

HYDRAULIC STEERING SYSTEMS FOR INBOARD MOTOR BOATS

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HYDRAULIC STEERING SYSTEMS

INTRODUCTION

LS Hydraulic Steering Systems

Our hydraulic steering systems **are perfectly adapted** to outboard and inboard motor boats and pleasure, sporting, fishing and commercial applications and to monohull and multihull sailing-boats.

They **are easy to install**, state of the art machine finished and **made to resist a marine environment**.

You can easily select **the best suited system for your boat** within a range of more than **20 pumps and 30 cylinders** which will provide **efficiency, reliability and smoothness**.

Our systems carry a **2 year warranty** and our range of cylinders for fishing and work boats **is approvable** by Classification Societies such as **BV, ABS, LRS, GL** and others.

All our cylinders and pumps are CE approved.

DESCRIPTION OF LS HYDRAULIC STEERING SYSTEMS

As a general rule, the basic set up of a steering system includes:

- 1 cylinder,
- 1 manual pump,
- tubing to connect the cylinder to the manual pump.

Other elements will be added to this basic set up in function of the number of steering stations or rudders to be operated, and of the installation of a power unit for automatic or non automatic pilot.

Cylinder

The cylinder is the dictating element towards the selection of a system as it gives the power to the steering system. To select a cylinder, follow the instructions on page 4.

Manual pump

The manual pump is an axial piston pump which makes it possible to suck and force back the oil contained in the circuit when the wheel is turned. Its cubic capacity determines the number of turns required for a lock to lock manoeuvre. The pump is fitted with a lock valve which prevents rudder or motor movement when the helm is not operated. Some models are fitted with pressure relief valves which protect the circuit against abnormal pressure increase.

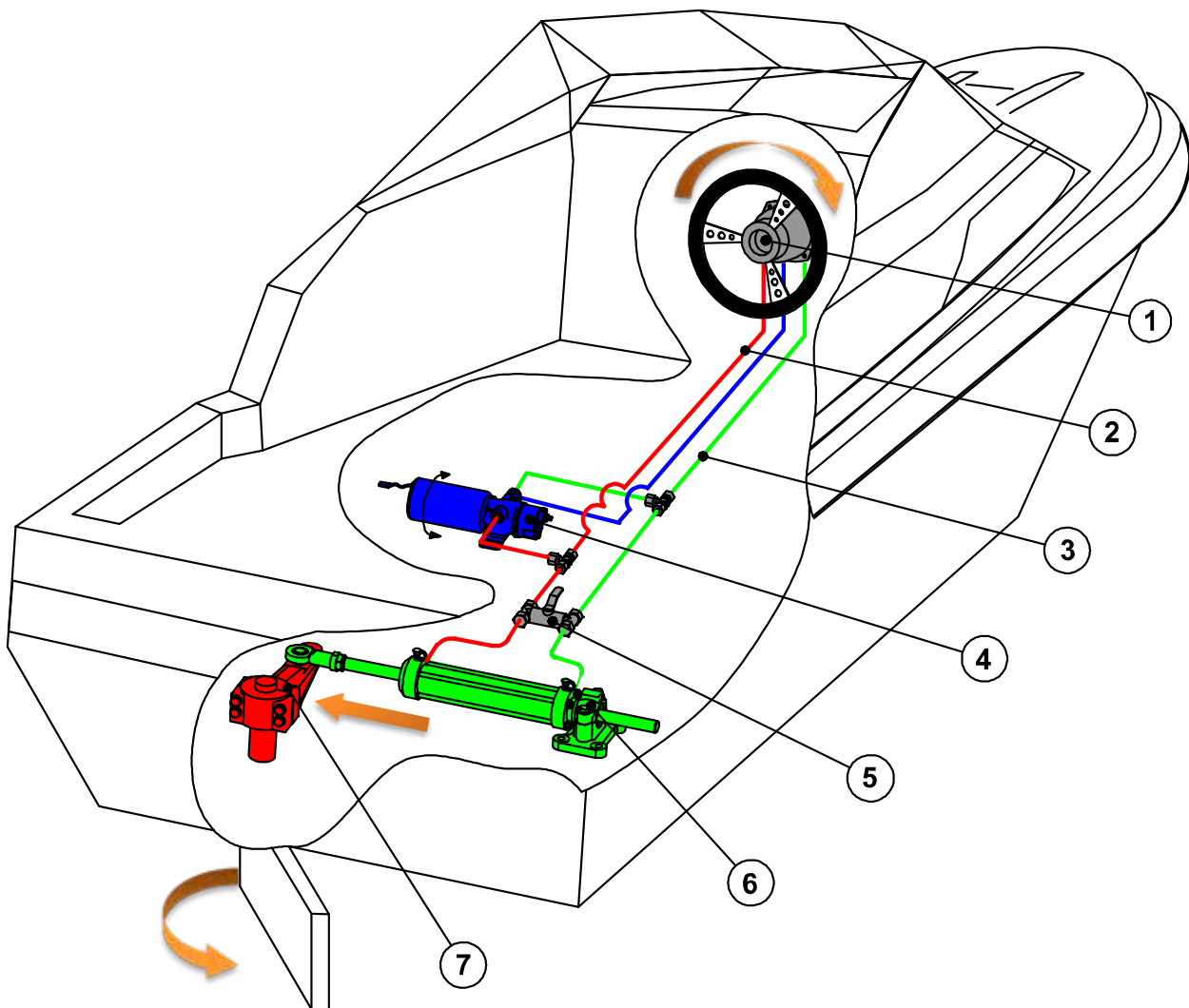
Tubing

Only tubing designed for hydraulic transfer is to be used. The tube diameter is calculated in function of the pump cubic capacity (see charts pages 7,8 and 12). Maximum efficiency is achieved with inflexible tubing, however flexible tubing may be used for torque levels not exceeding 100 kpm.

HYDRAULIC STEERING SYSTEMS

WORKING PRINCIPLE

- ① Manual pump
- ② Port circuit Tubing
- ③ Starboard circuit Tubing
- ④ Power pack
- ⑤ By-pass valve
- ⑥ Cylinder
- ⑦ Tiller arm



When the helm is turned to starboard, the pump (1) sucks the oil from the port circuit (2) and pushes it back into the starboard circuit (3), thus driving the cylinder rod (6) which in turn displaces the rudder or motor.

The cylinder body (6) is fixed to the boat.

HYDRAULIC STEERING SYSTEMS

SELECTION OF A HYDRAULIC STEERING SYSTEM

- **For boats fitted with a rudder** with speed not exceeding 25 knots, the torque of the rudder or rudders is calculated according to following formula and corrections.

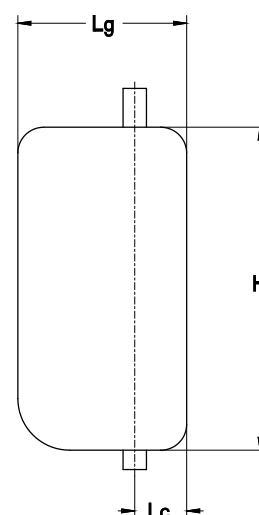
It must be known that the torque necessary to manoeuvre a boat depends on:

- the speed of the water flowing on the surface of the rudder at a certain angle,
- the rudder size,
- the total sweep of the rudder (and part of the boat), if the rudder stock is not perpendicular,
- the compensating surface of the rudder.

Torque Calculation Formula for Speed below 25 Knots

$$C = S \times [(0.4 L_g) - L_c] \times V^2 \times K$$

- C** = Torque in kpm
S = Total surface of rudder (H x Lg) in sq. m
H = Height of rudder in m
Lg = Width of rudder in m
Lc = Compensation width in m
V = Maximum speed of the boat in knots
K = Coefficient according to total angle of rudder
- Port to starboard 70° **K = 15.89**
 - Port to starboard 80° **K = 17.80**
 - Port to starboard 90° **K = 19.52**



Corrections in function of the type of boat:

- For sailing-boats **C x 0.5**
- For a boat with a steering nozzle **C x 2.0**
- For twin engine power boats with 1 rudder **C x 0.5**
- For boats fitted with several rudders (catamarans, trimarans, monohulls), multiply the calculated torque result by the number of rudders fitted on the boat.

Once the torque is known, the appropriate cylinder is selected (pages 6 or 11) and one or two manual pumps will be added accordingly (pages 6 or 11).

Note: If the selected pump has a higher flow rate in order to reduce the number of turns lock to lock, it will be necessary to use a steering wheel with the maximum recommended diameter.

- **For pleasure boats with planing or semi-planing hulls** and speed exceeding 25 knots, the cylinder may be selected by using the chart below:

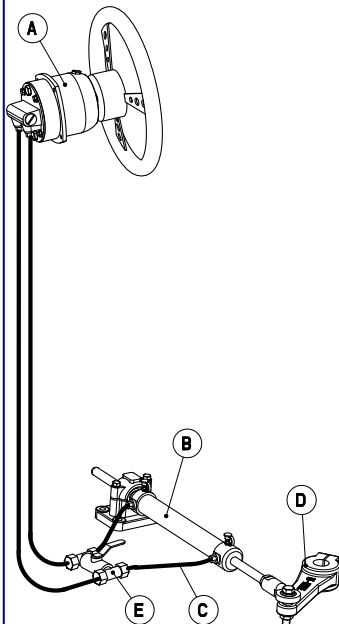
Length of Hull	Cylinder Type – 1 Rudder	Cylinder Type – 2 Rudders
8 metres	VHM 40 DTP – code 2200075 page 10	VHM 32 DTP – code 2200059 page 9
10 metres	VHM 40-254 – code 2200496 page 10	VHM 40 DTP – code 2200075 page 10
12 metres	VHM 40-254 – code 2200496 page 10	VHM 40 DTP – code 2200075 page 10
14 metres	VHM 50 DTP – code 2200497 page 10	VHM 40-254 – code 2200496 page 10

This chart is given as an indication only

HYDRAULIC STEERING SYSTEMS

ASSEMBLING DIAGRAMS OF HYDRAULIC STEERING SYSTEMS

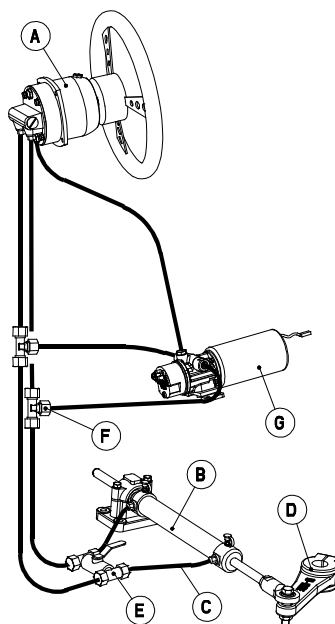
Single station + lock valve



A – 1 pump + LV + fittings
B – 1 cylinder
C – 2 hoses + fittings

Option D – tiller arm
E – by-pass valve

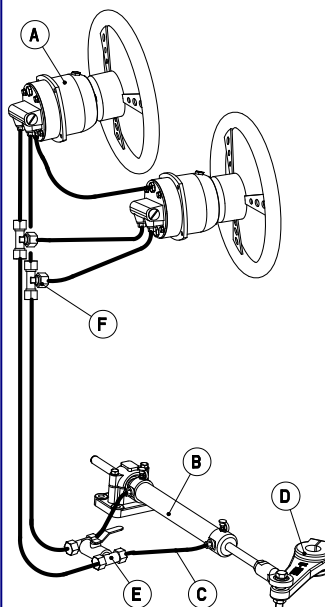
Single station + lock valve +
power pack



A – 1 pump + LV + fittings
B – 1 cylinder
C – 2 hoses + fittings
F – tees + connection fittings
G – 1 power pack

Option D – tiller arm
E – by-pass valve

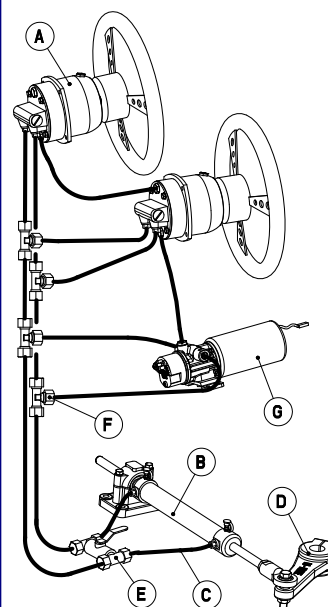
Double station + lock valve



A – 2 pumps + LV + fittings
B – 1 cylinder
C – 2 hoses + fittings
F – tees + connection fittings

Option D – tiller arm
E – by-pass valve

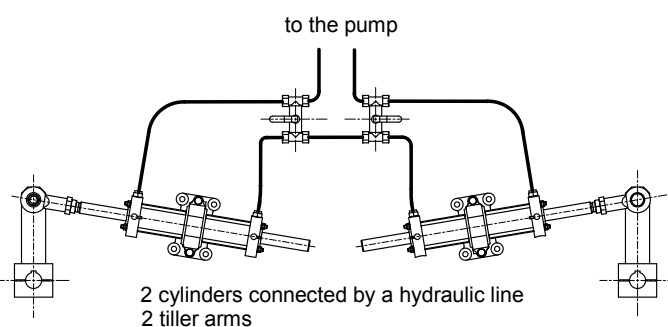
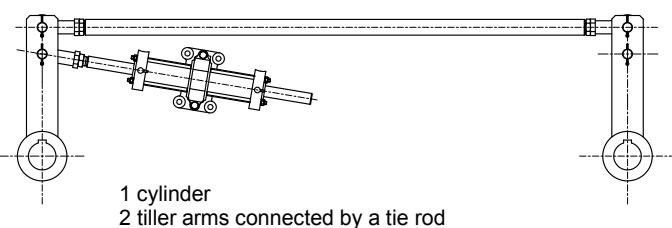
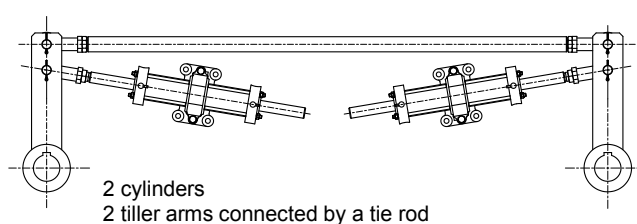
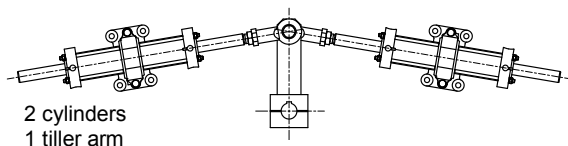
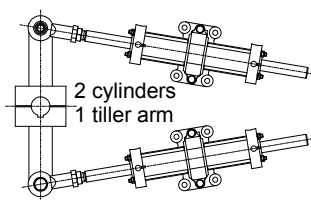
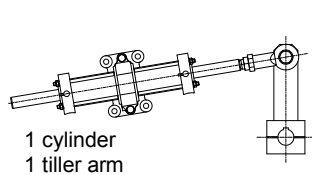
Double station + lock valve
+ power pack




A – 2 pumps + LV + fittings
B – 1 cylinder
C – 2 hoses + fittings
F – tees + connection fittings
G – 1 power pack

Option D – tiller arm
E – by-pass valve

POSSIBLE ASSEMBLIES



HYDRAULIC STEERING SYSTEMS FOR INBOARD MOTOR BOATS

Number of turns lock to lock in function of the PUMP / CYLINDER selection 		T Y P E O F P U M P						
		Page 7 2200804 20 HB with lock valve	Page 7 2200948 26 HB with lock valve	Page 7 2200949 30 HB without lock valve 2200950 30 HB with lock valve	Page 7 2201104 35 HB without lock valve 2201105 35 HB with lock valve	Page 8 2201106 40 HB without lock valve 2201107 40 HB with lock valve	Page 8 2201732 50 HB without lock valve 2201728 50 HB with lock valve	Page 8 2200194 70 CT without lock valve 2200088 70 CT with lock valve
T Y P E O F C Y L I N D E R	Page 9 2200831 VHM 26 DTP 27 kpm 200 ft.lbs 265 N.m.	3						
	Page 9 2200051 VHM 28 DTP 30 kpm 217 ft.lbs 295 N.m.	3.5	2.7	2.3				
	Page 9 2200059 VHM 32 DTP 50 kpm 361 ft.lbs 490 N.m.		4.6	4	3.4			
	Page 10 2200075 VHM 40 DTP 84 kpm 620 ft.lbs 823 N.m.			6.4	5.5	4.8		
	Page 10 2200496 VHM 40 DTP C254 105 kpm 759 ft.lbs 1030 N.m.				6.8	6	4.8	3.4
	Page 10 2200497 VHM 50 DTP 185 kpm 1350 ft.lbs 1813 N.m.					8.8	7.1	5
	Page 10 2200498 VHM 50 DTP C300 240 kpm 1750 ft.lbs 2350 N.m.					11.6	9.3	6.6

PUMPS



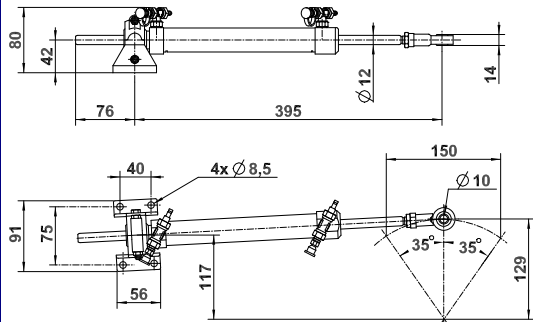
	<p>2200804 Pump 20 HB with lock valve</p> <p>2200807 Set of straight fittings for Ø 6 mm flexible tube</p> <p>2201989 Set of elbow fittings for Ø 6 mm flexible tube</p> <p>2200809 Set of tees for Ø 6 mm flexible tube</p> <p>2200986 S/Steel wheel Ø 400 mm</p>	<p>Flow rate 20 cc/t 1.2 cu.in</p> <p>Minimum size of tubing Ø 6 mm .25 "</p> <p>Weight 2.8 kg 6.17 lbs</p> <p>Volume 400 cc 24.4 cu.in</p> <p>Max. Wheel diameter Ø 520 mm 20 ½ "</p>
	<p>2200948 Pump 26 HB with lock valve</p> <p>2200021 Set of elbow fittings for Ø 8 mm flexible tube</p> <p>2200048 Set of straight fittings for Ø 10mm inflexible tube</p> <p>2200047 Set of tees for Ø 8 mm flexible tube</p> <p>2200046 Set of tees for Ø 10 mm inflexible tube</p> <p>2200986 S/Steel wheel Ø 400 mm</p>	<p>Flow rate 26 cc/t 1.6 cu.in</p> <p>Minimum size of tubing 8x10 mm .31"x.39"</p> <p>Weight 2.8 kg 6.17 lbs</p> <p>Volume 400 cc 24.4 cu.in</p> <p>Max. Wheel diameter Ø 520 mm 20 ½ "</p>
	<p>2200949 Pump 30 HB without lock valve</p> <p>2200950 Pump 30 HB with lock valve</p> <p>2200021 Set of elbow fittings for Ø 8mm flexible tube</p> <p>2200048 Set of straight fittings for Ø 10mm inflexible tube</p> <p>2200047 Set of tees for Ø 8 mm flexible tube</p> <p>2200046 Set of tees for Ø 10 mm inflexible tube</p> <p>2200029 Adaptable cone + locking pin</p> <p>2200986 S/Steel wheel Ø 400 mm</p>	<p>Flow rate 29 cc/t 1.7 cu.in</p> <p>Minimum size of tubing 8x10 mm .31"x.39"</p> <p>Weight 3.4 kg 7.5 lbs</p> <p>Volume 400 cc 24.4 cu.in</p> <p>Max. Wheel diameter Ø 520 mm 20 ½ "</p>
	<p>2201104 Pump 35 HB without lock valve</p> <p>2201105 Pump 35 HB with lock valve</p> <p>2200021 Set of elbow fittings for Ø 8mm flexible tube</p> <p>2200048 Set of straight fittings for Ø 10mm inflexible tube</p> <p>2200047 Set of tees for Ø 8 mm flexible tube</p> <p>2200046 Set of tees for Ø 10 mm inflexible tube</p> <p>2200029 Adaptable cone + locking pin</p> <p>2200986 S/Steel wheel Ø 400 mm</p>	<p>Flow rate 35 cc/t 2.14 cu.in</p> <p>Minimum size of tubing 8x10 mm .31"x.39"</p> <p>Weight 3.4 kg 7.5 lbs</p> <p>Volume 400 cc 24.4 cu.in</p> <p>Max. Wheel diameter Ø 520 mm 20 ½ "</p>

PUMPS



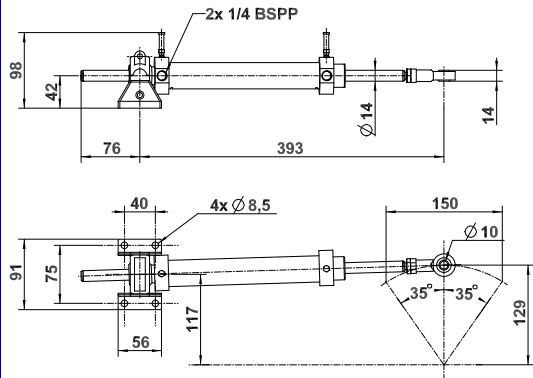
	<p>2201106 Pump type 40 HB without lock valve</p> <p>2201107 Pump type 40 HB with lock valve</p> <p>2200068 Set of straight fittings for Ø 10mm flexible tube</p> <p>2200048 Set of straight fittings for Ø 10mm inflexible tube</p> <p>2200072 Set of tees for Ø 10mm flex. tube</p> <p>2200046 Set of tees for Ø 10mm inflex. tube</p> <p>2200029 Adaptable cone + locking pin</p> <p>2200180 S/Steel wheel Ø 500 mm</p>	<p>Flow rate 40 cc/t 2.44 cu.in</p> <p>Minimum size of tubing 8x10mm .31"x.39"</p> <p>Weight 3.4 kg 7.5 lbs</p> <p>Volume 400 cc 24.4 cu.in</p> <p>Max. Wheel diameter Ø 520 mm 20 ½ "</p>
	<p>2201732 Pump type 50 HB without lock valve</p> <p>2201728 Pump type 50 HB with lock valve</p> <p>2200068 Set of straight fittings for Ø 10mm flexible tube</p> <p>2200048 Set of straight fittings for Ø 10mm inflexible tube</p> <p>2200072 Set of tees for Ø 10mm flex. tube</p> <p>2200046 Set of tees for Ø 10mm inflex. tube</p> <p>2200029 Adaptable cone + locking pin</p> <p>2200180 S/Steel wheel Ø 500 mm</p>	<p>Flow rate 50 cc/t 3.05 cu.in</p> <p>Minimum size of tubing 8x10 mm .31"x.39"</p> <p>Weight 3.4 kg 7.5 lbs</p> <p>Volume 400 cc 24.4 cu.in</p> <p>Max. Wheel diameter Ø 520 mm 20 ½ "</p>
	<p>2200194 Pump 70 CT without lock valve</p> <p>2200088 Pump 70 CT with lock valve</p> <p>2200089 Set of straight fittings 3/8 BSPP Ø12 mm</p> <p>2200102 Set of tees for Ø 12 mm inflex. tube</p> <p>2200175 Wooden wheel Ø 600 mm</p>	<p>Flow rate 70 cc/t 4.27 cu.in</p> <p>Minimum size of tubing 10x12 mm .39"x.47"</p> <p>Weight 7.5 kg 16 lbs</p> <p>Volume 660 cc 40 cu.in</p> <p>Max. Wheel diameter Ø 1000 mm 39 ¾ "</p>

CYLINDERS



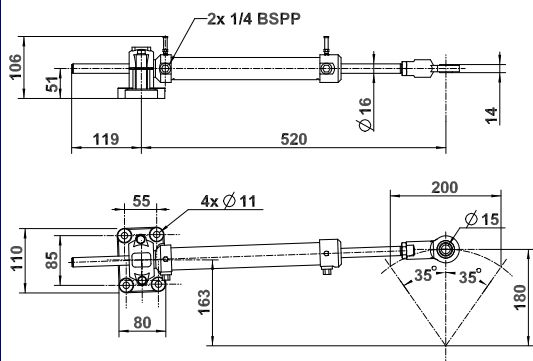
- 2200831** VHM 26 DTP + fittings
- 2201994** Set of fittings for VHM 224
- 2200810** Ø 6 mm flexible tube (per metre)
- 2200803** By-pass for Ø 6 mm flexible tube
- 2200003** Tiller arm LS 30 P + screws & bolts
- 2200017** Oil (2 litre can)

Maximum torque	27 kpm	200 ft.lbs
Stroke	150 mm	5 ²⁹ /32"
Maximum pressure	50 bars	725 PSI
Volume	62.6 cc	3.8 cu.in
Radius of tiller arm	129 mm	5 ⁵ /64"
Total rudder angle	70°	
Weight	0.9 kg	1.98 lbs



- 2200051** VHM 28 DTP
- 2200123** Set of straight fittings 1/4 BSPP for Ø 8 mm flexible tube
- 2200049** Set of flexible tube and fittings 1/4 BSPP Ø 10 mm
- 2200024** Ø 8 mm flexible tube (per metre)
- 2200027** By-pass for Ø 8 mm flexible tube
- 2200045** By-pass for Ø 10 mm inflexible tube
- 2200003** Tiller arm LS 30 P + screws & bolts
- 2200017** Oil (2 litre can)

Maximum torque	30 kpm	217 ft.lbs
Stroke	150 mm	5 ²⁹ /32"
Maximum pressure	50 bars	725 PSI
Volume	69.2 cc	34.22 cu.in
Radius of tiller arm	129 mm	5 ⁵ /64"
Total rudder angle	70°	
Weight	1.1 kg	2.4 lbs



- 2200059** VHM 32 DTP
- 2200123** Set of straight fittings 1/4 BSPP for Ø 8 mm flexible tube
- 2200049** Set of flexible tube and fittings 1/4 BSPP Ø 10 mm
- 2200024** Ø 8 mm flexible tube (per metre)
- 2200027** By-pass for Ø 8 mm flexible tube
- 2200045** By-pass for Ø 10 mm inflexible tube
- 2200060** Tiller arm LS 50 P + screws & bolts
- 2200017** Oil (2 litre can)


Maximum torque	50 kpm	361 ft.lbs
Stroke	200 mm	7 ⁷ /8"
Maximum pressure	50 bars	725 PSI
Volume	120.5 cc	7.35 cu.in
Radius of tiller arm	180 mm	7 ³ /32"
Total rudder angle	70°	
Weight	2.4 kg	5.3 lbs

CYLINDERS



	<p>2200075 VHM 40 DTP</p> <p>2200068 Set of straight fittings 1/4 BSPP for flexible tube Ø 10 mm</p> <p>2200049 Set of flex. tubes & fitt. 1/4 BSPP Ø10 mm</p> <p>2200070 Flexible tube Ø 10 mm per metre</p> <p>2200067 By-pass for flex. tube Ø 10 mm</p> <p>2200045 By-pass for inflex. tube Ø 10 mm</p> <p>2200499 Tiller arm LS 75 P + screws & bolts</p> <p>2200017 Oil (2 litre can)</p>	<p>Maximum torque 84 kpm 620 ft.lbs</p> <p>Stroke 204 mm 8"</p> <p>Maximum pressure 50 bars 725 PSI</p> <p>Volume 191 cc 11.6 cu.in</p> <p>Radius of tiller arm 180 mm 7 3/32"</p> <p>Total rudder angle 70°</p> <p>Weight 4.2 kg 9.3 lbs</p>
	<p>2200496 VHM 40 DTP C254</p> <p>2200049 Set of flex. tubes & fitt. 1/4 BSPP Ø10 mm</p> <p>2200045 By-pass for inflex. tube Ø 10 mm</p> <p>2200533 Tiller arm LS 105P + screws & bolts</p> <p>2200017 Oil (2 litre can)</p>	<p>Maximum torque 105 kpm 759 ft.lbs</p> <p>Stroke 254 mm 10"</p> <p>Maximum pressure 50 bars 725 PSI</p> <p>Volume 239 cc 14.5 cu.in</p> <p>Radius of tiller arm 220 mm 8 21/32"</p> <p>Total rudder angle 70°</p> <p>Weight 4.5 kg 9.9 lbs</p>
	<p>2200497 VHM 50 DTP</p> <p>2200096 Set of flexible tubes & fittings 3/8 BSPP Ø 12 mm</p> <p>2200097 By-pass for inflex. tube Ø 12 mm</p> <p>2200534 Tiller arm LS 185 P + screws & bolts</p> <p>2200017 Oil (2 litre can)</p>	<p>Maximum torque 185 kpm 1350 ft.lbs</p> <p>Stroke 228 mm 9"</p> <p>Maximum pressure 60 bars 870 PSI</p> <p>Volume 352 cc 21.5 cu.in</p> <p>Radius of tiller arm 200 mm 7 7/8"</p> <p>Total rudder angle 70°</p> <p>Weight 5 kg 11 lbs</p>
	<p>2200498 VHM 50 DTP C300</p> <p>2200096 Set of flexible tubes & fittings 3/8 BSPP Ø 12 mm</p> <p>2200097 By-pass for inflex. tube Ø 12 mm</p> <p>2200535 Tiller arm LS 240 P + screws & bolts</p> <p>2200017 Oil (2 litre can)</p>	<p>Maximum torque 240 kpm 1750 ft.lbs</p> <p>Stroke 300 mm 11 13/16"</p> <p>Maximum pressure 60 bars 870 PSI</p> <p>Volume 464 cc 28.5 cu.in</p> <p>Radius of tiller arm 260 mm 10 1/4"</p> <p>Total rudder angle 70°</p> <p>Weight 5.5 kg 12 lbs</p>

HYDRAULIC STEERING SYSTEMS FOR INBOARD MOTOR BOATS

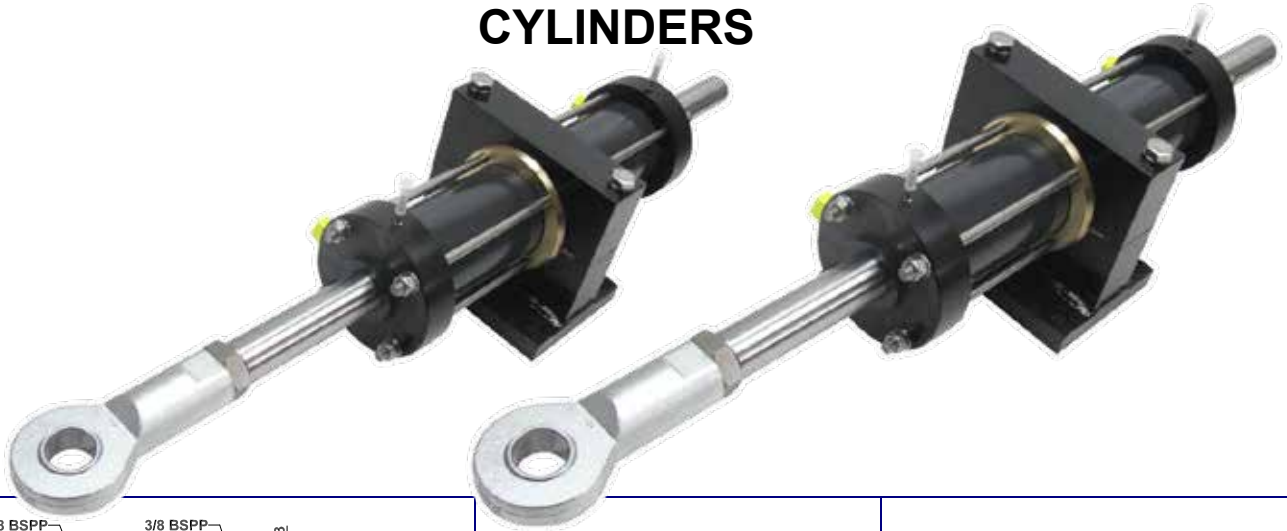
Number of turns lock to lock in function of the PUMP / CYLINDER selection 		T Y P E O F P U M P				
		Page 12 2200194 70 CT without lock valve 2200088 70 CT with lock valve	Page 12 2200494 90 CT without lock valve 2200489 90 CT with lock valve	Page 12 2200106 105 CT without lock valve	Page 12 2200130 150 CT without lock valve	Page 12 2200135 200 CT without lock valve
T Y P E O F C Y L I N D E R	Page 13 2200093 VHM 45 DT C228 140 kpm 1033 ft.lbs 1372 N.m.	3.8				
	Page 13 2200094 VHM 60 DT 265 kpm 1957 ft.lbs 2597 N.m.	7.2	5.6			
	Page 13 2200095 VHM 60 DT C300 344 kpm 2540 ft.lbs 3510 N.m.	9.5	7.4	6.3		
	Page 13 2202932 VHM 63 DT C345 450 kpm 3250 ft.lbs 4591 N.m.	12.3	9.6	8.2	5.75	
	Page 14 2202700 VHM 80 DT 600 kpm 4430 ft.lbs 5880 N.m.		13	11	7.8	
	Page 14 2202699 VHM 90 DT 840 kpm 6076 ft.lbs 8230 N.m.			15	10.4	7.8
	Page 14 2202840 VHM 90 DT C400 1000 kpm 7233 ft.lbs 9806 N.m.			19	14	10.5
	Page 15 2202815 VHM 110 DT C300 1200 kpm 8660 ft.lbs 11765 N.m.			22	15.5	11.5
	Page 15 2202698 VHM 110 DT 1600 kpm 11800 ft.lbs 15680 N.m.				20.5	15.4
	Page 15 2202685 VHM 120 DT 2000 kpm 14770 ft.lbs 19600 N.m.					20

PUMPS



	<p>2200194 Pump 70 CT without lock valve</p> <p>2200088 Pump 70 CT with lock valve</p> <p>2200089 Set of straight fittings for pump 3/8 BSPP Ø 12 mm</p> <p>2200102 Set of tees for Ø 12 mm inflex. tube</p> <p>2200175 Wooden wheel Ø 600 mm</p> <p>Ø 12-17 fittings available on request</p>	<table> <tr> <td>Flow rate</td><td>70 cc/t</td><td>4.27 cu.in</td></tr> <tr> <td>Minimum size of tubing</td><td>10x12 mm</td><td>.39"x.47"</td></tr> <tr> <td>Weight</td><td>7.5 kg</td><td>16 lbs</td></tr> <tr> <td>Volume</td><td>660 cc</td><td>40 cu.in</td></tr> <tr> <td>Max. Wheel diameter</td><td>Ø 1000 mm</td><td>39 3/8 "</td></tr> </table>	Flow rate	70 cc/t	4.27 cu.in	Minimum size of tubing	10x12 mm	.39"x.47"	Weight	7.5 kg	16 lbs	Volume	660 cc	40 cu.in	Max. Wheel diameter	Ø 1000 mm	39 3/8 "
Flow rate	70 cc/t	4.27 cu.in															
Minimum size of tubing	10x12 mm	.39"x.47"															
Weight	7.5 kg	16 lbs															
Volume	660 cc	40 cu.in															
Max. Wheel diameter	Ø 1000 mm	39 3/8 "															
	<p>2200494 Pump 90 CT without lock valve</p> <p>2200489 Pump 90 CT with lock valve</p> <p>2200089 Set of straight fittings for pump 3/8 BSPP Ø 12 mm</p> <p>2200102 Set of tees for Ø 12 mm inflex. tube</p> <p>2200998 Wooden wheel Ø 700 mm</p> <p>Ø 12-17 fittings available on request</p>	<table> <tr> <td>Flow rate</td><td>90 cc/t</td><td>5.5 cu.in</td></tr> <tr> <td>Minimum size of tubing</td><td>10x12 mm</td><td>.39"x.47"</td></tr> <tr> <td>Weight</td><td>7.5 kg</td><td>16 lbs</td></tr> <tr> <td>Volume</td><td>660 cc</td><td>40 cu.in</td></tr> <tr> <td>Max. Wheel diameter</td><td>Ø 1000 mm</td><td>39 3/8 "</td></tr> </table>	Flow rate	90 cc/t	5.5 cu.in	Minimum size of tubing	10x12 mm	.39"x.47"	Weight	7.5 kg	16 lbs	Volume	660 cc	40 cu.in	Max. Wheel diameter	Ø 1000 mm	39 3/8 "
Flow rate	90 cc/t	5.5 cu.in															
Minimum size of tubing	10x12 mm	.39"x.47"															
Weight	7.5 kg	16 lbs															
Volume	660 cc	40 cu.in															
Max. Wheel diameter	Ø 1000 mm	39 3/8 "															
	<p>2200106 Pump 105 CT without lock valve</p> <p>2200107 Set of straight fittings for pump 1/2 BSPP Ø 18 mm</p> <p>2200110 Lock valve LS 170</p> <p>2200111 Set of straight fittings for lock valve 1/2 BSPP Ø 18 mm</p> <p>2200115 Set of tees for Ø 18 mm inflex. tube</p> <p>2200177 Wooden wheel Ø 700 mm</p> <p>Ø 15-21 fittings available on request</p>	<table> <tr> <td>Flow rate</td><td>105 cc/t</td><td>6.41 cu.in</td></tr> <tr> <td>Minimum size of tubing</td><td>15x18 mm</td><td>.59"x.70"</td></tr> <tr> <td>Weight</td><td>16 kg</td><td>35 lbs</td></tr> <tr> <td>Volume</td><td>2000 cc</td><td>122 cu.in</td></tr> <tr> <td>Max. Wheel diameter</td><td>Ø 1000 mm</td><td>39 3/8 "</td></tr> </table>	Flow rate	105 cc/t	6.41 cu.in	Minimum size of tubing	15x18 mm	.59"x.70"	Weight	16 kg	35 lbs	Volume	2000 cc	122 cu.in	Max. Wheel diameter	Ø 1000 mm	39 3/8 "
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Weight	16 kg	35 lbs															
Volume	2000 cc	122 cu.in															
Max. Wheel diameter	Ø 1000 mm	39 3/8 "															
	<p>2200130 Pump 150 CT without lock valve</p> <p>2200107 Set of straight fittings for pump 1/2 BSPP Ø 18 mm</p> <p>2200110 Lock valve LS 170</p> <p>2200111 Set of straight fittings for lock valve 1/2 BSPP Ø 18 mm</p> <p>2200115 Set of tees for Ø 18 mm inflex. tube</p> <p>2200178 Wooden wheel Ø 800 mm</p> <p>Ø 15-21 fittings available on request</p>	<table> <tr> <td>Flow rate</td><td>150 cc/t</td><td>9.15 cu.in</td></tr> <tr> <td>Minimum size of tubing</td><td>15x18 mm</td><td>.59"x.70"</td></tr> <tr> <td>Weight</td><td>16 kg</td><td>35 lbs</td></tr> <tr> <td>Volume</td><td>2000 cc</td><td>122 cu.in</td></tr> <tr> <td>Max. Wheel diameter</td><td>Ø 1000 mm</td><td>39 3/8 "</td></tr> </table>	Flow rate	150 cc/t	9.15 cu.in	Minimum size of tubing	15x18 mm	.59"x.70"	Weight	16 kg	35 lbs	Volume	2000 cc	122 cu.in	Max. Wheel diameter	Ø 1000 mm	39 3/8 "
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Minimum size of tubing	15x18 mm	.59"x.70"															
Weight	16 kg	35 lbs															
Volume	2000 cc	122 cu.in															
Max. Wheel diameter	Ø 1000 mm	39 3/8 "															
	<p>2200135 Pump 200 CT without lock valve</p> <p>2200107 Set of straight fittings for pump 1/2 BSPP Ø 18 mm</p> <p>2200110 Lock valve LS 170</p> <p>2200111 Set of straight fittings for lock valve 1/2 BSPP Ø 18 mm</p> <p>2200115 Set of tees for Ø 18 mm inflex. tube</p> <p>2200179 Wooden wheel Ø 1000 mm</p> <p>Ø 15-21 fittings available on request</p>	<table> <tr> <td>Flow rate</td><td>200 cc/t</td><td>12.2 cu.in</td></tr> <tr> <td>Minimum size of tubing</td><td>15x18 mm</td><td>.59"x.70"</td></tr> <tr> <td>Weight</td><td>16 kg</td><td>35 lbs</td></tr> <tr> <td>Volume</td><td>2000 cc</td><td>122 cu.in</td></tr> <tr> <td>Max. Wheel diameter</td><td>Ø 1000 mm</td><td>39 3/8 "</td></tr> </table>	Flow rate	200 cc/t	12.2 cu.in	Minimum size of tubing	15x18 mm	.59"x.70"	Weight	16 kg	35 lbs	Volume	2000 cc	122 cu.in	Max. Wheel diameter	Ø 1000 mm	39 3/8 "
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Minimum size of tubing	15x18 mm	.59"x.70"															
Weight	16 kg	35 lbs															
Volume	2000 cc	122 cu.in															
Max. Wheel diameter	Ø 1000 mm	39 3/8 "															

CYLINDERS



	<p>2200093 VHM 45 DT C228 APD</p> <p>2200096 Set of flex. tube and fitt. 3/8 BSPP Ø 12 mm</p> <p>2200097 By-pass for Ø 12 mm inflexible tube</p> <p>2200098 Tiller arm LS 105 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p>On request: Ø 12-17 fittings, flexible tube and by-pass</p>	<table> <tr> <td>Maximum torque</td><td>140 kpm</td><td>1033 ft.lbs</td></tr> <tr> <td>Stroke</td><td>228 mm</td><td>9"</td></tr> <tr> <td>Maximum pressure</td><td>60 bars</td><td>870 PSI</td></tr> <tr> <td>Volume</td><td>268 cc</td><td>16.3 cu.in</td></tr> <tr> <td>Radius of tiller arm</td><td>200 mm</td><td>7 7/8"</td></tr> <tr> <td>Total rudder angle</td><td colspan="2">70°</td></tr> <tr> <td>Weight</td><td>11.5 kg</td><td>25 lbs</td></tr> </table>	Maximum torque	140 kpm	1033 ft.lbs	Stroke	228 mm	9"	Maximum pressure	60 bars	870 PSI	Volume	268 cc	16.3 cu.in	Radius of tiller arm	200 mm	7 7/8"	Total rudder angle	70°		Weight	11.5 kg	25 lbs
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Total rudder angle	70°																						
Weight	11.5 kg	25 lbs																					
	<p>2200094 VHM 60 DT APD</p> <p>2200096 Set of flex. tube and fitt. 3/8 BSPP Ø 12 mm</p> <p>2200097 By-pass for Ø 12 mm inflexible tube</p> <p>2200099 Tiller arm LS 155 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p>On request: Ø 12-17 fittings, flexible tube and by-pass</p>	<table> <tr> <td>Maximum torque</td><td>265 kpm</td><td>1957 ft.lbs</td></tr> <tr> <td>Stroke</td><td>228 mm</td><td>9"</td></tr> <tr> <td>Maximum pressure</td><td>60 bars</td><td>870 PSI</td></tr> <tr> <td>Volume</td><td>505 cc</td><td>30.8 cu.in</td></tr> <tr> <td>Radius of tiller arm</td><td>200 mm</td><td>7 7/8"</td></tr> <tr> <td>Total rudder angle</td><td colspan="2">70°</td></tr> <tr> <td>Weight</td><td>16 kg</td><td>35 lbs</td></tr> </table>	Maximum torque	265 kpm	1957 ft.lbs	Stroke	228 mm	9"	Maximum pressure	60 bars	870 PSI	Volume	505 cc	30.8 cu.in	Radius of tiller arm	200 mm	7 7/8"	Total rudder angle	70°		Weight	16 kg	35 lbs
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Maximum pressure	60 bars	870 PSI																					
Volume	505 cc	30.8 cu.in																					
Radius of tiller arm	200 mm	7 7/8"																					
Total rudder angle	70°																						
Weight	16 kg	35 lbs																					
	<p>2200095 VHM 60 DT C300 APD</p> <p>2200096 Set of flex. tube and fitt. 3/8 BSPP Ø 12 mm</p> <p>2200097 By-pass for Ø 12 mm inflexible tube</p> <p>2200100 Tiller arm LS 330 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p>On request : Ø 12-17 fittings, flexible tube and by-pass</p>	<table> <tr> <td>Maximum torque</td><td>344 kpm</td><td>2540 ft.lbs</td></tr> <tr> <td>Stroke</td><td>300 mm</td><td>11 13/16"</td></tr> <tr> <td>Maximum pressure</td><td>60 bars</td><td>870 PSI</td></tr> <tr> <td>Volume</td><td>664 cc</td><td>40.5 cu.in</td></tr> <tr> <td>Radius of tiller arm</td><td>260 mm</td><td>10 1/4"</td></tr> <tr> <td>Total rudder angle</td><td colspan="2">70°</td></tr> <tr> <td>Weight</td><td>16.5 kg</td><td>36 lbs</td></tr> </table>	Maximum torque	344 kpm	2540 ft.lbs	Stroke	300 mm	11 13/16"	Maximum pressure	60 bars	870 PSI	Volume	664 cc	40.5 cu.in	Radius of tiller arm	260 mm	10 1/4"	Total rudder angle	70°		Weight	16.5 kg	36 lbs
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Volume	664 cc	40.5 cu.in																					
Radius of tiller arm	260 mm	10 1/4"																					
Total rudder angle	70°																						
Weight	16.5 kg	36 lbs																					
	<p>2202932 VHM 63 DT C345 APD</p> <p>2200109 Set of flex. tube and fitt. 1/2 BSPP Ø 18 mm</p> <p>2200015 By-pass for Ø 18 mm inflexible tube</p> <p>2201540 Tiller arm LS 450 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p>On request : Ø 15-21 fittings, flexible tube and by-pass</p>	<table> <tr> <td>Maximum torque</td><td>450 kpm</td><td>3250 ft.lbs</td></tr> <tr> <td>Stroke</td><td>345 mm</td><td>13 19/32"</td></tr> <tr> <td>Maximum pressure</td><td>60 bars</td><td>870 PSI</td></tr> <tr> <td>Volume</td><td>862 cc</td><td>52.6 cu.in</td></tr> <tr> <td>Radius of tiller arm</td><td>300 mm</td><td>11 13/16"</td></tr> <tr> <td>Total rudder angle</td><td colspan="2">70°</td></tr> <tr> <td>Weight</td><td>25 kg</td><td>55 lbs</td></tr> </table>	Maximum torque	450 kpm	3250 ft.lbs	Stroke	345 mm	13 19/32"	Maximum pressure	60 bars	870 PSI	Volume	862 cc	52.6 cu.in	Radius of tiller arm	300 mm	11 13/16"	Total rudder angle	70°		Weight	25 kg	55 lbs
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Maximum pressure	60 bars	870 PSI																					
Volume	862 cc	52.6 cu.in																					
Radius of tiller arm	300 mm	11 13/16"																					
Total rudder angle	70°																						
Weight	25 kg	55 lbs																					

CYLINDERS



<p>232 141 380 526 25 146 190 146 190 236 146 4x Ø 21 300 Ø 38 Ø 35 35° 35° 260</p>	<p>2202700 VHM 80 DT APD</p> <p>2200109 Set of flexible tubes and fittings 1/2 BSPP Ø 18 mm</p> <p>2200015 By-pass for Ø 18 mm inflex. tube</p> <p>2200113 Tiller arm LS 550 - 840 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p><i>On request: Ø 15-21 fittings, flexible pipe and by-pass</i></p>	<p>Maximum torque 600 kpm 4430 ft.lbs</p> <p>Stroke 300 mm 11 13/16"</p> <p>Maximum pressure 60 bars 870 PSI</p> <p>Volume 1167 cc 71.2 cu.in</p> <p>Radius of tiller arm 260 mm 10 1/4"</p> <p>Total rudder angle 70°</p> <p>Weight 30 kg 66 lbs</p>
<p>245 148.5 380 526 25 146 190 146 190 236 146 4x Ø 21 300 Ø 38 Ø 35 35° 35° 260</p>	<p>2202699 VHM 90 DT APD</p> <p>2200109 Set of flexible tubes and fittings 1/2 BSPP Ø 18 mm</p> <p>2200015 By-pass for Ø 18 mm inflex. tube</p> <p>2200113 Tiller arm LS 550 – 840 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p><i>On request: Ø 15-21 fittings, flexible pipe and by-pass</i></p>	<p>Maximum torque 840 kpm 6076 ft.lbs</p> <p>Stroke 300 mm 11 13/16"</p> <p>Maximum pressure 60 bars 870 PSI</p> <p>Volume 1567 cc 95.6 cu.in</p> <p>Radius of tiller arm 260 mm 10 1/4"</p> <p>Total rudder angle 70°</p> <p>Weight 35 kg 77 lbs</p>
<p>245 148.5 480 626 25 146 190 146 190 318 146 4x Ø 21 400 Ø 38 Ø 35 35° 35° 350</p>	<p>2202840 VHM 90 DT C400 APD</p> <p>2200109 Set of flexible tubes and fittings 1/2 BSPP Ø 18 mm</p> <p>2200015 By-pass for Ø 18 mm inflex. tube</p> <p>2202626 Tiller arm LS 1000 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p><i>On request: Ø 15-21 fittings, flexible pipe and by-pass</i></p>	<p>Maximum torque 1000 kpm 7233 ft.lbs</p> <p>Stroke 400 mm 15 3/4"</p> <p>Maximum pressure 60 bars 870 PSI</p> <p>Volume 2090 cc 128 cu.in</p> <p>Radius of tiller arm 350 mm 13 3/4"</p> <p>Total rudder angle 70°</p> <p>Weight 45 kg 100 lbs</p>

CYLINDERS



	<p>2202815 VHM 110 DT C300 APD</p> <p>2200109 Set of flexible tubes and fittings 1/2 BSPP Ø 18 mm</p> <p>2200015 By-pass for Ø 18 mm inflex. tube</p> <p>2201935 Tiller arm LS 1200 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p>On request: Ø 15-21 fittings, flexible pipe and by-pass</p>	<p>Maximum torque 1200 kpm 8660 ft.lbs</p> <p>Stroke 300 mm 11 13/16"</p> <p>Maximum pressure 60 bars 870 PSI</p> <p>Volume 2307 cc 141 cu.in</p> <p>Radius of tiller arm 260 mm 10 1/4"</p> <p>Total rudder angle 70°</p> <p>Weight 50 kg 110 lbs</p>
	<p>2202698 VHM 110 DT APD</p> <p>2200109 Set of flexible tubes and fittings 1/2 BSPP Ø 18 mm</p> <p>2200015 By-pass for Ø 18 mm inflex. tube</p> <p>2200134 Tiller arm LS 1350 - 1660 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p>On request: Ø 15-21 fittings, flexible pipe and by-pass</p>	<p>Maximum torque 1600 kpm 11800 ft.lbs</p> <p>Stroke 400 mm 15 3/4"</p> <p>Maximum pressure 60 bars 870 PSI</p> <p>Volume 3076 cc 187.7 cu.in</p> <p>Radius of tiller arm 350 mm 13 3/4"</p> <p>Total rudder angle 70°</p> <p>Weight 53 kg 116 lbs</p>
	<p>2202685 VHM 120 DT APD</p> <p>2200109 Set of flexible tubes and fittings 1/2 BSPP Ø 18 mm</p> <p>2200015 By-pass for Ø 18 mm inflex. tube</p> <p>2200134 Tiller arm LS 1350 - 1660 + screws & bolts</p> <p>2200017 Oil (2 litre can)</p> <p>On request: Ø 15-21 fittings, flexible pipe and by-pass</p>	<p>Maximum torque 2000 kpm 14770 ft.lbs</p> <p>Stroke 400 mm 15 3/4"</p> <p>Maximum pressure 60 bars 870 PSI</p> <p>Volume 3798 cc 231.8 cu.in</p> <p>Radius of tiller arm 350 mm 13 3/4"</p> <p>Total rudder angle 70°</p> <p>Weight 60 kg 132 lbs</p>

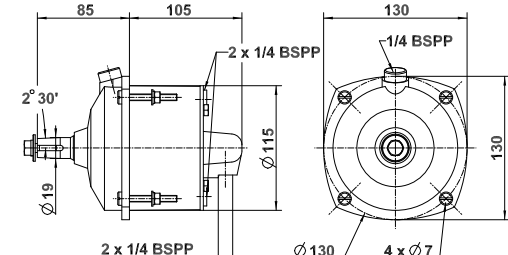
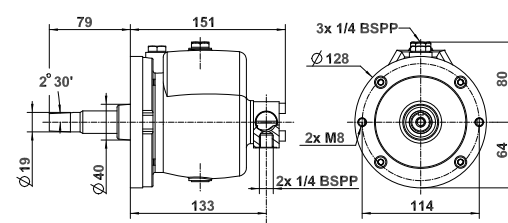
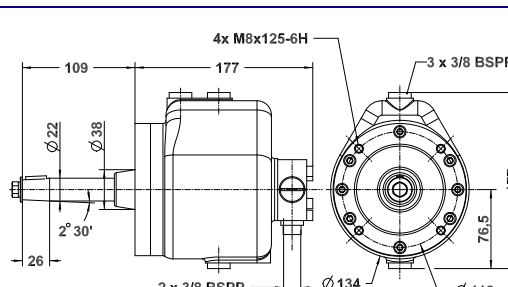
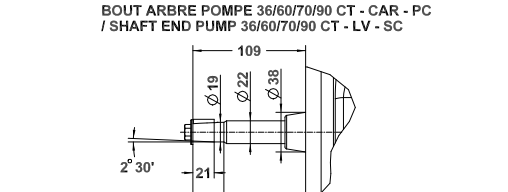
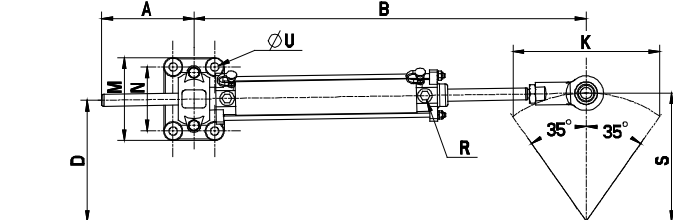
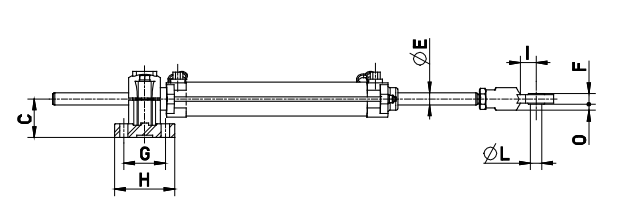
MANUAL HELM PUMPS



	2200842 Pump 70 CT without lock valve double bearing	Flow rate Minimum tubing size Weight Volume Max. wheel diameter	70 cc/t 16 x 18 mm 7.7 kg 660 cc Ø 1000 mm
	2200711 Pump 70 CT with lock valve double bearing		
	2202189 Pump 70 CT with lock valve double bearing BR		
	2200814 Pump 90 CT without lock valve double bearing	Flow rate Minimum tubing size Weight Volume Max. wheel diameter	90 cc/t 16 x 18 mm 7.7 kg 660 cc Ø 1000 mm
	2200832 Pump 90 CT with lock valve double bearing		
	2201941 Pump 60 CT with lock valve - 8° - sailing-boat	Flow rate Minimum tubing size Weight Volume Max. wheel diameter	60 cc/t 16 x 18 mm 10 kg 660 cc Ø 1000 mm
	2201942 Pump 70 CT with lock valve - 8° - sailing-boat	Flow rate Minimum tubing size Weight Volume Max. wheel diameter	70 cc/t 16 x 18 mm 10 kg 660 cc Ø 1000 mm
	2201857 Pump 90 CT with lock valve - 8° - sailing-boat	Flow rate Minimum tubing size Weight Volume Max. wheel diameter	90 cc/t 16 x 18 mm 10 kg 660 cc Ø 1000 mm
	2200605 Pump 115 CT without lock valve - 8°	Flow rate Minimum tubing size Weight Volume Max. wheel diameter	115 cc/t 16 x 18 mm 10 kg 1000 cc Ø 1200 mm
	2201420 Pump 115 CT with lock valve - 8°		
	2201421 Pump 170 CT without lock valve - 8°	Flow rate Minimum tubing size Weight Volume Max. wheel diameter	170 cc/t 16 x 18 mm 10 kg 1000 cc Ø 1200 mm

OTHER PUMP AND CYLINDER MODELS



		2201762 Pump 23 HB – LV Flow rate 23 cc/rev 1.4 cu.in / rev 2200037 Pump 29 CT HB – LV Flow rate 29 cc/rev 1.7 cu.in / rev 2200019 Pump 35 CT HB – LV Flow rate 35 cc/rev 2.14 cu.in/ rev	Minimum size of tubing 8x10mm .31"x.39" Weight 3,4 kg 7.5 lbs Volume 400 cc 24.4 cu.in Max. wheel diameter Ø 520 mm 20 ½ "															
		2200282 Pump 29 CT 30 – LV Flow rate 29 cc/rev 1.7 cu.in / rev 2200073 Pump 40 CT – LV Flow rate 40 cc/rev 2.44 cu.in / rev	Minimum size of tubing 8x10 mm .31"x.39" Weight 3,4 kg 7.5 lbs Volume 400 cc 24.4 cu.in Max. wheel diameter Ø 800 mm 31 ½ "															
 <p>BOUT ARBRE POMPE 36/60/70/90 CT - CAR - PC / SHAFT END PUMP 36/60/70/90 CT - LV - SC</p> 		2200248 Pump 36 CT - LV Flow rate 36 cc/rev 2.2 cu.in / rev 2200353 Pump 60 CT - LV Flow rate 60 cc/rev 3.66 cu.in / rev 2201896 Pump 36 CT – LV - SC Flow rate 36 cc/rev 2.2 cu.in / rev 2200413 Pump 60 CT – LV - SC Flow rate 60 cc/rev 3.66 cu.in / rev 2200262 Pump 70 CT – LV - SC Flow rate 70 cc/rev 4.27 cu.in / rev 2200567 Pump 90 CT – LV - SC Flow rate 90 cc/rev 5.5 cu.in / rev	Minimum size of tubing 10x12 mm .39"x.47" Weight 7,5 kg 16 lbs Volume 660 cc 40 cu.in Max. wheel diameter Ø 1000 mm 39 ¾ " Minimum size of tubing 15x18 mm .59"x.70" Weight 7,5 kg 16 lbs Volume 660 cc 40 cu.in Max. wheel diameter Ø 1000 mm 39 ¾ "															
																		
TYPE		A	B	C	D	E	F	G	H	I	K	L	M	N	O	U	R	S
Vérins	2200249 VHM 32 DT	97	444	42	117	16	14	40	56	20	150	15	91	75	9	8,5	¼ BSPP	129
	2200222 VHM 35 DTP	122	520	51	163	16	14	55	80	20	200	15	110	85	9	11	¼ BSPP	180
Cylinders	2200249 VHM 32 DT	3 ^{13/16}	17 ^{31/64}	1 ^{21/32}	4 ^{39/64}	5/8	5/8	1 ^{37/64}	2 ^{3/16}	25/32	5 ^{29/32}	19/32	3 ^{37/64}	2 ^{61/64}	23/64	21/64	¼ BSPP	5 ^{5/64}
	2200222 VHM 35 DTP	4 ^{1/32}	20 ^{9/16}	2	6 ^{27/64}	5/8	5/8	2 ^{5/32}	3 ^{5/32}	25/32	7 ^{7/8}	19/32	4 ^{21/64}	3 ^{11/32}	23/64	7/16	¼ BSPP	7 ^{5/64}

OPTIONAL ADDITIONS TO OUR STEERING SYSTEMS

2203593 Speedy Purge

LS Speedy purge makes it possible for one single operator to fill in and bleed a hydraulic steering system perfectly well and neatly within 10 minutes.

With a capacity of 4 litres of oil and 12 V power supply, the bleeding procedure can be made directly from the boat batteries.

LS Speedy purge is the ideal tool for shipyards with small series of boats or for installation or maintenance work at marinas.



2200376 Elect. by-pass NO 06 12 VDC 3/8 BSPP

2201479 Elect. by-pass NO 06 24 VDC 3/8 BSPP

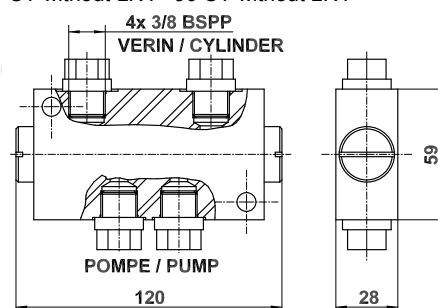
2200566 Elect. by-pass NO 12 12 VDC 1/2 BSPP

2201438 Elect. by-pass NO 12 24 VDC 1/2 BSPP

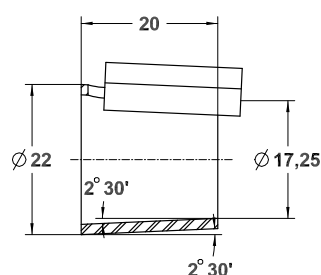


2200078 Lock valve on line LS 115

For pumps : 30 HB without L.V. - 35 HB without L.V.
40 HB without L.V. - 50 HB without L.V.
70 CT without L.V. - 90 CT without L.V.



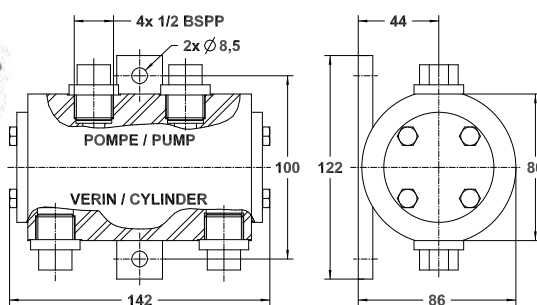
2201138 Adaptable cone + pin Ø 22 - 2.30° angle



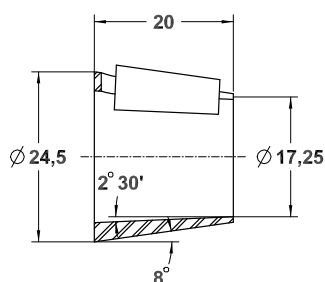
For pumps: 30 HB, 35 HB, 40 HB

2200110 Lock valve on line LS 170

For pumps : 105 CT without lock valve - 150 CT without lock valve
170 CT without lock valve - 200 CT without lock valve

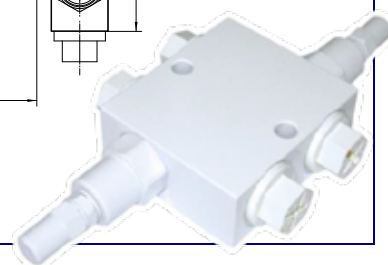
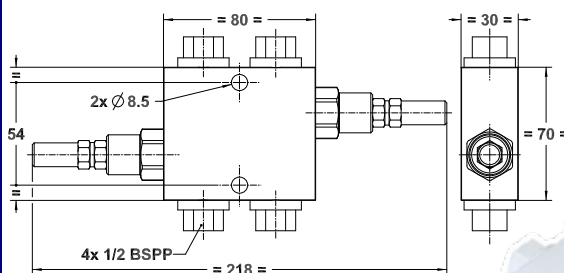


2200029 Adaptable cone + pin Ø 24.5 - 8° angle



For pumps: 30 HB, 35 HB, 40 HB

2203369 Dual pressure relief valve



TILT SYSTEM – BY-PASS VALVES – PUMP BEZEL - OIL

TILT HB 5

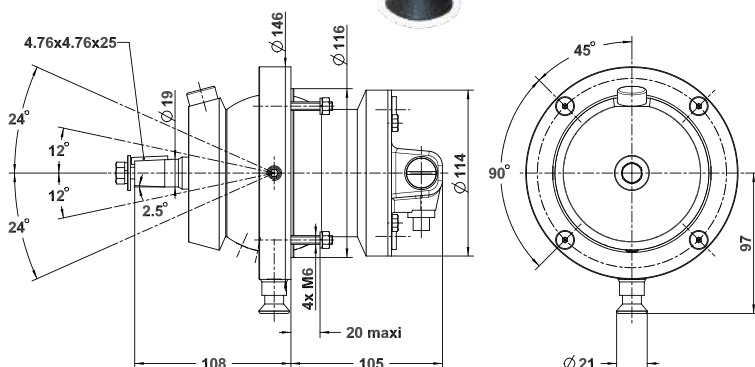
NEW

This product – the only one of its kind – is the most compact System on the market.

The hydraulic pump has been integrated directly into the tilt mechanism.

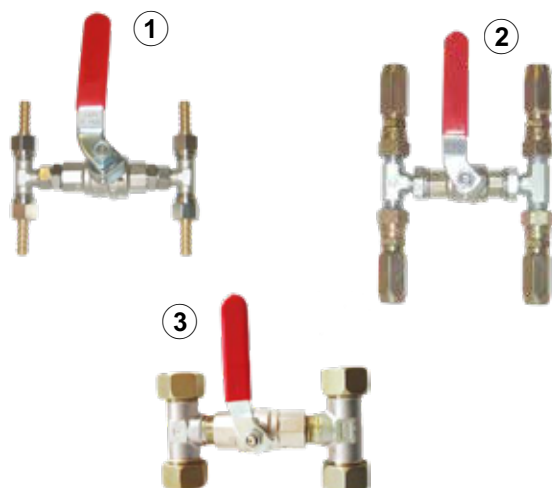
ORIENTATION CAPACITY

Possible orientation angle:
-24° to +24° (5 positions).



Ref.	Designation	Flow rate
2203658	TILT HB 5 – 20 CT	20 cc/t
2203559	TILT HB 5 – 26 CT	26 cc/t
2203659	TILT HB 5 – 30 CT	30 cc/t
2203669	TILT HB 5 – 35 CT	35 cc/t
2203670	TILT HB 5 – 40 CT	40 cc/t
2203695	TILT HB 5 – 50 CT	50 cc/t

BY-PASS VALVES



- ① **2200803** By-pass valve–flexible tube Ø 6 mm
2202496 By-pass valve–flexible tube TS 8
- ② **2200027** By-pass valve–flexible tube Ø 8 mm
2200067 By-pass valve–flexible tube Ø 10 mm
- ③ **2200683** By-pass valve–inflexible tube 6 x 8
2200045 By-pass valve–inflexible tube 8 x 10
2200097 By-pass valve–inflexible tube 10 x 12
2202022 By-pass valve–inflexible tube 13 x 15
2200015 By-pass valve–inflexible tube 15 x 18

2201058 PUMP BEZEL



STEERING OIL

- 2200017** 2 Litre oil can
Dexron II
- 2203045** 20 Litre oil can
white oil ISO 22
- 2203201** 20 Litre oil can
Dexron II

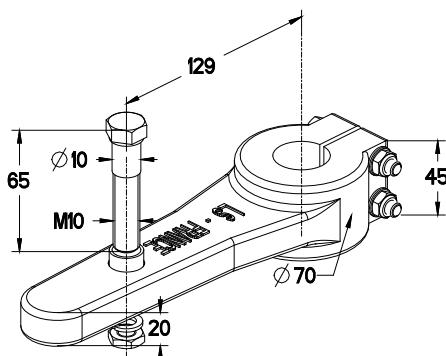


TILLER ARMS



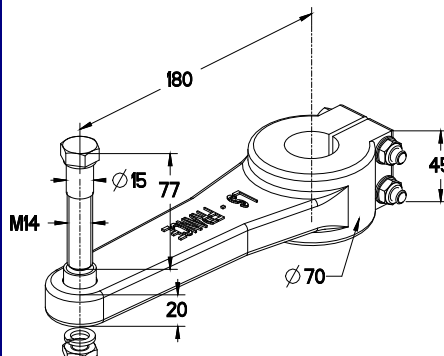
2200003

Pilot bored equipped tiller arm LS 30 P
 Ø 22 pilot bored – maxi Ø 40



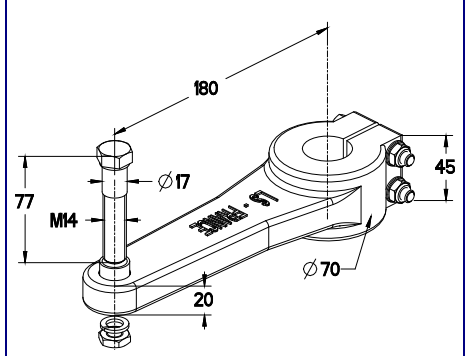
2200060

Pilot bored equipped tiller arm LS 50 P
 Ø 22 pilot bored – maxi Ø 40



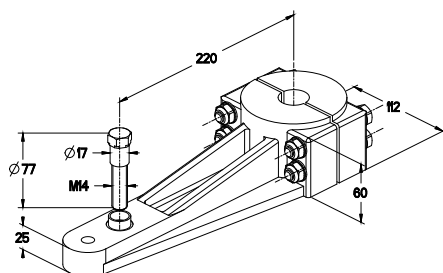
2200499

Pilot bored equipped tiller arm LS 75 P
 Ø 22 pilot bored – maxi Ø 40



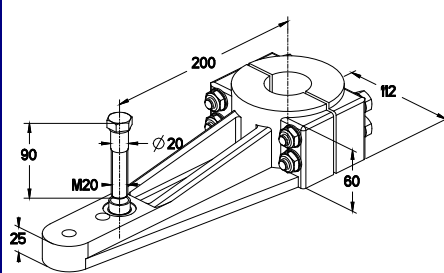
2200533

Pilot bored equipped tiller arm LS 105 P
 Ø 28 pilot bored – maxi Ø 50



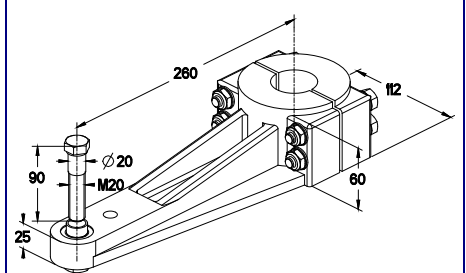
2200534

Pilot bored equipped tiller arm LS 185 P
 Ø 28 pilot bored – maxi Ø 50



2200535

Pilot bored equipped tiller arm LS 240 P
 Ø 28 pilot bored – maxi Ø 50

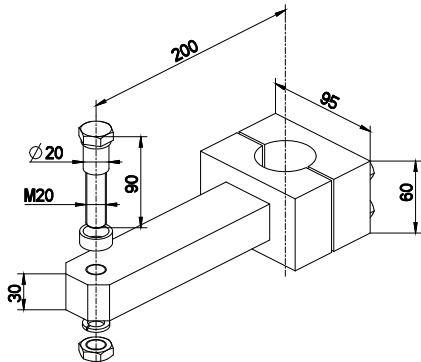


TILLER ARMS

2200098

Pilot bored equipped tiller arm LS 105

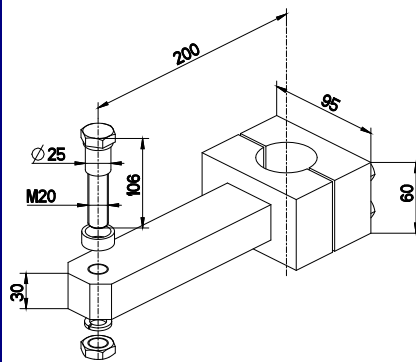
Ø 20 pilot bored – maxi Ø 50



2200099

Pilot bored equipped tiller arm LS 155

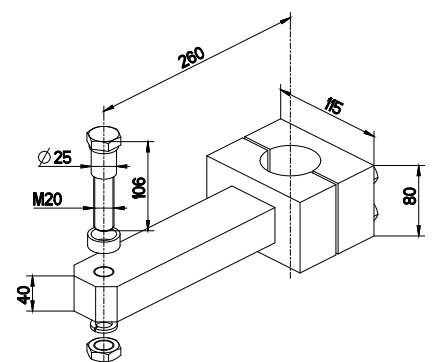
Ø 20 pilot bored – maxi Ø 50



2200100

Pilot bored equipped tiller arm LS 330

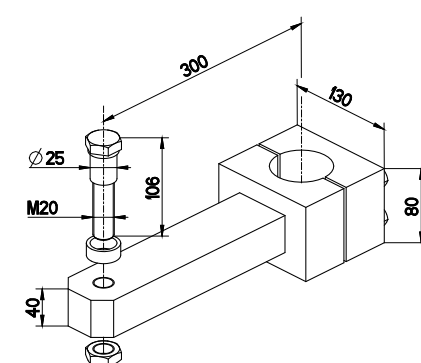
Ø 20 pilot bored – maxi Ø 64



2201540

Pilot bored equipped tiller arm LS 450

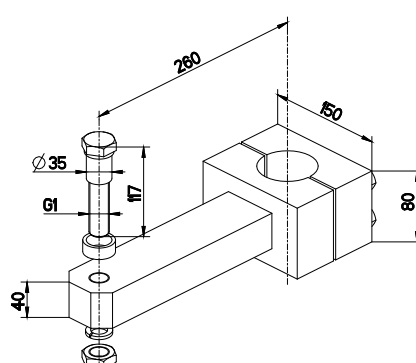
Ø 20 pilot bored – maxi Ø 64



2200113

Pilot bored equipped tiller arm LS 550-840

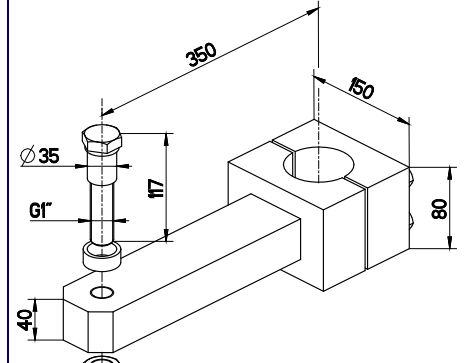
Ø 20 pilot bored – maxi Ø 88



2202626

Pilot bored equipped tiller arm LS 1000

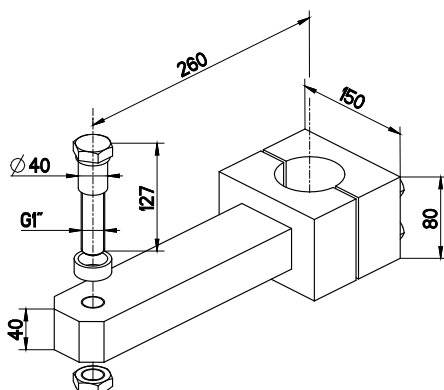
Ø 20 pilot bored – maxi Ø 88



2201935

Pilot bored equipped tiller arm LS 1200

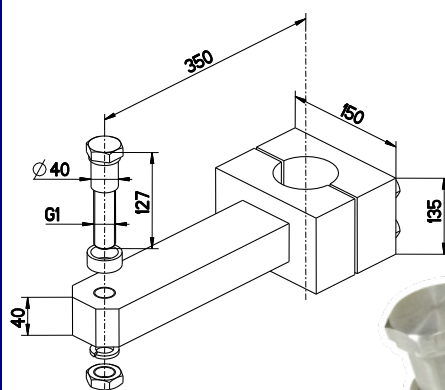
Ø 20 pilot bored – maxi Ø 88



2200134

Pilot bored equipped tiller arm LS 1350-1660

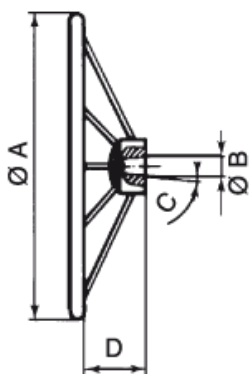
Ø 20 pilot bored – maxi Ø 100



S/STEEL AND WOODEN STEERING WHEELS

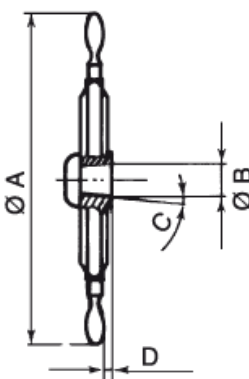


S/STEEL WHEELS



CODE	DESIGNATION	Ø A	Ø B	C	D
2200985	S/steel wheel 350 – 19	350 13 ²⁵ / ₃₂ "	19 ³ / ₄ "	2°30'	75 2 ⁶¹ / ₆₄ "
2200986	S/steel wheel 400 – 19	400 15 ³ / ₄ "	19 ³ / ₄ "	2°30'	75 2 ⁶¹ / ₆₄ "
2200180	S/steel wheel 500 – 19	500 19 ¹¹ / ₁₆ "	19 ³ / ₄ "	2°30'	75 2 ⁶¹ / ₆₄ "
2200987	S/steel wheel 600 – 22	600 23 ⁵ / ₈ "	22 ⁷ / ₈ "	2°30'	26 1"
2200988	S/steel wheel 700 – 22	700 27 ⁹ / ₁₆ "	22 ⁷ / ₈ "	2°30'	26 1"

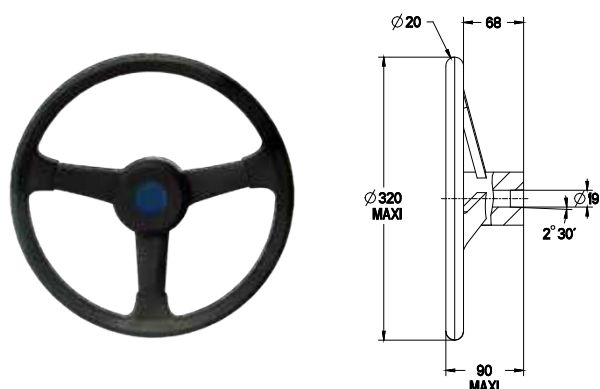
WOODEN WHEELS



CODE	DESIGNATION	Ø A	Ø B	C	D
2200173	Wooden wheel 420 – 22	420 16 ¹⁷ / ₃₂ "	22 ⁷ / ₈ "	2°30'	15 ¹⁹ / ₃₂ "
2200996	Wooden wheel 420 – 19	420 16 ¹⁷ / ₃₂ "	19 ³ / ₄ "	2°30'	15 ¹⁹ / ₃₂ "
2200174	Wooden wheel 500 – 22	500 19 ¹¹ / ₁₆ "	22 ⁷ / ₈ "	2°30'	15 ¹⁹ / ₃₂ "
2200997	Wooden wheel 500 – 19	500 19 ¹¹ / ₁₆ "	19 ³ / ₄ "	2°30'	15 ¹⁹ / ₃₂ "
2200175	Wooden wheel 600 – 22	600 23 ⁵ / ₈ "	22 ⁷ / ₈ "	2°30'	15 ¹⁹ / ₃₂ "
2200998	Wooden wheel 700 – 22	700 27 ⁹ / ₁₆ "	22 ⁷ / ₈ "	2°30'	15 ¹⁹ / ₃₂ "
2200177	Wooden wheel 700 – 28	700 27 ⁹ / ₁₆ "	28 1 ³ / ₃₂ "	0°	15 ¹⁹ / ₃₂ "
2200178	Wooden wheel 800 – 28	800 31 ¹ / ₂ "	28 1 ³ / ₃₂ "	0°	15 ¹⁹ / ₃₂ "
2200179	Wooden wheel 1000 – 28	1000 39 ³ / ₈ "	28 1 ³ / ₃₂ "	0°	15 ¹⁹ / ₃₂ "

RANGE OF STEERING WHEELS

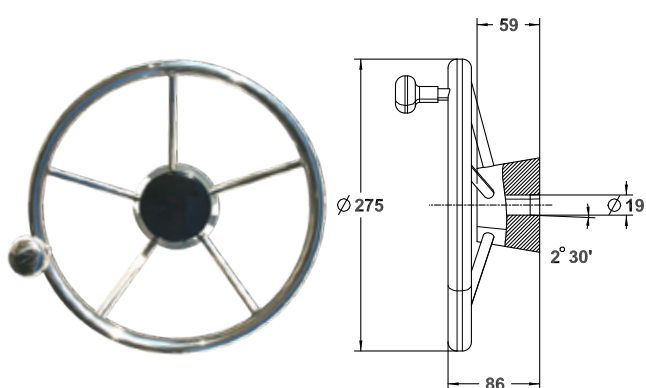
2200181 Plastic Wheel Ø 320



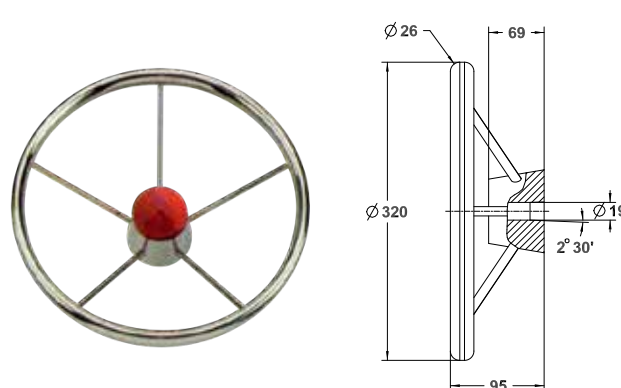
2200182 Imitation Leather/Anodised Alu Ø 320



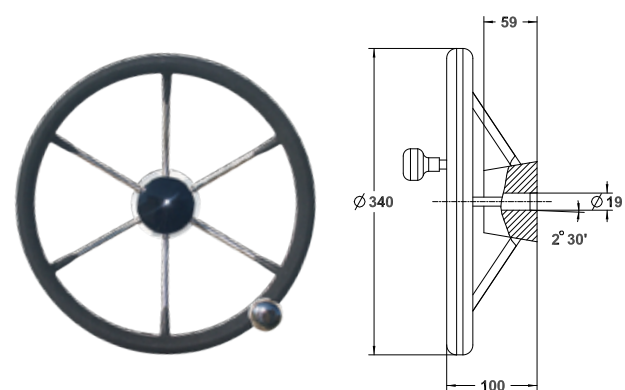
2202462 S/Steel Wheel with knob Ø 275



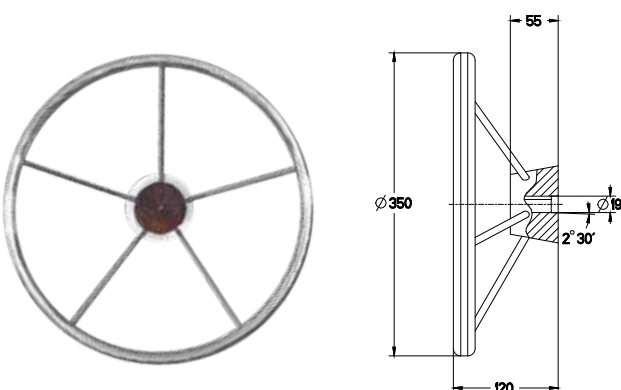
2203376 S/Steel Wheel Ø 320



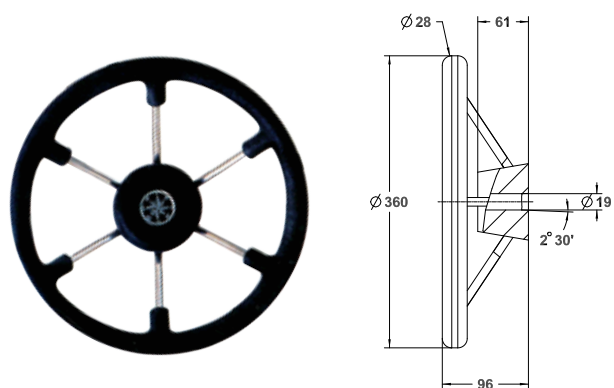
2202464 Covered S/Steel Wheel with knob Ø 340



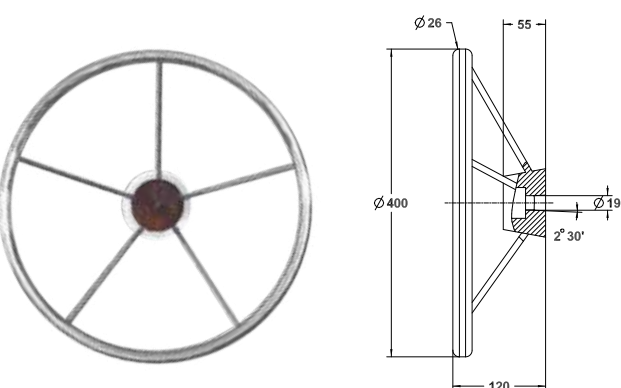
2200985 S/Steel Wheel Ø 350



2203377 Covered S/Steel Wheel Ø 360



2200986 S/Steel Wheel Ø 400



HYDRAULIC FLEXIBLE TUBES

FLEXIBLE TUBES FOR CRIMP CONNECTIONS

Only the sole use of LS flexible tubes in Ø6, Ø8 or Ø10 mm will guarantee the global performances of LS steering systems.

A few references:

- Ø6 Flexible tube - per metre	2200810
- Ø8 Flexible tube - per metre	2200024
- Ø10 Flexible tube - per metre	2200070
- Ø6 Flexible tube - length 8 m	1204267
- Ø6 Flexible tube - length 10 m	1204268
- Ø6 Flexible tube - length 12 m	1204740
- Ø6 Flexible tube - length 25 m	1204985
- Ø6 Flexible tube - length 35 m	1205301
- Ø6 Flexible tube - length 400 m	1205359
- Ø8 Flexible tube - length 10 m	1204825
- Ø8 Flexible tube - length 12 m	1204742
- Ø8 Flexible tube - length 20 m	1205245
- Ø8 Flexible tube - length 35 m	1205300
- Ø8 Flexible tube - length 400 m	1205360



FLEXIBLE TUBES WITH PRE-CRIMPED CONNECTIONS

High pressure flexible tubes of various lengths with pre-crimped connections of various kinds (several diameters, straight fittings, 90° elbow fittings). Stainless steel fittings available.

A few references in 10 L :

- Flex. tube R1T8 lg 500 – 2 x EFT10L	1290013
- Flex. tube R1T8 lg 1000 – 2 x EFT10L	1290023
- Flex. tube R1T8 lg 1500 – 2 x EFT10L	1290025
- Flex. tube R1T8 lg 2000 – 2 x EFT10L	1290027
- Flex. tube R1T8 lg 3000 – 2 x EFT10L	1290117

A few references in 12 L :

- Flex. tube R1T10 lg 500 – 2 x EFT12L	1290042
- Flex. tube R1T10 lg 1000 – 2 x EFT12L	1290052
- Flex. tube R1T10 lg 1500 – 2 x EFT12L	1290054
- Flex. tube R1T10 lg 2000 – 2 x EFT12L	1290056
- Flexi. tube R1T10 lg 3000 – 2 x EFT12L	1290130

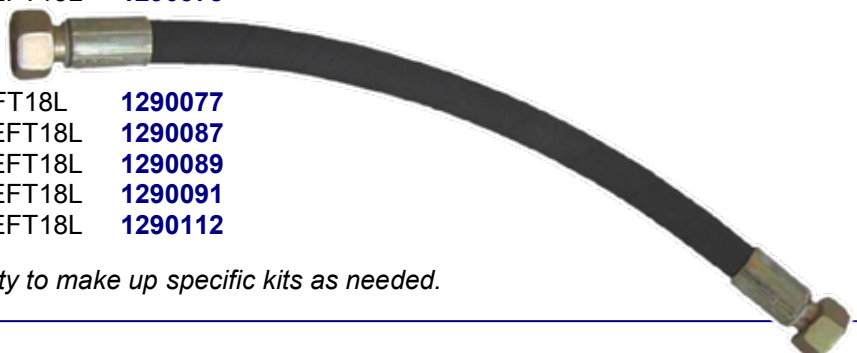
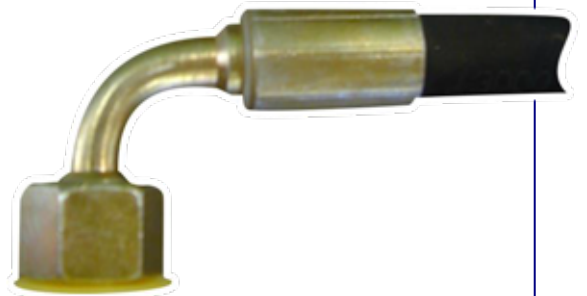
A few references in 15 L :

- Flex. tube R1T13 lg 500 – 2 x EFT15L	1290385
- Flex. tube R1T13 lg 1000 – 2 x EFT15L	1290376
- Flex. tube R1T13 lg 2000 – 2 x EFT15L	1290387
- Flex. tube R1T13 lg 2500 – 2 x EFT15L	1290378

A few references in 18 L :








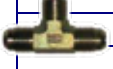




- Flex. tube R1T16 lg 500 – 2 x EFT18L	1290077
- Flex. tube R1T16 lg 1000 – 2 x EFT18L	1290087
- Flex. tube R1T16 lg 1500 – 2 x EFT18L	1290089
- Flex. tube R1T16 lg 2000 – 2 x EFT18L	1290091
- Flex. tube R1T16 lg 3000 – 2 x EFT18L	1290112

Other lengths on request. Possibility to make up specific kits as needed.










FITTINGS

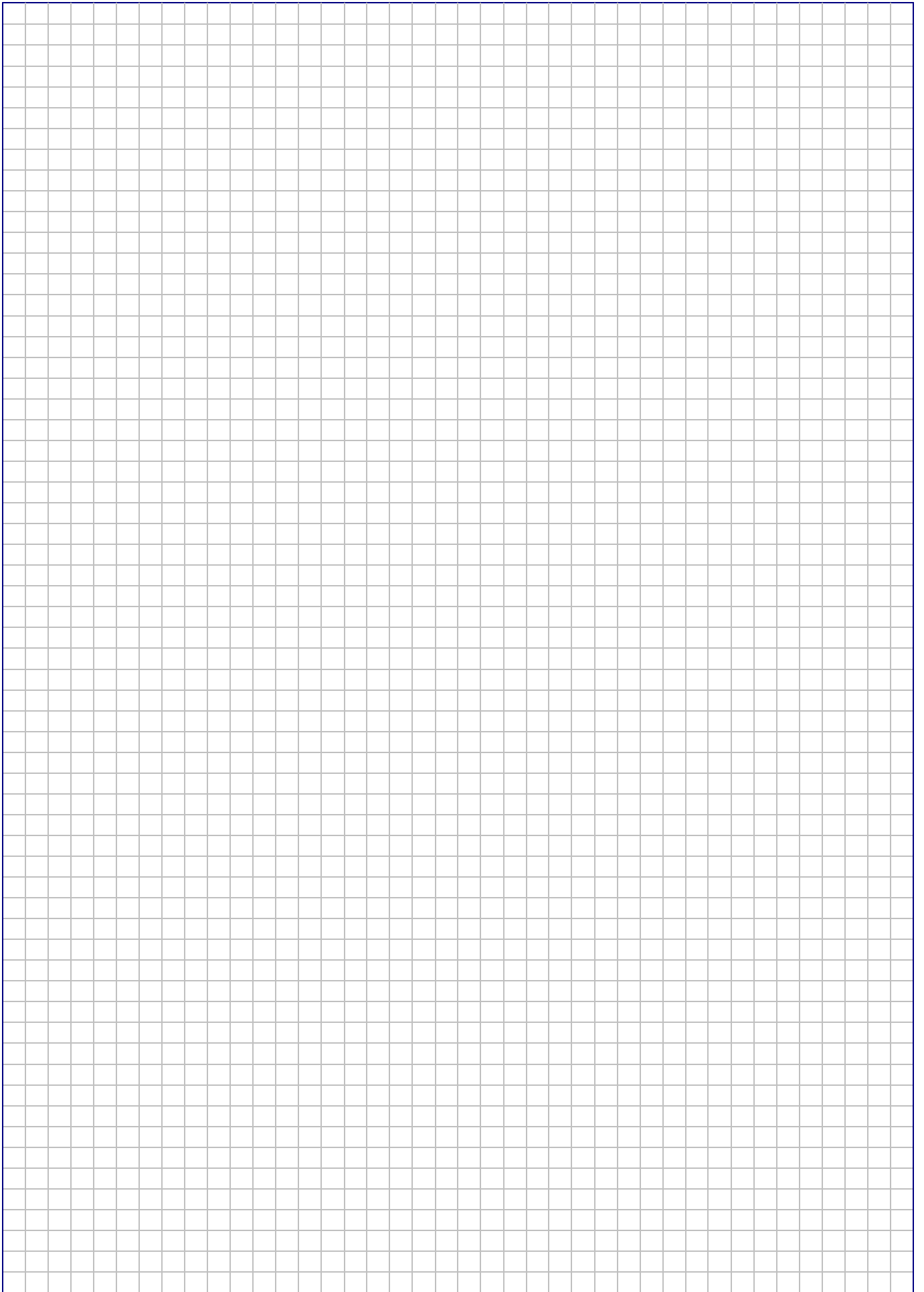
FOR FLEXIBLE TUBE

Type	Designation	Code for steel	Code for s/steel
 Elbow fittings 90°	1/4 BSPT JIC M. 9/16	2200321	2200309
	3/8 BSPT JIC M. 9/16	2200426	
 Swivel elbow fitt.	1/4 BSPP JIC M. 9/16	1205997	1206365
 Swivel elbow fitt.	JIC M. 9/16 – JIC F 9/16	1205894	1205656
 Straight fittings	1/4 BSPT JIC M. 9/16	2200427	2200447
	1/4 BSPP JIC M. 9/16	2200199	2200448
	3/8 BSPT JIC M. 9/16	2200428	
	3/8 BSPP JIC M. 9/16	2200429	2202039
 Adapters	1/4 BSPT JIC F.T. 9/16	2200430	
	3/8 BSPT JIC F.T. 9/16	2200356	
 Connection fitt.	JIC M. 9/16	2200288	
 Tee fittings	1/4 BSPT 2 x JIC M. 9/16	2200431	1203946
	3/8 BSPT 2 x JIC M. 9/16	2200432	
 Equal tee fittings	JIC M. 9/16	2200433	2202009
 Swivel tee fittings	Rotatable JIC M. 9/16	2201566	
 Straight fittings	JIC M. 9/16 inner diam. 8	2200299	2200449
	JIC M. 9/16 inner diam. 10	2200301	
 Elbow fittings	Inner diam. 8	2200302	
	Inner diam. 10	2200303	
 Connection fitt.	Inner diam. 8	2200373	
	Inner diam. 10	2200434	

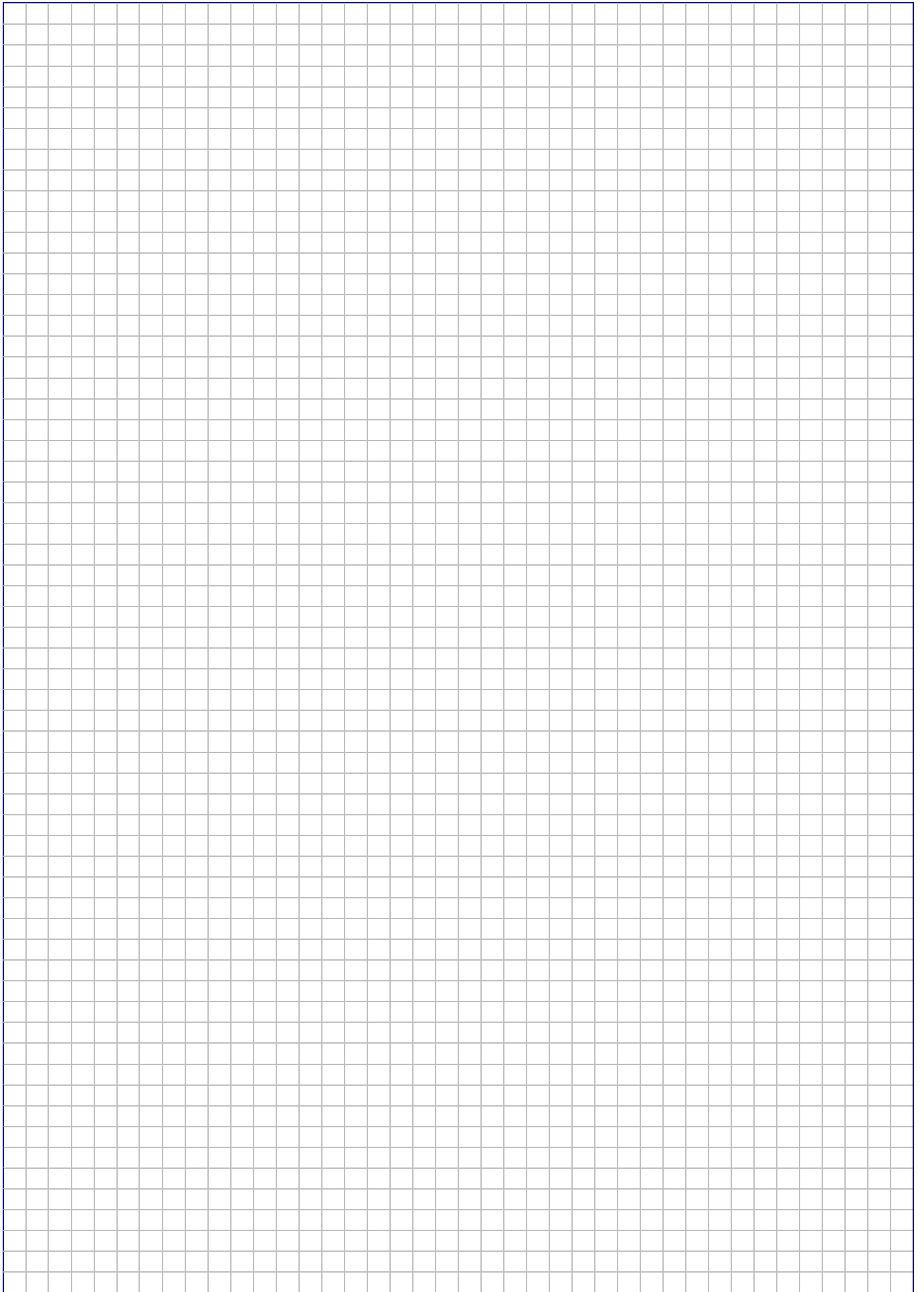
FOR INFLEXIBLE TUBE

	Straight fittings	1/4 BSPP diam. 8	2200435	
		1/4 BSPP diam. 10	2200436	
		3/8 BSPP diam. 10	2200437	
		3/8 BSPP diam. 12	2200438	
		3/8 BSPP diam. 15	1203905	1205517
		1/2 BSPP diam. 18	2200439	
	Elbow fittings	1/4 BSPT diam. 10	2200440	
		3/8 BSPT diam. 12	2200306	
		3/8 BSPT diam. 15	1204618	
		1/2 BSPT diam. 18	2200441	
	Tee fittings	1/4 BSPT diam. 10	2200442	
		3/8 BSPT diam. 12	2200443	
		1/2 BSPT diam. 18	2200339	
	Connection fitt.	Diam. 10	2200469	
		Diam. 12	2200585	
		Diam. 15	1206228	1205518
		Diam. 18	2200270	
	Equal tee fittings	Diam. 8	2200444	
		Diam. 10	2200259	
		Diam. 12	2200445	
		Diam. 15	1204627	1206521
		Diam. 18	2200446	
	Swivel tee fittings	Diam. 10	1204516	
		Diam. 12	1202634	
		Diam. 18	1202635	
	Reductions	1/8 BSPP M – 1/4 BSPP F	1202438	
		1/4 BSPP M – 3/8 BSPP F	2200390	1206522
		1/4 BSPP M – 1/2 BSPP F	2200389	2200859
		3/8 BSPP M – 1/4 BSPP F	2200374	1203268
		3/8 BSPP M – 1/2 BSPP F	2200396	2200858
		1/2 BSPP M – 1/4 BSPP F	2200221	
		1/2 BSPP M – 3/8 BSPP F	2200332	

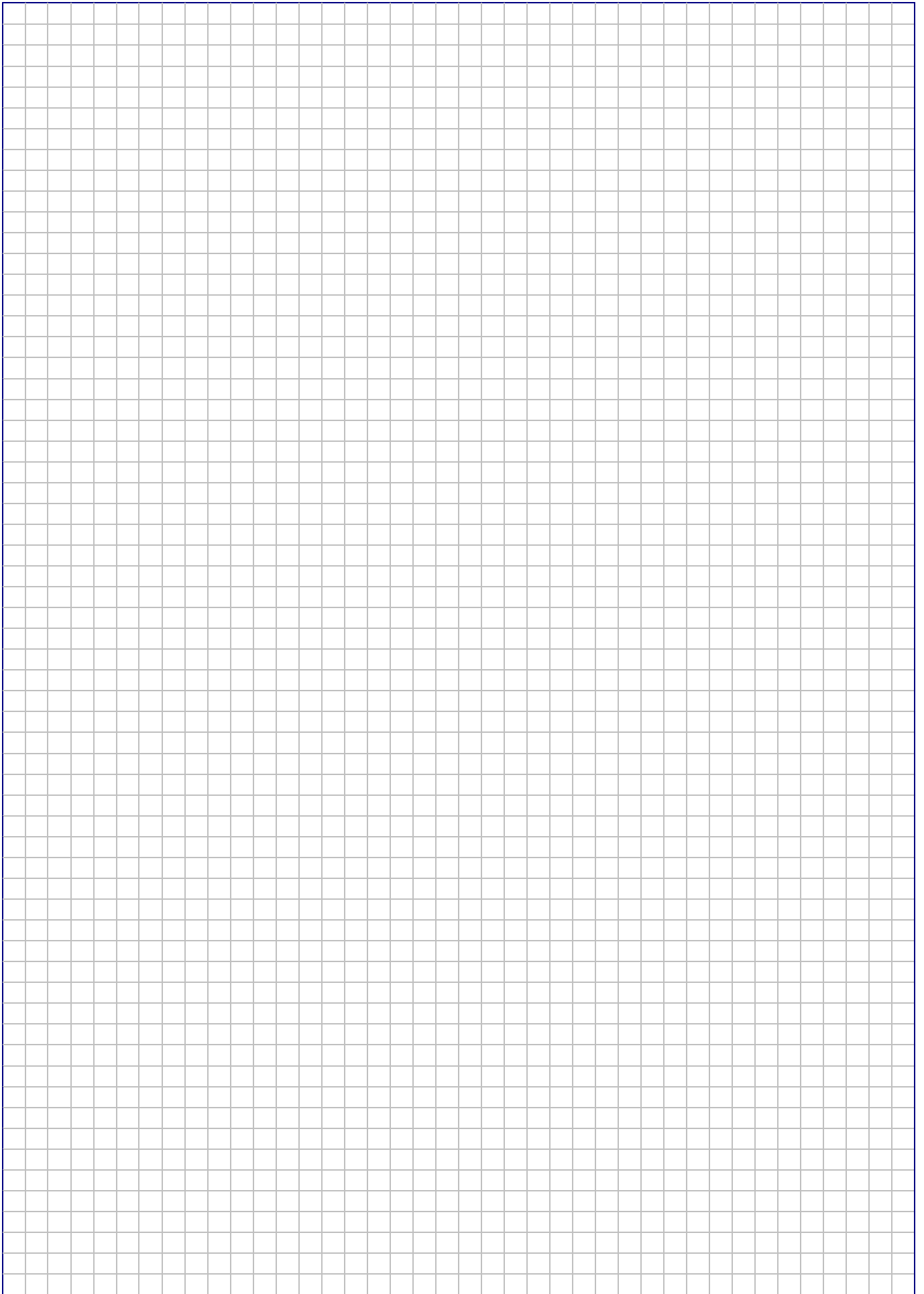
NOTES



NOTES



NOTES



GUARANTEE

- 1) The manufacturer guarantees the equipment sold and supplied against any faulty manufacturing or defects whether they are the result of the design, the raw material, the manufacturing or construction under the terms and restrictions indicated below :
- 2) The guarantee is applicable only if the client has satisfied the general obligations of this contract, in particular, the terms of payment.
- 3) The guarantee only includes equipment sold by the manufacturer. It does not extend to equipment in which the manufacturer's supply has been installed and, in particular, to the performances of this equipment.
- 4) When the manufacturer's supplies are installed by the client or a third party into any other equipment, they remain solely responsible for this installation, the selection and suitability of the manufacturer's supplies as the manufacturer's diagrams, designs and proposals are given as an indication only, unless otherwise specified in the order. In particular, the manufacturer does not guarantee components or equipment not sold by him, nor the assembly, adaptation, design or operation of the assembly or parts of the assembly thus created. The manufacturer's supply, as well as the assembly created by the client or a third party, are assumed to be operated under the exclusive control of the client or the third party.
- 5) The period of the guarantee is eighteen months starting from the date of first use by the original consumer or twenty four months from the date of delivery of the products to the transporter, distributor or wholesaler. The manufacturer has the right to require from the client proof of the commissioning date specified on the guarantee request. This period is neither extended nor interrupted through legal or amicable claims on the part of the client. At the end of this period, the guarantee is terminated without further consideration.
- 6) The obligation of the guarantee only applies if the client establishes that the defect appeared under normal operating conditions stipulated for this type of supply, or indicated by the manufacturer in writing and during normal operation. It does not apply in case of negligence, faulty maintenance or supervision, operator's responsibility, imprudence, non observance of recommended or operating instructions, or the use of oil of insufficient quality for the equipment. The manufacturer is released from responsibility for any damage caused by loss of oil or leaks. The guarantee also does not apply for any incidents resulting from a case of force majeure or Acts of God, as well as any damage, replacement or repairs exceeding the normal material wear.
- 7) The guarantee is limited to the repair in the manufacturer's shop at his own cost within the shortest possible time, of the equipment and parts supplied by him, identified as defective by the technical department. These parts must be sent pre-paid. No claim may be made for compensation for any damage such as personal injury, damage to goods other than those concerned in this contract, privation of possession, operating losses, commercial damage or loss of earnings. During the guarantee period, the cost of labor, dismantling and reassembly of the equipment outside the manufacturer's plant, the shipping costs for repaired, replaced or faulty equipment, travelling and accommodation expenses for technicians are the responsibility of the client.

When the guarantees are given according to the industrial results for a given equipment, these results and the consequences of this undertaking will result in a special agreement between the parties.

- 8) In order to take advantage of this guarantee, the client must notify the manufacturer in writing as soon as possible of the defects attributed to the equipment and provide any proof concerning these defects. He must do his best for the manufacturer to be able to ascertain these defects and to perform corrective actions. The guarantee does not apply if the equipment is not returned to the manufacturer in the state in which it broke down or if it has previously been disassembled, repaired, modified either by a third party, the user or the client. After receiving proper notification of the equipment defect, the manufacturer shall correct this fault as soon as possible, reserving the right, if applicable, to modify all or part of equipment in order to fulfil the obligations.
- 9) The client agrees that the manufacturer will not be responsible for damage due to the fact that the client has not satisfied any one of the obligations defined above.

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Brief history:

At the time of its setting up in the Paris region in 1944, Lecomble & Schmitt was designing and manufacturing volumetric pumps with flow rate regulation. It was not until 1983 that, boosted by 40 years of experience in hydraulics, the adventure in the nautical industry started. In the meantime, the company had moved to the Basque Country in the north south west of France.

Nowadays, Lecomble & Schmitt is the only French manufacturer to offer hydrostatic and mechanical steering systems for pleasure boats, fishing and work crafts.

Since 1998, L.S. has been a subsidiary of the industrial group Ateliers which is also established in the Basque Country. The activities of the group and its know-how are an asset as complementary and include design, precision machining, sheet-metal working, plastic technology, injection and thermofinishing and composite moulding.

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