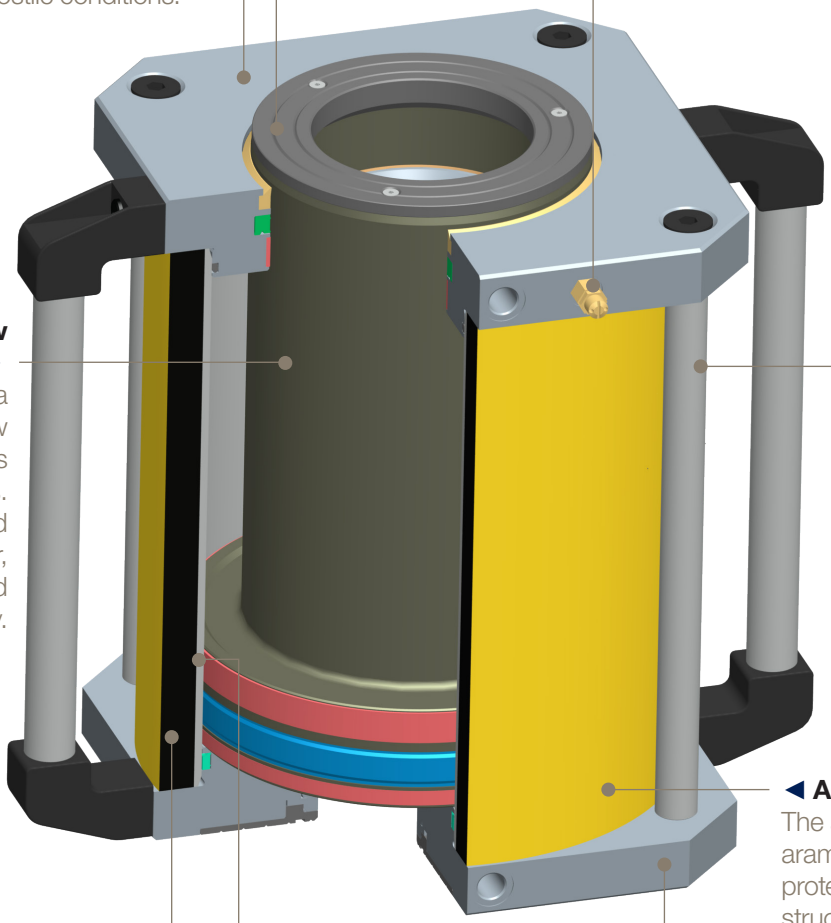
▼ Steel pressure plate
The steel pressure plate is machined from robust and hardened materials and is easily replaceable.

Lightweight gland end cap ▼
The gland end cap is machined from high grade aluminium alloy and surface treated to resist corrosion and to deliver high performance under hostile conditions.

▼ Pressure relief valve
A safety valve protects the cylinder by preventing over-pressurizing during retraction.



Lightweight hollow piston rod ►
The low inertia aluminium hollow piston rod permits rapid cycle times. The hard anodized rod resists wear, ensuring long life and high productivity.

◄ Tie rods
The Hollow Piston Cylinder is equipped with aluminium tie rods (for 50 bar retraction) or steel tie rods (for 100 bar retraction) to carry the axial loads.

◄ Aramid overwrap
The abrasion resistant aramid fibre overwrap protects the composite structure in harsh conditions.

Composite barrel ▲
With the carbon fibre reinforced composite structure working pressures up to 700 bar (10.152 psi) are possible.

▲ Liner
A thin-walled metal liner acts as a diffusion barrier and supports hoop loads. The wear resistant hard coating ensures high performance for thousands of cycles.

▲ Lightweight base end cap
The base end cap is machined from high grade aluminium alloy and surface treated to resist corrosion, even in aggressive environments.

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Lightraulics® Hollow Piston Tie Rod Cylinders - 100 bar Retraction

Performance

Tonnage	Passage	Stroke	Piston Area (cm^2)	Force (kN)	Mass (kg)
100t	83	100	141.4	990	20
	83	150	141.4	990	22.5
	83	200	141.4	990	25.5
	83	250	141.4	990	28
120t	90	100	167.8	1175	22.5
	90	180	167.8	1175	27
	90	250	167.8	1175	30.5
	90	300	167.8	1175	33
	100	100	167.8	1175	24.5
	100	180	167.8	1175	29.5
	100	250	167.8	1175	34
	100	300	167.8	1175	37.5
140t	105	100	197.9	1385	28
	105	180	197.9	1385	33
	105	250	197.9	1385	38
	105	300	197.9	1385	41.5
170t	110	100	254.5	1781	40
	110	180	254.5	1781	48.5
	110	250	254.5	1781	55.5
	110	300	254.5	1781	60.5
200t	150	100	274.5	1922	51
	150	180	274.5	1922	61
	150	250	274.5	1922	70
	150	300	274.5	1922	76.5
270t	130	100	396.5	2775	55
	130	180	396.5	2775	66.5
	130	250	396.5	2775	76.5
	130	300	396.5	2775	84
360t	145	100	505.6	3539	83
	145	180	505.6	3539	97
	145	250	505.6	3539	110
	145	300	505.6	3539	119

All dimensions are in millimeters unless otherwise stated. In line with our policy of continuous product improvement, specifications in this catalogue are subject to change without notice. Please enquire for exact dimensions when placing order.

In addition to the standard version, Lightraulics® Hollow Piston Tie Rod Cylinders with 100 bar retraction are also available with alternative bolt patterns for additional attachement options at top and bottom side. For dimensions of this version please see pages 36.

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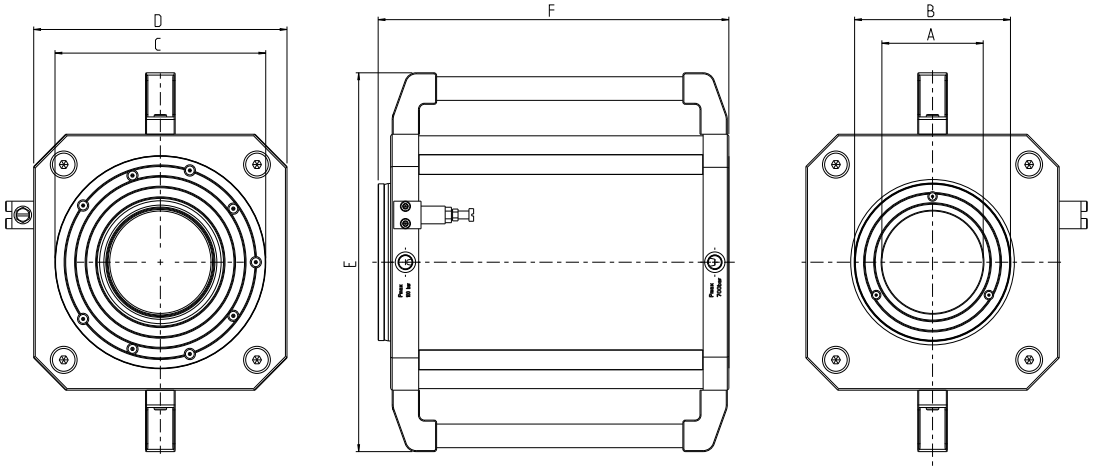
Dimensions - Standard Version

Tonnage	Passage	Stroke	A	B	C	D	E	F
100t	83	100	83	125	165	194	350	282
	83	150	83	125	165	194	350	332
	83	200	83	125	165	194	350	382
	83	250	83	125	165	194	350	432
120t	90	100	90	145	186	217	273	282
	90	180	90	145	186	217	273	362
	90	250	90	145	186	217	273	432
	90	300	90	145	186	217	273	482
	100	100	100	150	186	217	273	383
	100	180	100	150	186	217	273	363
	100	250	100	150	186	217	273	433
	100	300	100	150	186	217	273	483
140t	105	100	105	150	199	235	391	283
	105	180	105	150	199	235	391	363
	105	250	105	150	199	235	391	433
	105	300	105	150	199	235	391	483
170t	110	100	110	170	225	265	421	297
	110	180	110	170	225	265	421	377
	110	250	110	170	225	265	421	447
	110	300	110	170	225	265	421	497
200t	150	100	150	230	270	325	481	299
	150	180	150	230	270	325	481	379
	150	250	150	230	270	325	481	449
	150	300	150	230	270	325	481	499
270t	130	100	130	200	270	325	481	300
	130	180	130	200	270	325	481	380
	130	250	130	200	270	325	481	450
	130	300	130	200	270	325	481	500
360t	145	100	145	250	320	405	561	319
	145	180	145	250	320	405	561	399
	145	250	145	250	320	405	561	469
	145	300	145	250	320	405	561	519



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Lightraulics® Hollow Piston Tie Rod Cylinders - 100 bar Retraction

Dimensions - Alternative Bolt Pattern

For Additional Attachments at Top and Bottom Side

Tonnage	Passage	Stroke	A	B	C	D	E	F	G	H	J	K	L	M
100t	83	100	83	125	165	194	350	278	M12	131.5	5x72°	M6	111	15x24°
	83	150	83	125	165	194	350	328	M12	131.5	5x72°	M6	111	15x24°
	83	200	83	125	165	194	350	378	M12	131.5	5x72°	M6	111	15x24°
	83	250	83	125	165	194	350	428	M12	131.5	5x72°	M6	111	15x24°
120t	90	100	90	145	186	217	273	278	M12	162.5	5x72°	M6	130	15x24°
	90	180	90	145	186	217	273	358	M12	162.5	5x72°	M6	130	15x24°
	90	250	90	145	186	217	273	428	M12	162.5	5x72°	M6	130	15x24°
	90	300	90	145	186	217	273	478	M12	162.5	5x72°	M6	130	15x24°
	100	100	100	150	186	217	273	378	M12	162.5	5x72°	M8	133	12x30°
	100	180	100	150	186	217	273	358	M12	162.5	5x72°	M8	133	12x30°
	100	250	100	150	186	217	273	428	M12	162.5	5x72°	M8	133	12x30°
	100	300	100	150	186	217	273	478	M12	162.5	5x72°	M8	133	12x30°
140t	105	100	105	150	199	235	391	278	M12	175		M8	135	12x30°
	105	180	105	150	199	235	391	358	M12	175	*1	M8	135	12x30°
	105	250	105	150	199	235	391	428	M12	175		M8	135	12x30°
	105	300	105	150	199	235	391	478	M12	175		M8	135	12x30°
170t	110	100	110	170	225	265	421	292	M12	185	2x42°	M10	153	12x30°
	110	180	110	170	225	265	421	372	M12	185	2x48°	M10	153	12x30°
	110	250	110	170	225	265	421	442	M12	185	2x42°	M10	153	12x30°
	110	300	110	170	225	265	421	492	M12	185	3x35°	M10	153	12x30°
200t	150	100	150	230	270	325	481	292	M14	242.5	5x72°	M8	212	12x30°
	150	180	150	230	270	325	481	372	M14	242.5	5x72°	M8	212	12x30°
	150	250	150	230	270	325	481	442	M14	242.5	5x72°	M8	212	12x30°
	150	300	150	230	270	325	481	492	M14	242.5	5x72°	M8	212	12x30°
270t	130	100	130	200	270	325	481	292	M14	205	8x45°	M12	175	12x30°
	130	180	130	200	270	325	481	372	M14	205	8x45°	M12	175	12x30°
	130	250	130	200	270	325	481	442	M14	205	8x45°	M12	175	12x30°
	130	300	130	200	270	325	481	492	M14	205	8x45°	M12	175	12x30°
360t	145	100	145	250	320	405	561	311	M14	270		M12	220	12x30°
	145	180	145	250	320	405	561	391	M14	270	*2	M12	220	12x30°
	145	250	145	250	320	405	561	461	M14	270		M12	220	12x30°
	145	300	145	250	320	405	561	511	M14	270		M12	220	12x30°

Notes:
*1: 2x42° + 2x48° + 2x42° + 3x32°
*2: 2x45° + 1x35° + 1x55° + 2x42° + 1x35°

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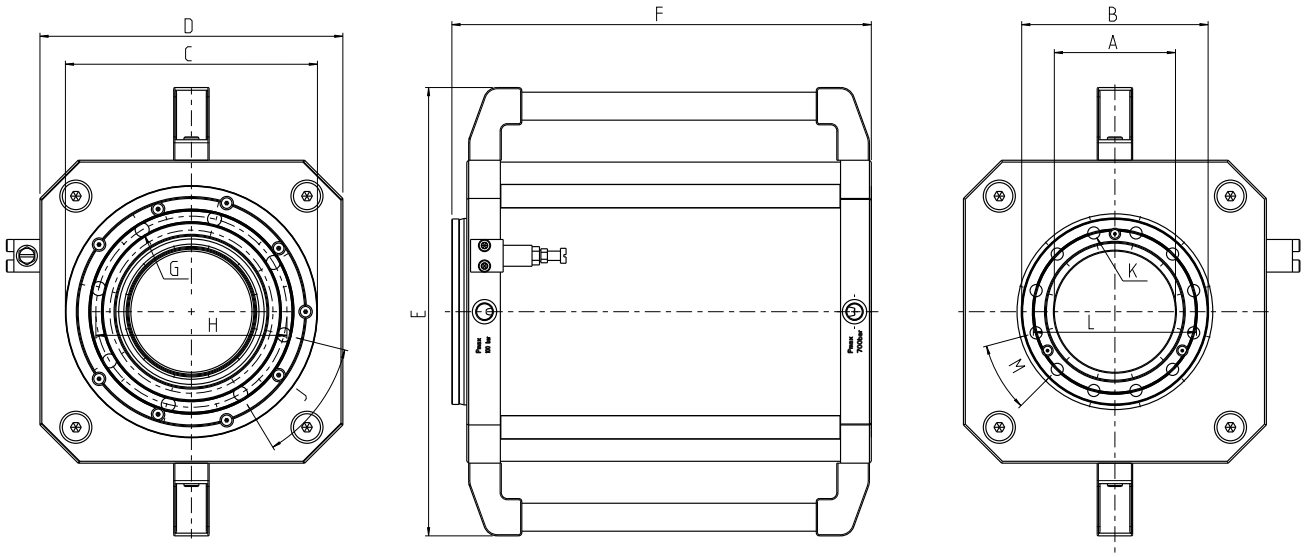

Note that these design variants do not include a pressure plate on the piston rod end (top side).

All dimensions are in millimeters unless otherwise stated. In line with our policy of continuous product improvement, specifications in this catalogue are subject to change without notice. Please enquire for exact dimensions when placing order.

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Lightraulics® Hollow Piston Tie Rod Cylinders - 50 bar Retraction

Performance

Tonnage	Passage	Stroke	Piston Area (cm^2)	Force (kN)	Mass (kg)
80t	80	100	118.8	832	18
	80	150	118.8	832	20
	80	200	118.8	832	22
	80	250	118.8	832	24
100t	83	100	141.4	990	19
	83	150	141.4	990	21.5
	83	200	141.4	990	23.5
	83	250	141.4	990	26
120t	90	100	167.8	1175	21.5
	90	180	167.8	1175	25.5
	90	250	167.8	1175	28.5
	90	300	167.8	1175	31
	100	100	167.8	1175	23.5
	100	180	167.8	1175	28
	100	250	167.8	1175	32
	100	300	167.8	1175	35
140t	105	100	197.9	1385	26.5
	105	180	197.9	1385	31.5
	105	250	197.9	1385	35.5
	105	300	197.9	1385	39
170t	110	100	254.5	1781	38
	110	180	254.5	1781	45.5
	110	250	254.5	1781	51.5
	110	300	254.5	1781	56.5
200t	150	100	274.5	1922	49
	150	180	274.5	1922	58.5
	150	250	274.5	1922	66.5
	150	300	274.5	1922	72.5
270t	130	100	396.5	2775	54.5
	130	180	396.5	2775	64.5
	130	250	396.5	2775	73
	130	300	396.5	2775	79.5

All dimensions are in millimeters unless otherwise stated. In line with our policy of continuous product improvement, specifications in this catalogue are subject to change without notice. Please enquire for exact dimensions when placing order.

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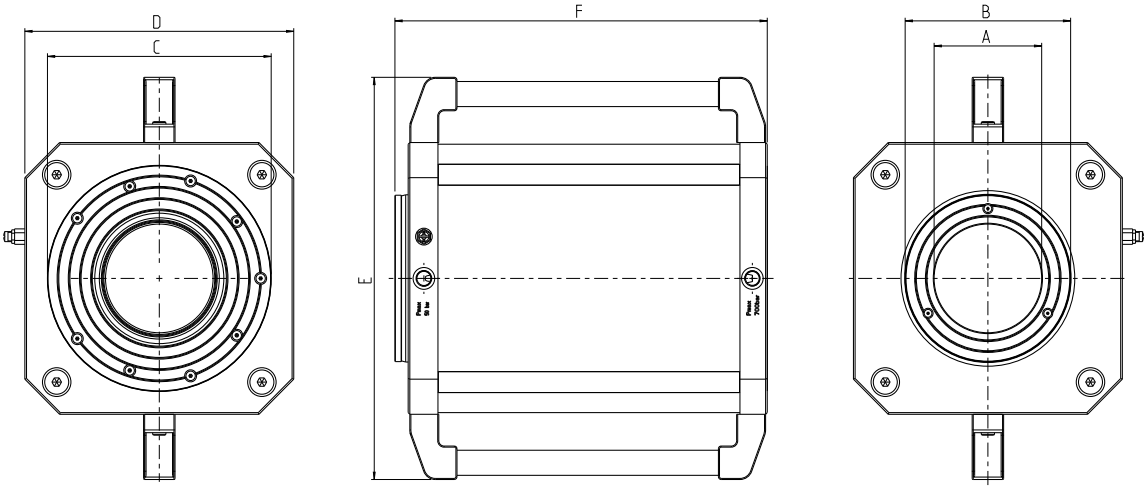
Composite Technologies Europe CTE
Stuhr, Germany

Dimensions

Tonnage	Passage	Stroke	A	B	C	D	E	F
80t	80	100	80	130	165	194	350	282
	80	150	80	130	165	194	350	332
	80	200	80	130	165	194	350	382
	80	250	80	130	165	194	350	432
100t	83	100	83	125	165	194	350	282
	83	150	83	125	165	194	350	332
	83	200	83	125	165	194	350	382
	83	250	83	125	165	194	350	432
120t	90	100	90	145	186	217	373	282
	90	180	90	145	186	217	373	362
	90	250	90	145	186	217	373	432
	90	300	90	145	186	217	373	482
	100	100	100	147	186	217	373	283
	100	180	100	147	186	217	373	363
	100	250	100	147	186	217	373	433
	100	300	100	147	186	217	373	483
140t	105	100	105	150	199	235	391	283
	105	180	105	150	199	235	391	363
	105	250	105	150	199	235	391	433
	105	300	105	150	199	235	391	483
170t	110	100	110	170	225	265	421	297
	110	180	110	170	225	265	421	377
	110	250	110	170	225	265	421	447
	110	300	110	170	225	265	421	497
200t	150	100	150	230	270	325	481	299
	150	180	150	230	270	325	481	379
	150	250	150	230	270	325	481	449
	150	300	150	230	270	325	481	489
270t	130	100	130	200	270	325	481	300
	130	180	130	200	270	325	481	380
	130	250	130	200	270	325	481	450
	130	300	130	200	270	325	481	500

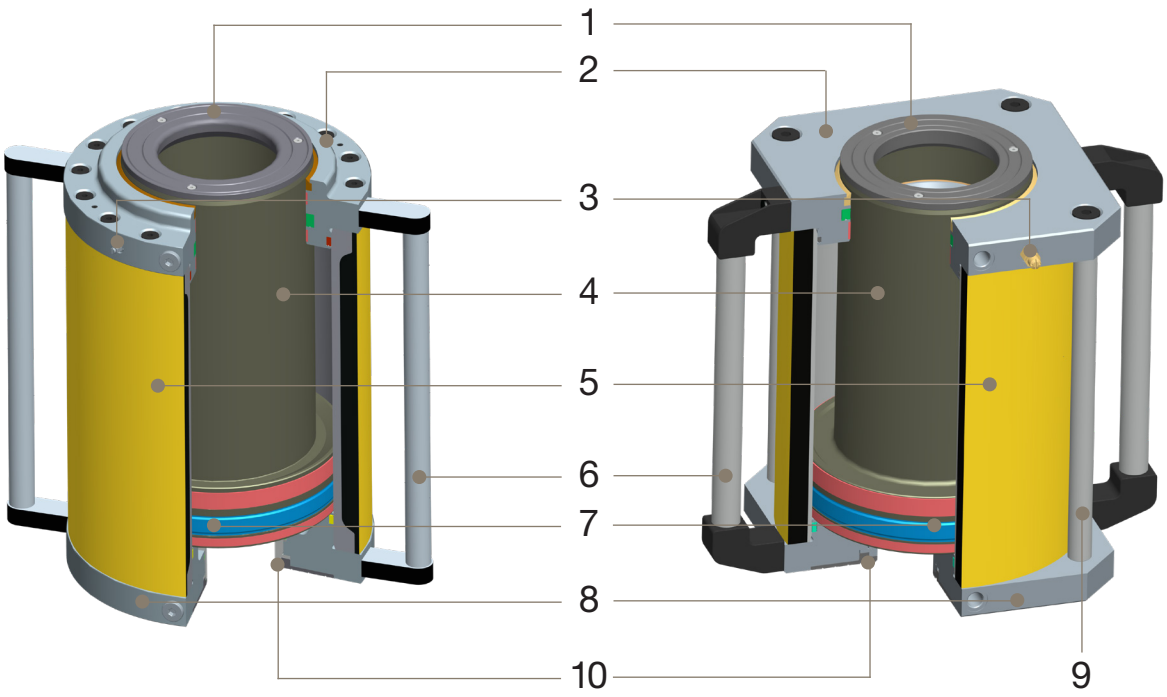
D



Parker Hannifin Corporation
Composite Technologies Europe CTE
Stuhr, Germany

Spare Parts

For all Lightraulics® cylinders, spare parts are available. To keep the warranty in effect, we recommend to send your cylinder to our factory for any maintenance work. If you like to enquire for a spare part for your Lightraulics® Hollow Piston Cylinder, please provide your cylinder serial number together with the type of spare part referring to the list below.



Product Type

1 - Pressure Plate
2 - Guiding End Cap
3 - Pressure Relief Valve
4 - Piston Rod
5 - Composite Cylinder Barrel
6 - Handle
7 - Seal Kit
8 - Base End Cap
9 - Tie Rod
10 - Base Plate

Accessories

For further accessories like quick couplings, hoses, etc. please contact your local authorized Parker distributor.

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Order Code Lightraulics® Hollow Piston Cylinders

Please use the following order code to enquire for your Lightraulics® Hollow Piston Cylinder.

L	C													

Cylinder Type

L	Lightraulics®

Product Type

C	Cylinder

Series Type

HPT	Hollow Piston Tie Rod
HPR	Hollow Piston Roundline

Tonnage

e.g. 080	80 t

Passage in mm

e.g. 083	83 mm

Stroke in mm

e.g. 250	250 mm

Special Options

00	Standard
01	100 bar Retraction Pressure
02	Additional Attachments Top and Bottom Side

D

Overhaul Service

Maintaining peak performance

Parker's unique composite cylinder technology delivers continuous high performance over hundreds of thousands of cycles.

To maintain the performance and to protect your investment, we offer a maintenance and overhaul service in our own factory, to the same exacting standards as the original manufacturing process. Factory refurbished cylinders are covered by the same warranty terms as the original product.

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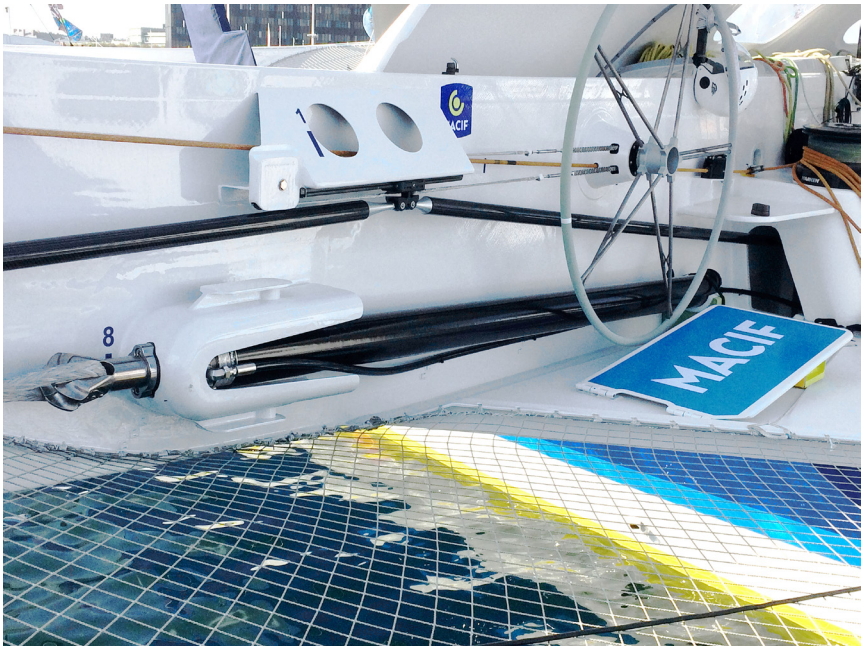
Stuhr, Germany

Lightraulics® Yachting Cylinders

Carbon fibre composite components deliver enhanced performance in yachting applications through light weight, exceptional strength, corrosion resistance and the inherent damping characteristics of the material.
Stylish and technically sophisticated, Parker's Lightraulics® Composite Cylinders are ideally suited to marine leisure and competition applications.
Lightraulics® Cylinders for yachting applications are available in a wide product range, e. g.

- Vang cylinders
- Canting keel cylinders
- Lifting keel cylinders
- Mast canting cylinders
- Rigging cylinders
- Foil setting cylinders
- Deck crane cylinders

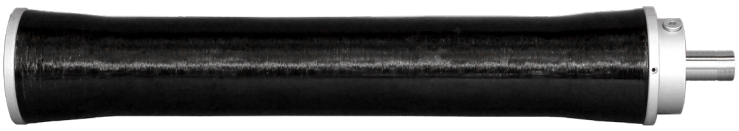
Lightraulics® yachting cylinders will be designed especially for your application. Please contact CLDE_Quote@parker.com with your specifications.



© Trimaran MACIF

▲ Mast Canting Cylinder

Woring pressure	350 bar
Piston diameter	100 mm
Stroke	2500 mm
Weight	30 kg



▲ Stay Tensioning Cylinder

Working pressure	350 bar (5076 psi)
Piston diameter	100 mm
Stroke	700 mm
Weight	11 kg

Foil Setting Cylinder ▲

Working pressure	300 bar (4351 psi)
Piston diameter	100 mm
Stroke	1550 mm
Weight	28 kg

Lifting Keel Cylinders ►

Working pressure	350 bar (5076 psi)
Piston diameter	125 mm
Stroke	2250 mm
Weight	93 kg

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© ORACLE TEAM USA / Photo Javier Salinas

◄ ORACLE TEAM USA

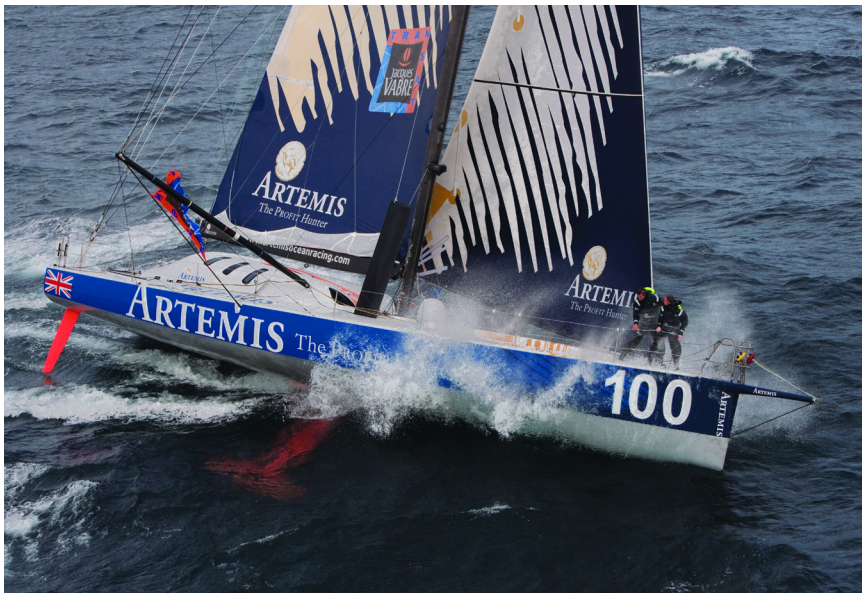
The America's Cup 2017 ORACLE TEAM USA racing yacht was completely supplied with hydraulics from Parker.

All participating yachts were exclusively equipped with Parker Lightraulics® Composite Piston Accumulators for foil setting and float rudder raking.

MACIF100 Trimaran ►

The new trimaran MACIF100, designed by the french skipper François Gabart, was equipped with Parker Lightraulics® cylinders for mast canting, foil setting and tensioning of the stays. Amongst many more, the programme for the trimaran includes the Route du Rhum race 2018 and a solo round the world attempt.

© Vincent Curutchet / DPPI / Macif



◄ Artemis II racing yacht

Fitted with Parker composite canting keel cylinders, Artemis II set a new record for Open 60 class in the 2010 Sevenstar Race around Britain and Ireland.

E

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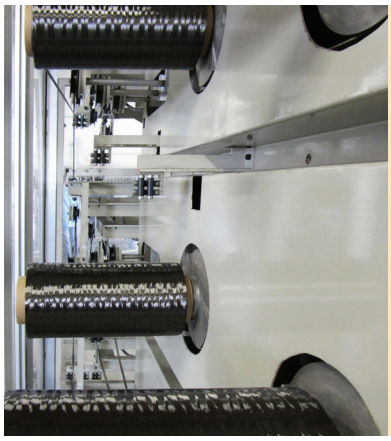

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