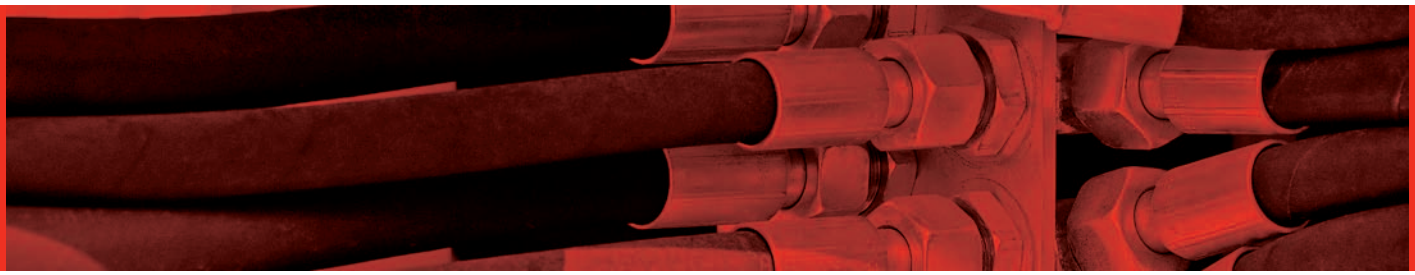
TransLink®



Hydraulic hoses

BASICS ON HYDRAULIC HOSES

Table keys

Size

The size is described by the internal diameter in inches, the rounded off to the integer figure in millimeters and the dash expressed in 1/16" fractions.

WD

Wire diameter. Minimum and maximum expressed in millimeters.

WP

Working pressure. The maximum recommended pressure indicates the selected hose and fitting which has to be equal or higher than the circuit's pressure. Expressed in Mega Pascal, MPa and Pound Square Inch, Psi.

BP

The pressure at which the hose is destroyed. Expressed in Mega Pascal, MPa and Pound Square Inch, Psi.

WT

The weight expressed in Kg/m.

ID

Internal diameter. Minimum and maximum expressed in millimeters.

OD

Outer diameter. Minimum and maximum expressed in millimeters in types A and AT.

PP

Proof pressure. The pressure at which hose is tested as defined by ISO Standard. Expressed in Mega Pascal, MPa and Pound Square Inch, Psi.

Min BR

Minimum Bending Radius. Bending the hose under this rated radii will provoke a loss of pressure and strength which may lead at the extreme, to a failure. Expressed in inch and the equivalent in mm.

SAE hoses. Description

SAE 100 R1

- Type A. Consisting of an inner tube of oil-resistant synthetic rubber. Reinforcement of a single wire braid.
- Cover of a synthetic rubber, weather and oil resistant.
- Used with petroleum based hydraulic fluids.
- Temperature range of -40ºC to 100ºC (-52ºF to 212ºF).
- Type AT. Same construction than A with the exception of the cover which is designed to use fittings without need to remove it.

SAE 100 R2

- Consisting of an inner tube of oil-resistant synthetic rubber. Reinforcement according type as indicated.
- Cover of a synthetic rubber, weather and oil resistant.
- Used with petroleum based hydraulic fluids.
- Temperature range of -40ºC to 100ºC (-52ºF to 212ºF).
- Type A. Two braids.
- Type B Two spiral and one braid.
  Type AT. Same construction than A with the exception of the cover which is designed to use fittings without need to remove it.
- Type BT. Same construction than B with the exception of the cover which is designed to use fittings without need to remove it.

SAE 100 R3

- Consisting of an inner tube of oil-resistant synthetic rubber.
- Reinforcement of two braids of textile yarn.
- Used with petroleum based hydraulic fluids.
- Cover of a synthetic rubber, weather and oil resistant.
- Temperature range of -40ºC to 100ºC (-52ºF to 212ºF).

SAE 100 R4

- Used in low pressure and vacuum applications.
- Consisting of an inner tube of oil-resistant synthetic rubber.
- Reinforcement of a ply or plies of woven or braided textile fibers with and spiral of body wire.
- Used with petroleum based hydraulic fluids.
- Temperature range of -40ºC to 100ºC (-52ºF to 212ºF).

SAE 100 R5

- Consisting of an inner tube of oil-resistant synthetic rubber.
- Reinforcement of two braids of textile yarn and an in-between high-tensile-strength steel-wire braid.
- Used with petroleum based hydraulic fluids.
- Cover of a synthetic rubber, weather and oil resistant.
- Temperature range of -40ºC to 100ºC (-52ºF to 212ºF).

SAE 100 R6

- Consisting of an inner tube of oil-resistant synthetic rubber.
- Reinforcement of one braided ply of textile yarn.
- Used with petroleum based hydraulic fluids.
- Cover of a synthetic rubber, weather and oil resistant.
- Temperature range of -40ºC to 100ºC (-52ºF to 212ºF).

SAE 100 R7

- Consisting of a thermoplastic hose.
- Used with petroleum based hydraulic fluids.
- Consisting of a thermoplastic inner tube resistant to hydraulic fluids.
- Reinforcement with a synthetic fiber.
- Cover of weather resisting thermoplastic.
- Temperature range of -40ºC to 93ºC (-52ºF to 135ºF).

SAE 100 R8

- Consisting of a high pressure thermoplastic hose.
- Used with petroleum based hydraulic fluids.
- Consisting of a thermoplastic inner tube resistant to hydraulic fluids.
- Reinforcement with a synthetic fiber.
- Cover of weather resisting thermoplastic.
- Temperature range of -40ºC to 93ºC (-52ºF to 135ºF).
- Similar pressure than 100 R2.

SAE 100 R9

- Used with petroleum based hydraulic fluids.
- Temperature range of -40ºC to 100ºC (-52ºF to 212ºF).
- Type A. Consisting of an inner tube of oil-resistant synthetic rubber.
- Reinforcement consisting of four spiral plies of wire wrapped in alternating directions.
- Cover of oil and weather resisting.
- Type AT with the same construction than Type A with the exception the cover is designed not to require removal to assemble the fittings.

SAE 100 R12

- Used with petroleum based hydraulic fluids.
- Temperature range of -40ºC to 100ºC (-52ºF to 212ºF).
- Consisting of an inner tube of oil-resistant synthetic rubber.
- Reinforcement consisting of four spiral plies of heavy wire wrapped in alternating directions.
- Cover of oil and weather resisting.
- A ply or braid may be used over the inner tube and/over the wire reinforcement to anchor the synthetic rubber to the wire.

SAE 100 R13

- Used with petroleum based hydraulic fluids.
- Temperature range of -40ºC to 100ºC (-52ºF to 212ºF).
- Consisting of an inner tube of oil-resistant synthetic rubber.
- Reinforcement consisting of multiple spiral plies of heavy wire wrapped in alternating directions.
- Cover of oil and weather resisting.
- A ply or braid may be used over the inner tube and/over the wire reinforcement to anchor the synthetic rubber to the wire.

SAE 100 R14

- Used with petroleum based hydraulic fluids.
- Temperature range of -54ºC to 204ºC (-65ºF to 400ºF).
- Type A.- Consisting of an inner tube of polytetrafluorethylene (PTFE) reinforced by a single stainless steel braid of type 303.
- Type B.- Has the same construction as type A, but B has an additional feature of an electrically-conductive inner surface to prevent build-up of an electrostatic charge.

SAE 100 R15

- Used with petroleum based hyraulics fluids.
- Temperature range from -40ºC to 121ºC (-52 ºF to 250 ºF)
- Consisting of an inner tube of oil-resistant synthetic rubber, multiple spiral plies of heavy wire wrapped in alternate directions.
- Cover of oil and weather-resistant rubber cover
- A ply of braid may be used over the inner tube and/over the wire reinforcement to anchor the synthetic rubber to the wire.

SAE 100 R16

- Used with petroleum based hydraulic fluids.
- Temperature range from -40ºC to 121ºC (-52ºF to 250ºF).
- Consisting of an inner tube of oil-resistant synthetic rubber, steel wire reinforcement of one or two braids.
- Cover of oil and weather-resistant rubber cover.
- A ply or braid may be used over the inner tube and/over the wire reinforcement to anchor the synthetic rubber to the wire.

SAE 100 R17

- Used with petroleum based hydraulic fluids.
- Temperature range from -40ºC to 121ºC (-52ºF to 250ºF).
- Inner tube of Black NBR.
- Reinforcement of one or two wire braid oh high tensile strength. Cover of oil and weather-resistant neoprene or rubber
- Smaller bend radius than 100 R1 and 100 R2.

EN hoses. Description

DIN EN 853

This European Standard specifies requirements for four types of wire braid reinforced hoses and hose assemblies of nominal bore from 5 to 51. Used with petrol and water base fluids. Temperatures range from-40ºC to 100ºC in petrol base fluids and -40ºC to 70ºC in water based fluids.

DIN EN 853 1ST

Medium pressure hydraulic hose. Meets or exceeds the requirements of SAE 100 R1 AT. One braid of high tensile steel-wire. Black tube oils resistant of synthetic fiber. Temperature range of -40ºC to 121ºC. Cover of abrasion resistant synthetic rubber.

DIN EN 853 1SN

Medium pressure hydraulic hose. Meets or exceeds the requirements of SAE 100 R1 AT. One braid of high tensile steel-wire. Black tube oils resistant of synthetic fiber. Temperature range of -40ºC to 121ºC. Cover of abrasion resistant synthetic rubber.

DIN EN 853 2SN

High pressure hydraulic hose. Meets or exceeds the requirements of 100 R2 AT. Two braids of high tensile steel-wire. Black tube oils resistant of synthetic fiber. Temperature range of -40ºC to 121ºC. Cover of abrasion resistant synthetic rubber.

DIN EN 853 2ST

Medium pressure hydraulic hose. Meets or exceeds the requirements of 100 R2 AT. Two braids of high tensile steel-wire. Black tube oils resistant of synthetic fiber. Temperature range of -40ºC to 121ºC. Cover of abrasion resistant synthetic rubber. Cover is thinner than 1SN and thus not suitable for skive applications.

DIN EN 854

This European Standard specifies requirements for for three types of textile reinforced rubber hoses and hose assemblies of nominal bore from 5 to 100. Used with petrol and water base fluids. Temperatures range from -40ºC to 100ºC in petrol base fluids and -40ºC to 70ºC in water based fluids.

DIN EN 854 1TE

Low pressure hydraulic hose. Single textile braid. Environment resistant synthetic rubber covers the tube to keep it away from chemicals, ozone and adverse factors. Tube oil resistant nitrile, compatible with petroleum based hydraulic fluids. Temperature range -40ºC to 100ºC. Wide use in low pressure lines, return and dry lines.

DIN EN 854 2TE

Medium pressure hydraulic hose with high resistance to kick and impulse fatigue. Inner tube of black seamless synthetic rubber. Double textile braid and abrasion and weather resistant synthetic rubber.

DIN EN 854 3TE

Medium pressure hydraulic hose with high flexibility due to its two textile braids. Indicated for suction and return hydraulic. Inner tube of oil and water resistant synthetic rubber and oil and weather resistant cover. Double textile braids.

DIN EN 856

This European Standard specifies requirements for four types of rubber-covered spiral wire reinforced hydraulic hoses and hose assemblies of nominal bore from 6 to 51. Types, 4SP, 4SH, R12 and R13. Used with petrol and water base fluids. Temperatures range from -40ºC to 100ºC for types aSP and 4SH and -40ºC to 120ºC for types R12 and R13.

DIN EN 856 4SH

Very high pressure hydraulic hose. Inner tube of oil resistant synthetic rubber, four spiral plies of steel wire wrapped in alternating direction. Exceed pressures than SAE 100R12. Indicated for high impulse like forestry and mining applications. Black smooth or black corrugated. Oil, weather and abrasive resistant synthetic rubber cover.

DIN EN 856 4SP

Very high pressure hydraulic hose. Inner tube of oil resistant synthetic rubber, four spiral plies of steel wire wrapped in alternating direction. Exceed pressures than SAE 100R12. Indicated for high impulse like forestry and mining applications. Black corrugated. Oil, weather and abrasive resistant synthetic rubber cover.

DIN EN 857

This European Standard specifies requirements for two types of wire braid reinforced compact hoses and hose assemblies of nominal bore from 6 to 25. Types1SC and 2SC. Temperatures range from -40ºC to 100ºC in petrol base fluids and -40ºC to 70ºC in water based fluids.

DIN EN 857 2SC

High pressure hydraulic hose. Exceeds pressure that of SAE 100R2 and SAE 100 R16 with tighter BR. Two hight tensile wire braids. Oil resistant tube. Oil and weather resistant synthetic rubber cover.

DIN EN 857 1SC

High pressure hydraulic hose. Exceeds pressure that of SAE 100R1 with tighter BR. One single wire braid. Ozone and weather resistant cover.

Working pressures bar and psi

BAR	SIZE										
	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	1 1/4"	1 1/2"	2"
SAE100R1	210	192	175	158	140	105	87	70	43	35	26
SAE100R2	350	350	297	280	245	192	157	140	113	87	78
SAE100R3	105	87	84	78	70	61	52	39	26		
SAE100R4*							21	17	14	10,5	7
SAE100R5*	210	210	157		122	105					
SAE100R6	35	28	28	28	28	24	21				
SAE100R7	210	192	175	157	140	105	87	70			
SAE100R8	350	350		280	245	192	157	140			
SAE100R9				315	280		210	210	175	140	140
SAE100R12				280	280	280	280	280	210	175	175
SAE100R13							350	350	350	350	350
SAE100R14*											
SAE100R15				420	420		420	420	420	420	
SAE100R16		350	300	280	250	190	160	140	110		
SAE100R17		210	210	210	210	210	210	210			
EN853 1SN	250	225	215	180	160	130	105	88	63	50	40
EN853 2SN	415	400	350	330	275	250	215	165	125	90	80
EN854 1TE	25	25	20	20	16	16					
EN854 2TE	80	75	68	63	58	50	45	40			
EN8564 3TE	160	145	130	110	93	80	70	55	45	40	33
EN856 4SP		450		445	415	350	350	280	210	185	165
EN856 4SH							420	380	325	290	250
EN857 1SC		225	215	180	160	130	105	88			
EN857 2SC		400	350	330	275	250	215	165			

BAR	SIZE			
	2 1/2"	3"	3 1/2"	4"
SAE100R4*	4	4	3	2,5

BAR	SIZE						
	13/32"	7/8"	1 1/8"	1 3/8"	1 13/16"	2 3/8"	3"
*SAE100R5	140	56	43	35	24	24	14

BAR	mm									
	6,3	8	10	11	12,5	16	19	22	25	29
SAE100R14*	105	105	105	70	56	56	56	56	56	42

PSI	SIZE										
	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	1 1/4"	1 1/2"	2"
SAE100R1	3045	2780	2540	2280	2030	1520	1260	1015	620	510	380
SAE100R2	5075	5075	4310	4060	3550	2780	2280	2030	1640	1260	1130
SAE100R3	1520	1260	1220	1130	1015	885	750	570	3080		
SAE100R4*							305	250	200	150	100
SAE100R5*	3045	3045	2270		1770	1520					
SAE100R6	510	410	410	410	410	350	310				
SAE100R7	3045	2780	2535	2275	2030	1520	1260	1015			
SAE100R8	5075	5075		4060	3550	2780	2275	2030			
SAE100R9				4570	4060		3045	3045	2540	2030	2030
SAE100R12				4060	4060	4060	4060	4060	3045	2540	2540
SAE100R13							5075	5075	5075	5075	5075
SAE100R14*											
SAE100R15				6090	6090		6090	6090	6090	6090	
SAE100R16		5075	4305	4060	3550	2780	2275	2030	1635		
SAE100R17		3045	3045	3045	3045	3045	3045	3045			
EN853 1SN	3625	3260	3120	2610	2320	1885	1520	1280	910	725	580
EN853 2SN	6020	5800	5075	4785	3990	3625	3120	2390	1810	1305	1160
EN854 1TE	363	363	290	290	232	232					
EN854 2TE	1160	1088	986	914	841	725	653	580			
EN8564 3TE	2320	2103	1885	1595	1349	1160	1015	798	653	580	479
EN856 4SP		6525		6450	6020	5075	5075	4060	3045	2680	2390
EN856 4SH							6090	5510	4710	4205	3625
EN857 1SC		3260	3120	2610	2320	1885	1520	1280			
EN857 2SC		5800	5075	4785	3990	3625	3120	2390			

BAR	SIZE			
	2 1/2"	3"	3 1/2"	4"
SAE100R4*	60	60	40	40

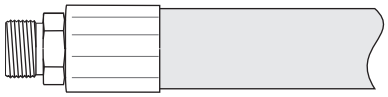
BAR	SIZE						
	13/32"	7/8"	1 1/8"	1 3/8"	1 13/16"	2 3/8"	3"
*SAE100R5	2030	810	620	510	350	350	200

BAR	mm									
	6,3	8	10	11	12,5	16	19	22	25	29
SAE100R14*	1523	1523	1523	1015	812	812	812	812	812	609

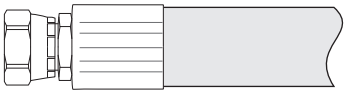
How to measure hose assemblies

The hose length will be a result of the distance between the two ends to which to add the buffer length for bends required by the routing as well as the fitting ends.

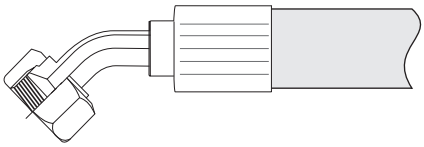
Description of the standard measuring according the type of fitting ends the application requests ensue.



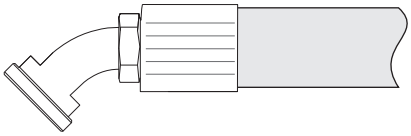
Male threads.
Measuring reference point is the tip end.



Female threads, JIC, SAE, NPSM.
Measuring reference point is the end of the nut.

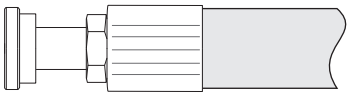


Elbow fittings.
Measuring reference point is the tip of the nut at the Center.

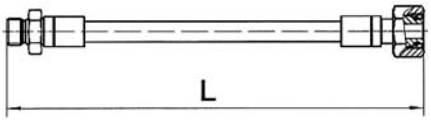


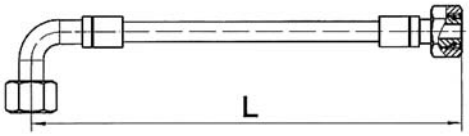
Flange elbow.
Measuring reference point is the tip of the flange at the Center.

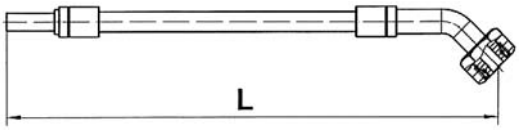
Female threads, DIN, BSP, OFS.
Measuring reference point is the tip of the sealing head.



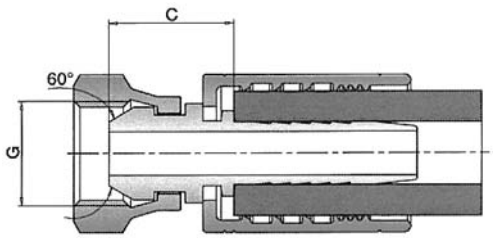
Flange fittings straight.
Measuring reference point is the tip end of the flange.







The cut off factor of a hose assembly is the distance C in the diagram below. The hose length will result after deducting the cut off factor.

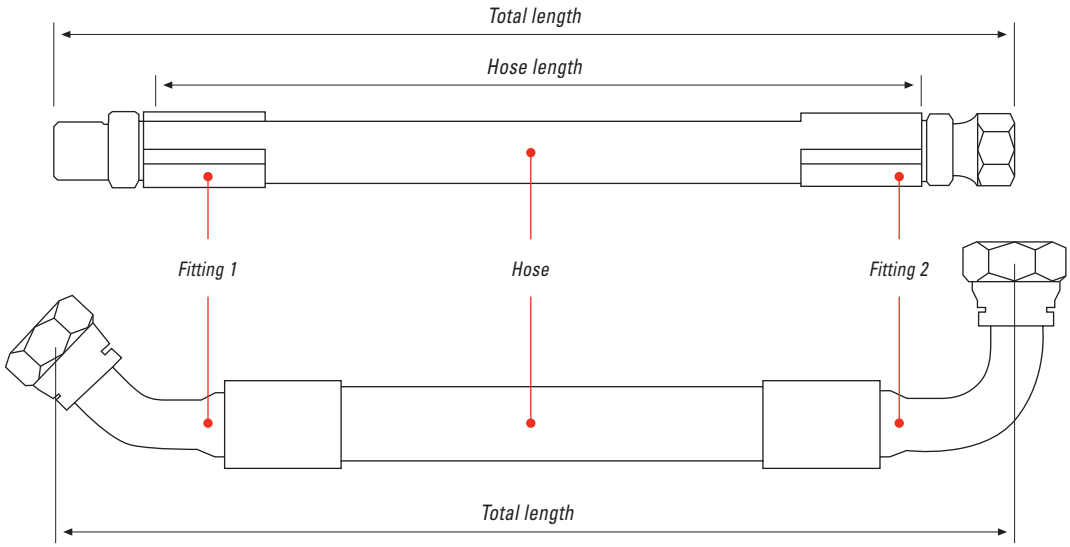


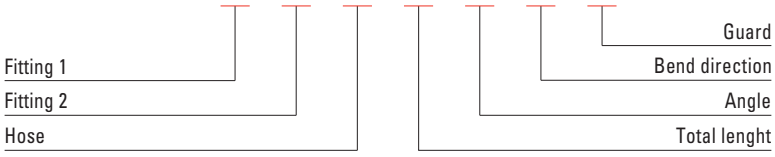
How to order hose assemblies

Different considerations must be taken into account at the time of ordering hose assemblies.

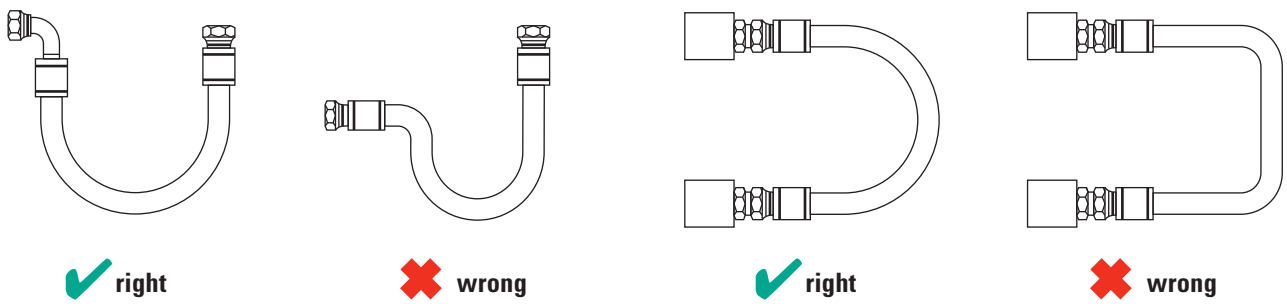
The type of the hose needed is determined by the application and above all the working pressure and the temperature of the fluid as well as the environament. As far as the pressure is concerned the working pressures are disclosed in the tables displayed. Comment on burst pressure is relevant, as the longer time the hose is used, the burst pressure will decrease and this factor is important to be taken into consideration.

The length of the hose is has to be decided according the application, having in mind that one thing is the length of the hose and another thing is the total length of the hose as, the end fittings have to be counted on as well as a safety length of the hose depending on the application, whether the application is static or have a movement and most important, the routing of the hose. Directions henceforward are described to help in the selection with all the elements in play.





The routing of the hose has to take into account the bending of the hose. Bending a hose under the rated radius will reduce its life expectancy. Also the routing has to avoid kinking, twisting, abrassion, sharp corners, falling objects and high temperatures which can create stress to the hose and in consequence reduce the life expectancy as well.



By increasing the length of the hose, the stress created to the hose by tight angles is relieved giving a longer life expectancy to the hose.

Conversion table of common used measure-units in hydraulics

LENGHT	1 inch (in)		25,4 mm
	1 foot (ft)	12 inches (in)	0,3048 m
	1 yard (yd)	3 feet (ft)	0,9144 m
	1 mile (mi)	5280 (ft)	1609,34 m
	1 milimeter (mm)		0,03937 in
	1 meter		3.28084 ft
AREA	1 square foot (ft^2)	144 square inches	0,0929 m^2
	1 square inch (in^2)		6,4516 cm^2
	1 square centimeter (cm^2)		0,155 in^2
VOLUME	1 cubic foot (ft^3)	1728 cubic inches (in^3)	28,316 liter
	1 gallon UK		4,54596 liter
	1 gallon US		3,78533 liter
WEIGHT	1 pound (lb)	16 ounces (oz)	0,453592 Kg
	1 short ton US	2000 (lb)	907,18 Kg
	1 long ton UK	2240 (lb)	1016,05 Kg
	1 Kilogram		2,204022 lb
FLOW	1 gallon per minute UK		4,54596 lit/min
	1 gallon per minute US		3.78533 lit/min
	1 liter per minute	0,264178 gal/min US	0.219976 gal/minUK
TORQUE	1 meter*Newton (mN)		0,67197 feet*pound
	1 feet*pound (ftLb)		1,48816 mN
TEMPERATURE	ºC Celsius . ºFarenheit		ºF=(9C+160)/5
HEAT	1 BTU = 1054,35 Joules	1 cal = 4,184 Joules	1 BTU = 251,996 cal
	Other measures used in hydraulics		
VISCOSITY	SUS (Saybolt Universal Seconds)		
	cSt (Centistoke)		

Most common fractions of an inch with mm equivalents

1/64	1/32	3/64	**1/16**	5/64	3/32	7/64	**1/8**	9/64	5/32	11/64	**3/16**
0,397	0,794	1,191	**1,588**	1,984	2,381	2,778	**3,175**	3,572	3,969	4,366	**0,476**
13/64	7/32	15/64	**1/4**	17/64	9/32	19/64	**5/16**	21/64	11/32	23/64	**3/8**
5,159	5,556	5,953	**6,350**	6,747	7,144	7,541	**7,938**	8,334	8,731	9,128	**9,525**
25/64	13/32	27/64	**7/16**	29/64	15/32	31/64	**1/2**	33/64	17/32	35/64	**9/16**
9,922	10,319	10,716	**11,11**	11,509	11,906	12,303	**12,700**	13,097	13,494	13,889	**14,288**
37/64	19/32	39/64	**5/8**	41/64	21/32	43/64	**11/16**	45/64	23/32	47/64	**3/4**
14,684	15,081	15,478	**15,875**	16,272	16,669	17,066	**17,463**	17,859	18,256	18,653	**19,050**
49/64	25/32	51/64	**13/16**	53/64	27/32	55/64	**7/8**	57/64	29/32	59/64	**15/16**
19,447	19,844	20,241	**20,638**	21,034	21,431	21,828	**22,225**	22,622	23,019	23,416	**23,813**
61/64	31/32	63/64	**1**								
24,209	24,609	25,003	**25,40**								

Commom pressure measure

	bar	mbar	Pa	kPa	Mpa	Torr	inHg	mWS	atm	at	Psi
1 bar	1	10^3	10^5	100	0,1	750,064	29,53	10,1972	0,986923	1,02	14,5
1 mbar	10^{-3}	1	100	0,1	$0,1*10^{-3}$	$750,064*10^{-3}$	$29,53*10^{-3}$	$10,197*10^{-3}$	$0,986923*10^{-3}$	$1,02*10^{-3}$	$14,50*10^{-3}$
1 Pa	10^{-5}	0,01	1	10^{-3}	10^{-6}	$7,50064*10^{-3}$	$0,2953*10^{-3}$	101,97	$9,86923*10^{-6}$	$0,01*10^{-3}$	$0,145*10^{-3}$
1 kPa	0,01	10	10^3	1	10^{-3}	7,50064	0,2953	$101,972*10^{-3}$	$9,86923*10^{-3}$	0,01	0,145
1 Mpa	10	$10*10^3$	10^6	10^3	1	$7,50064*10^3$	295,3	101,972	9,86923	10,2	145
1 Torr	$1,33322*10^{-3}$	1,33322	133,322	$133,322*10^{-3}$	$133,322*10^{-6}$	1	0,03937	$13,5951*10^{-3}$	$1,31579*10^{-3}$	$1,36*10^{-3}$	0,0194
1 inHg	0,03386	33,86	$3,387*10^3$	3,387	$3,387*10^{-3}$	25,4	1	$345,40*10^{-3}$	0,03342	0,0345	0,491
1 mWS	$98,0665*10^{-3}$	98,0665	$9,80665*10^3$	9,80665	$9,80665*10^{-3}$	73,5561	2,904	1	$96,7841*10^{-3}$	$99.9*10^{-3}$	1,422
1 atm	1,01325	$1,01325*10^{-3}$	**$101,325*10^3$**	101,325	$101,325*10^{-3}$	760	29,92	10,3323	1	1,033	14,69
1 ata	0,9803	980,3	$98,07*10^3$	98,07	$98,07*10^{-3}$	735,56	28,96	10,01	0,968	1 Kp/cm^2	14,22
1 Psi	0,0689	68,9	$6,893*10^3$	6,893	$6,893*10^{-3}$	51,71	2,036	0,70309	0,068	0,0703	1

Norms & Types

DIN	Deutsches Institute für Normung	BSP	British Standard Pipe
ISO	International Organization for Standardization	BSPT	British Standard Pipe Taper
SAE	Society of Automotive Engineers	BSPP	British Standard Pipe Parallel
ASTM	American Society for Testing Materials	NPT	National Pipe Thread
AISI	American Iron and Steel Institute	NPSM	National Pipe Straight Mechanical
ANSI	American National Standard Institute	JIC	Joint Industrial Council
EN	European Norm	UTS	Unified Thread Standad
JIS	Japanese Industrial Standards	UNC-UNF	(Coarse-Fine-Extrafine)
GB	Guobiao/Tuijian	ORFS	O-ring Flat Seal
GB/T	(National Standard/Recommended)	ORB	O-ring Boss
CETOP	Comité Européen des Transmissions Oléohydrauliques et Pneumatiques		
NFPA	National Fluid Power Association		

Materials

The chart hereinunder displays the materials of seals most commonly used in hydraulics with the temperature range

ASTM CODE	CHEMICAL DESCRIPTION	RANGE OF TEMPERATURE	TRADE NAME
NBR	Acrylonitril-Butadiene-Elastomer	-30°C to 100°C	Buna
EPDM	Ethilene-Propylene-Diene-Elastomer	-50°C to 150°C	Epdm
FKM	Fluorelastomer	-20°C to 200°C	Viton
PTFE	Polytetralfluoroethylene	-200°C to 230°C	Teflon
SBR	Styrene-Butadiene	-25°C to 100°C	Sbr
VMQ	Silicone elastomer	-40°C to 200°C	Silicone
CR	Polychloroprene	-35°C to 100°C	Neoprene

CONSIDERATIONS ON SAFETY

Selection of hoses, tubes, fittings, adaptors and other related components

Hydraulic circuits use fluids under pressure and in many applications, high pressure, what makes that the elements selected to be under stress which eventually may result in a burst and thus to be a potential danger to cause serious injuries either to the persons or property and even death. In consequence a proper selection of all the elements of the hydraulic circuit is fundamental.

The failure of any of the elements of the circuit may provoke that a fitting, a ferrule, an adaptor to be projected violently with dangerous consequences or the burst of hose may provoke the fluid to discharge at high pressure and pierce people or burn the fluid provoking an explosion, or electrocution may occur in case of high voltage lines are involved in the scenery of the failure. Upon that, the contact with the fluid may produce dangerous inhalation, ingestion of a toxic product with consequences potentially dangerous.

The selection of the elements composing a hydraulic circuit is a fundamental step when considering the safety.

The selection of the elements of a hydraulic circuit has a well-structured procedure defined by the wide world industry standard known as STAMPED which stand for:

S	SIZE
T	TEMPERATURE
A	APPLICATION
M	MEDIA
P	PRESSURE
E	ENDS
D	DELIVERY

Size, temperature, application, media, pressure, ends, and delivery

Size. Refers to the id, internal diameter of the hose as this measure and of course the length defines the size of a hydraulic hose. Internal diameter is the base for calculating parameters of the circuit, as flow and pressure. The od, outer diameter it may be critical when the hose has to go through narrow holes or if in confined areas. Conversely the od, outer diameter is a the basic size when defining a tubing.

Temperature. Refers to temperature of the flowing fluid along the hose. Account must be taken of the friction and the external temperature as well as whether the fluid experiments pulses or temperature spikes when choosing the hose based on the recommendation tables of the manufacturer.

Application. Refers to the use of the hose in the particular application, which may require a hose resistant to oil products, to sunlight, to chemical products, to very high pressure, a pulsating pressure. In every other use the choice has to be adapted to the particular application.

Media. Refers basically to the composition of the material that has to be conveyed along the hose, that is, abrasive, caustic, acid or any other chemical component. The fluid thus will determine the hose to be chosen based on the resistance of the hose to different agents.

Pressure. Refers to the pressure operating in the hydraulic circuit. The manufacturer provides details of the recommended pressure any model can stand up to. This measure of the pressure refers to the working pressure. The burst pressure means the pressure at which the hose will burst. The burst pressure usually has a factor of 4:1 referred to working pressure. When selecting the hose a very careful consideration must be taken to surges or spikes of pressure if any, as out of all the other factors having influence in the selection of a hose, the inadequacy of the pressure has the highest potential of injury or harm.

Ends. Refers to the fittings to mount at both ends of the hose and the way they have to be coupled. Consideration must be taken that the hydraulic circuit will be rated according the lesser pressure rate of any element of the circuit.

Delivery. Refers to the end user requirements, either testing, markings, lengths, special forms in case of tubing, packaging, quality or test certificates and others posed on by the user.

Maintenance hints to observe on a hydraulic circuit or installation

- ✔ **PROTECTION OF PERSONS AND PROPERTIES.**
- ✔ **REGULAR INSPECTION OF THE HYDRAULIC CIRCUIT FOR LEAKS AND WEAR.**
- ✔ **APPROACH WITH CAUTION TO A PRESSURIZED HYDRAULIC CIRCUIT.**
- ✔ **REPLACE THE POTENTIAL MISFIT ELEMENTS OF THE CIRCUIT WHENEVER NEEDED TO.**
- ✔ **OBSERVE POTENTIAL EXTERNAL CAUSES WHICH MAY ENDANGER THE CIRCUIT.**

HYDRAULIC HOSES TYPES

SAE 100 R1

Wrapped steel wire reinforced cover

SIZE			I.D		W.D		O.D			W.P		P.P		B.P		min B.R		W.T
							A		AT									
mm	inch	dash	min	max	min	max	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
5	3/16	-3	4.6	5.4	8.9	10.1	11.9	13.5	12.5	21	3045	42	6090	84	12180	3.54	90	0.20
6.3	1/4	-4	6.2	7.0	10.6	11.7	15.1	16.7	14.1	19.2	2780	39	5580	77	11165	3.94	100	0.25
8	5/16	-5	7.7	8.5	12.1	13.3	16.7	18.3	15.7	17.5	2540	35	5075	70	10150	4.53	115	0.31
10	3/8	-6	9.3	10.1	14.5	15.7	19.0	20.6	18.1	15.7	2280	32	4570	63	9135	4.92	125	0.36
12.5	1/2	-8	12.3	13.5	17.5	19.0	22.2	23.8	21.5	14	2030	28	4060	56	8120	7.09	180	0.45
16	5/8	-10	15.5	16.7	20.6	22.2	25.4	27.0	24.7	10.5	1520	21	3045	42	6090	8.07	205	0.52
19	3/4	-12	18.6	19.8	24.6	26.2	29.4	31.0	28.6	8.7	1260	18	2540	35	5075	9.45	240	0.65
25	1	-16	25.0	26.4	32.5	34.1	36.9	39.3	36.6	7	1015	14	2030	28	4060	11.81	300	0.91
31.5	1 1/4	-20	31.4	33.0	39.3	41.7	44.4	47.6	44.8	4.3	620	8.7	1260	18	2540	16.54	420	1.30
38	1 1/2	-24	37.7	39.3	45.6	48.0	50.8	54.0	52.0	3.5	510	7	1015	14	2030	19.69	500	1.70
51	2	-32	50.4	52.0	58.7	61.9	65.1	68.3	65.9	2.6	380	5.2	750	11	1520	24.80	630	2.00

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, a reinforcement consisting on a highly tensile steel wire braid, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hoses for use with petroleum base hydraulic fluids within a temperature range of -40°C to +100°C

SAE 100 R2

Wrapped high pressure steel wire rubber cover

SIZE			I.D		W.D		O.D			W.P		P.P		B.P		min B.R		W.T
							A		AT									
mm	inch	dash	min	max	min	max	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
5	3/16	-3	4.6	5.4	10.6	11.7	15.1	16.7	14.1	35	5075	70	10150	140	20300	3.54	90	0.32
6.3	1/4	-4	6.2	7.0	12.1	13.3	16.7	18.3	15.7	35	5075	70	10150	140	20300	3.94	100	0.36
8	5/16	-5	7.7	8.5	13.7	14.9	18.3	19.8	17.3	29.7	4310	60	8630	119	17255	4.53	115	0.45
10	3/8	-6	9.3	10.1	16.1	17.3	20.6	22.2	19.7	28	4060	56	8120	112	16240	4.92	125	0.54
12.5	1/2	-8	12.3	13.5	19.0	20.6	23.8	25.4	23.1	24.5	3550	49	7110	98	14210	7.09	180	0.68
16	5/8	-10	15.5	16.7	22.2	23.8	27.0	28.6	26.3	19.2	2780	39	5580	77	11165	8.07	205	0.80
19	3/4	-12	18.6	19.8	26.2	27.8	31.0	32.5	30.2	15.7	2280	32	4570	63	9135	9.45	240	0.94
25	1	-16	25.0	26.4	34.1	35.7	38.5	40.9	38.9	14	2030	28	4060	56	8120	11.81	300	1.35
31.5	1 1/4	-20	31.4	33.0	43.2	45.6	49.2	52.4	49.6	11.3	1640	23	3290	46	6600	16.54	420	2.15
38	1 1/2	-24	37.7	39.3	49.6	52.0	55.6	58.7	56.0	8.7	1260	18	2540	35	5075	19.69	500	2.65
51	2	-32	50.4	52.0	62.3	64.7	68.3	71.4	68.6	7.8	1130	16	2280	32	4570	24.80	630	3.42

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, a reinforcement consisting on two highly tensile steel wire layers, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hoses for use with petroleum base hydraulic fluids within a temperature range of -40°C to +100°C

SAE 100 R3

Double textile fiber braid rubber cover

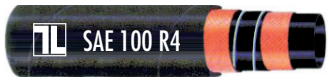
SIZE			I.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
5	3/16	-3	4.5	5.4	11.9	13.5	10.5	1520	21	3050	42	6090	2.95	75	0.16
6.3	1/4	-4	6.1	7.0	13.5	15.1	8.7	1260	17.5	2540	35	5075	2.95	75	0.18
8	5/16	-5	7.6	8.5	16.7	18.3	8.4	1220	16.8	2440	33.5	4860	3.94	100	0.27
10	3/8	-6	9.2	10.1	18.3	19.8	7.8	1130	15.7	2280	31.5	4570	3.94	100	0.31
12.5	1/2	-8	12.4	13.5	23.0	24.6	7.0	1015	14	2030	28	4060	4.92	125	0.45
16	5/8	-10	15.6	16.7	26.2	27.8	6.1	885	12.2	1770	24.5	3550	5.51	140	0.53
19	3/4	-12	18.7	19.8	31.0	32.5	5.2	750	10.5	1520	21	3045	5.91	150	0.72
25	1	-16	25.1	26.2	36.9	39.3	3.9	570	7.8	1130	15.7	2280	8.07	205	0.90
31.5	1 1/4	-20	31.4	32.9	42.9	46.0	2.6	380	5.2	750	10.5	1520	9.84	250	1.07

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, a reinforcement consisting on two highly tensile textile fiber braids, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hoses for use with petroleum base hydraulic fluids within a temperature range of -40°C to +100°C

SAE 100 R4

Wire inserted. Suction hose



SIZE			I.D		O.D	W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
19	3/4	-12	18.2	19.8	34.9	2.1	305	4.2	610	8.4	1210	4.92	125	0.92
25	1	-16	24.6	26.2	41.3	1.7	250	3.5	510	7	1015	5.91	150	1.10
31.5	1 1/4	-20	30.6	33.0	50.8	1.4	200	2.8	410	5.6	810	7.87	200	1.30
38	1 1/2	-24	36.9	39.3	57.2	1.05	150	2.1	305	4.2	610	10.04	255	1.80
51	2	-32	49.2	52.4	69.9	0.7	100	1.4	200	2.8	410	11.81	300	2.23
63	2 1/2	-40	61.9	65.1	82.6	0.4	60	0.85	120	1.7	250	13.98	355	3.23
76	3	-48	74.6	77.8	95.3	0.4	60	0.8	120	1.6	230	18.11	460	4.25
89	3 1/2	-56	87.3	90.5	107.9	0.3	40	0.6	90	1.25	180	20.87	530	5.05
102	4	-64	100.0	103.2	120.7	0.25	40	0.5	70	1	145	24.02	610	5.60

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, a reinforcement consisting on a ply or plies of woven or braided textile fibers with a suitable spiral of body steel wire, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hoses for use with petroleum base hydraulic fluids within a temperature range of -40°C to +100°C

SAE 100 R5

Single wire braid and double textile fibre braid

SIZE		I.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	min	max	min	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
5	3/16	4.8	5.5	12.7	13.7	21	3045	42	6090	84	12180	2.95	75	0.24
6.3	1/4	6.4	7.2	14.3	15.3	21	3045	42	6090	84	12180	3.35	85	0.28
8	5/16	7.9	8.7	16.7	17.6	15.7	2270	31.5	4570	63	9135	3.94	100	0.35
11	13/32	10.3	11.1	18.9	20.0	14	2030	28	4060	56	8120	4.53	115	0.38
12.5	1/2	12.7	13.7	22.8	24.0	12.2	1770	24.5	3550	49	7105	5.51	140	0.51
16	5/8	15.9	17.0	26.8	28.0	10.5	1520	21	3045	42	6090	6.50	165	0.68
22	7/8	22.2	23.3	30.6	32.2	5.6	810	11.2	1620	22.4	3250	7.28	185	0.70
29	1 1/8	28.6	29.8	37.3	38.9	4.3	620	8.7	1260	17.5	2540	9.06	230	0.80
35	1 3/8	34.9	36.1	43.7	45.2	3.5	510	7	1015	14	2030	10.43	265	0.93
46	1 13/16	46.0	47.2	55.2	57.6	2.4	350	4.9	700	9.8	1420	13.19	335	1.32
60	2 3/8	60.3	61.9	71.8	74.2	2.4	350	4.9	700	9.8	1420	24.02	610	2.96
76	3	76.2	77.8	89.3	91.7	1.4	200	2.8	410	5.6	810	33.07	840	4.10

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, a single wire braid reinforcement and a fiber braided cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +100°C.

SAE 100 R6

Single textile fiber braid rubber cover

SIZE			I.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
5	3/16	-3	4.5	5.4	10.3	11.9	3.5	510	7	1015	14	2030	1.97	50	1.10
6.3	1/4	-4	6.1	7.0	11.9	13.5	2.8	410	5.6	810	11.2	1620	2.56	65	0.13
8	5/16	-5	7.6	8.5	13.5	15.1	2.8	410	5.6	810	11.2	1620	2.95	75	0.15
10	3/8	-6	9.2	10.1	15.1	16.7	2.8	410	5.6	810	11.2	1620	2.95	75	0.18
12.5	1/2	-8	12.4	13.5	19.0	20.6	2.8	410	5.6	810	11.2	1620	3.94	100	0.26
16	5/8	-10	15.6	16.7	22.2	23.8	2.4	350	4.9	710	9.8	1420	4.92	125	0.31
19	3/4	-12	18.7	19.8	25.4	27.8	2.1	310	4.2	610	8.4	1220	5.91	150	0.40

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, one braid of suitable fiber, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +100°C.

SAE 100 R7

Thermoplastic synthetic fiber reinforced

SIZE			I.D		O.D	W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
5	3/16	-3	4.6	5.4	11.4	21	3045	42	6090	84	12180	3.54	90	0.073
6.3	1/4	-4	6.2	7.0	13.7	19.2	2780	38.5	5580	77	11165	3.94	100	0.090
8	5/16	-5	7.7	8.5	15.6	17.5	2535	35	5075	70	10150	4.53	115	0.128
10	3/8	-6	9.3	10.3	18.4	15.7	2275	31.5	4565	63	9135	4.92	125	0.155
12.5	1/2	-8	12.3	13.5	22.5	14	2030	28	4060	56	8120	7.09	180	0.224
16	5/8	-10	15.5	16.7	25.8	10.5	1520	21	3045	42	6090	8.07	205	0.277
19	3/4	-12	18.6	19.8	28.6	8.7	1260	17.5	2535	35	5075	9.45	240	0.330
25	1	-16	25.0	26.4	36.7	7	1015	14	2030	28	4060	11.81	300	0.403

CONSTRUCTION:
This hose consists of a thermoplastic inner tube resistant to hydraulic fluids with suitable synthetic fiber reinforcement, and a hydraulic fluid and weather resistant thermoplastic cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +93°C.

SAE 100 R8

High pressure thermoplastic synthetic fiber reinforced

SIZE			I.D		O.D	W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
5	3/16	-3	4.6	5.4	14.6	35	5075	70	10150	140	20300	3.54	90	0.086
6.3	1/4	-4	6.2	7.0	16.8	35	5075	70	10150	140	20300	3.94	100	0.097
10	3/8	-6	9.3	10.3	20.3	28	4060	56	8120	112	16240	4.92	125	0.178
12.5	1/2	-8	12.3	13.5	24.6	24.5	3550	49	7105	98	14210	7.09	180	0.216
16	5/8	-10	15.5	16.7	29.8	19.2	2780	38.5	5580	77	11165	8.07	205	0.312
19	3/4	-12	18.6	19.8	33.0	15.7	2275	31.5	4565	63	9135	9.45	240	0.360
25	1	-16	25.0	26.4	38.6	14	2030	28	4060	56	8120	11.81	300	0.505

CONSTRUCTION:
This hose consists of a thermoplastic inner tube resistant to hydraulic fluids with suitable synthetic fiber reinforcement, and a hydraulic fluid and weather thermoplastic cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +93°C.

SAE 100 R9

High pressure. Four wire spiral reinforced rubber cover

SIZE			I.D		W.D		O.D			W.P		P.P		B.P		min B.R		W.T
							A		AT									
mm	inch	dash	min	max	min	max	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
10	3/8	-6	9.3	10.1	16.9	18.0	20.6	22.2	21.1	31.5	4570	63	9135	126	18270	4.92	125	0.70
12.5	1/2	-8	12.3	13.5	19.4	21.0	23.8	25.4	24.3	28	4060	56	8120	112	16240	7.09	180	0.83
19	3/4	-12	18.6	19.8	26.6	28.2	30.6	32.2	31.9	21	3045	42	6090	84	12180	9.45	240	1.30
25	1	-16	25.0	26.4	34.5	36.1	38.5	40.9	40.5	21	3045	42	6090	84	12180	11.81	300	1.70
31.5	1 1/4	-20	31.4	33.0	43.3	45.6	49.2	52.4	50.7	17.5	2540	35	5075	70	10150	16.54	420	3.08
38	1 1/2	-24	37.7	39.3	49.6	52.0	55.6	58.7		14	2030	28	4060	56	8120	19.69	500	4.30
51	2	-32	50.4	52.0	63.9	66.2	69.9	73.0		14	2030	28	4060	56	8120	25.98	660	5.63

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, four spiral plies of steel wire wrapped in alternating directions, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +100°C.

SAE 100 R12

Heavy duty. Four wire spiral reinforced rubber cover

SIZE			I.D		W.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	min	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
10	3/8	-6	9.3	10.1	16.6	17.8	19.5	21.0	28	4060	56	8120	112	16240	4.92	125	0.70
12.5	1/2	-8	12.3	13.5	19.9	21.5	23.0	24.6	28	4060	56	8120	112	16240	7.09	180	0.83
16	5/8	-10	15.5	16.7	23.8	25.4	26.6	28.2	28	4060	56	8120	112	16240	7.87	200	1.12
19	3/4	-12	18.6	19.8	26.9	28.4	29.9	31.5	28	4060	56	8120	112	16240	9.45	240	1.43
25	1	-16	25.0	26.4	34.1	35.7	36.8	39.2	28	4060	56	8120	112	16240	11.81	300	2.00
31.5	1 1/4	-20	31.4	33.0	42.7	45.1	45.4	48.6	21	3045	42	6090	84	12180	16.54	420	2.80
38	1 1/2	-24	37.7	39.3	49.2	51.6	51.9	55.0	17.5	2540	35	5075	70	10150	19.69	500	3.40
51	2	-32	50.8	52.0	62.5	64.8	65.1	68.3	17.5	2540	35	5075	70	10150	25.20	640	4.25

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, four spiral plies of steel wire wrapped in alternating directions, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +121°C.

SAE 100 R13

Heavy duty. Multiple wire spiral reinforced rubber cover

SIZE			I.D		W.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	min	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
19	3/4	-12	18.6	19.8	28.2	29.8	31.0	33.2	35	5075	70	10150	140	20300	9.45	240	2.10
25	1	-16	25.0	26.4	34.9	36.4	37.6	39.8	35	5075	70	10150	140	20300	11.81	300	2.88
31.5	1 1/4	-20	31.4	33.0	45.6	48.0	48.3	51.3	35	5075	70	10150	140	20300	16.54	420	4.20
38	1 1/2	-24	37.7	39.3	53.1	55.5	55.8	58.8	35	5075	70	10150	140	20300	19.69	500	5.00
51	2	-32	50.4	52.0	66.9	69.3	69.5	72.7	35	5075	70	10150	140	20300	25.20	640	7.00

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, multiple spiral plies of heavy steel wire wrapped in alternating directions, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +121°C.

SAE 100 R14

Ptfe inner wire braid reinforced

SIZE		I.D		O.D		W.P		P.P		B.P		min B.R	
mm	dash	min	max	min	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm
6.3	-4	6	6.9	8.9	10.1	10.5	1523	31	4495	62	8990	2.95	75
8	-5	7.5	8.4	10.4	11.6	10.5	1523	27.6	4002	55.2	8004	3.94	100
10	-6	9.1	10.0	12.2	13.4	10.5	1523	24.1	3495	48.3	7004	4.92	125
11	-7	9.9	10.9	12.9	14.3	7	1015	20.7	3002	41.4	6003	5.31	135
12.5	-8	12.3	13.3	15.3	16.8	5.6	812	20.7	3002	41.4	6003	6.50	165
16	-10	15.3	16.5	18.6	20.1	5.6	812	17.2	2494	34.5	5003	7.87	200
19	-12	18.4	19.6	21.3	23.3	5.6	812	16.8	2436	27.6	4002	9.06	230
22	-14	21.4	23.0	24.6	26.9	5.6	812	12.1	1755	24.1	3495	9.06	230
25	-16	24.6	26.2	27.8	29.8	5.6	812	12.1	1755	24.1	3495	11.8	300
29	-18	27.8	29.4	31.9	33.5	4.2	609	8.6	1247	17.2	2494	16.1	410

CONSTRUCTION:
Tube: Temperature chemical resistant PTFE material.
Cover: Braided with stainless steel

APPLICATIONS:
Temperature range: -60°C up to +204°C.

SAE 100 R15

Heavy duty. Four wire spiral reinforced rubber cover

SIZE			I.D		W.D	O.D	W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
10	3/8	-6	9.3	10.1	20.3	23.3	42	6090	84	12180	168	24360	5.91	150	0.80
12.7	1/2	-8	12.3	13.5	24.0	26.8	42	6090	84	12180	168	24360	7.87	200	0.95
19	3/4	-12	18.6	19.8	32.9	36.1	42	6090	84	12180	168	24360	10.40	265	1.85
25	1	-16	25.0	26.4	38.9	42.9	42	6090	84	12180	168	24360	13.00	330	2.90
31.5	1 1/4	-20	31.4	33.0	48.4	51.5	42	6090	84	12180	168	24360	17.52	445	4.20
38	1 1/2	-24	37.7	39.3	56.3	59.6	42	6090	84	12180	168	24360	20.87	530	5.60

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, multiple spiral plies of heavy steel wire wrapped in alternating directions, and an oil and weather resistant synthetic rubber cover.
A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +121°C.

SAE 100 R16

High pressure. Two wire reinforced rubber cover

SIZE			I.D		W.D	O.D	M.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	max	max	min	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
6.3	1/4	-4	6.2	7.0	12.3	14.5	0.8	1.5	35	5075	70	10150	140	20300	1.97	50	0.30
8	5/16	-5	7.7	8.5	13.3	15.7	0.8	1.5	30	4305	59.5	8625	119	17255	2.17	55	0.34
10	3/8	-6	9.3	10.1	15.9	18.8	0.8	1.5	28	4060	56	8120	112	16240	2.56	65	0.42
12.5	1/2	-8	12.3	13.5	19.0	22.0	0.8	1.5	25	3550	49	7105	98	14210	3.54	90	0.54
16	5/8	-10	15.5	16.7	22.6	25.4	0.8	1.5	19	2780	38.5	5580	77	11165	3.94	100	0.68
19	3/4	-12	18.6	19.8	26.3	29.0	0.8	1.5	16	2275	31.5	4565	63	9135	4.72	120	0.80
25	1	-16	25.0	26.4	34.0	36.6	0.8	1.5	14	2030	28	4060	56	8120	5.91	150	1.15
31.5	1 1/4	-20	31.4	33.0	41.9	44.3	1.0	2.0	11	1635	22.7	3290	45.5	6595	8.27	210	1.83

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, steel wire reinforcement according to hose design (one or two braids), and an oil and weather resistant synthetic rubber cover. A ply or braid of suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +121°C.

SAE 100 R17

One or Two wire reinforced rubber cover. Low BR

SIZE			I.D		W.D	O.D	W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
6.3	1/4"	-4	6.2	7.0	11.0	13.2	21	3045	42	6090	84	12180	1.97	50	0.169
8	5/16"	-5	7.7	8.5	13.0	15.0	21	3045	42	6090	84	12180	2.17	55	0.210
10	3/8"	-6	9.3	10.1	15.0	17.0	21	3045	42	6090	84	12180	2.56	65	0.254
12.5	1/2"	-8	12.3	13.5	18.8	21.1	21	3045	42	6090	84	12180	3.54	90	0.466
16	5/8"	-10	15.5	16.7	23.6	25.9	21	3045	42	6090	84	12180	3.94	100	0.586
19	3/4"	-12	18.6	19.8	27.7	30.3	21	3045	42	6090	84	12180	4.72	120	0.749
25	1"	-16	25.0	26.4	35.6	38.6	21	3045	42	6090	84	12180	5.91	150	1.457

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, steel wire reinforcement according suitable material may be used over the inner tube and/or over the wire reinforcement to anchor the synthetic rubber to the wire.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +121°C.

DIN EN853 1SN/1ST

One wire braid reinforced. SN thinner cover than ST

SIZE			I.D		W.D		O.D			W.P		P.P		B.P		min B.R		W.T
							1 ST		1 SN									
mm	inch	dash	min	max	min	max	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
5	3/16	-3	4.6	5.4	9.0	10.0	11.9	13.5	12.5	25	3625	50	7250	100	14500	3.54	90	0.20
6.3	1/4	-4	6.2	7.0	10.6	11.6	15.1	16.7	14.1	22.5	3260	45	6525	90	13050	3.94	100	0.25
8	5/16	-5	7.7	8.5	12.1	13.3	16.7	18.3	15.7	21.5	3120	43	6235	85	12325	4.53	115	0.31
10	3/8	-6	9.3	10.1	14.5	15.7	19.0	20.6	18.1	18	2610	36	5220	72	10440	5.12	130	0.36
12.5	1/2	-8	12.3	13.5	17.5	19.1	22.2	23.8	21.4	16	2320	32	4640	64	9280	7.09	180	0.45
16	5/8	-10	15.5	16.7	20.6	22.2	25.4	27.0	24.5	13	1885	26	3770	52	7540	7.87	200	0.52
19	3/4	-12	18.6	19.8	24.6	26.2	29.4	31.0	28.5	10.5	1520	21	3045	42	6090	9.45	240	0.65
25	1	-16	25.0	26.4	32.5	34.1	37.1	39.1	36.6	8.8	1280	17.5	2540	35	5075	11.81	300	0.91
31.5	1 1/4	-20	31.4	33.0	39.3	41.7	44.4	47.6	44.8	6.3	910	15	2175	25	3625	16.54	420	1.30
38	1 1/2	-24	37.7	39.3	45.6	48.0	50.8	54.0	52.1	5	725	10	1450	20	2900	19.69	500	1.70
51	2	-32	50.4	52.0	58.7	61.7	65.1	68.3	65.5	4	580	8	1160	16	2320	24.80	630	2.00

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, one braid of steel wire reinforcement, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +100°C.

DIN EN853 2SN/2ST

Two wire braid reinforced. SN thinner cover than ST

SIZE			I.D		W.D		O.D			W.P		P.P		B.P		min B.R		W.T
							2 ST		2 SN									
mm	inch	dash	min	max	min	max	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
5	3/16	-3	4.6	5.4	10.6	11.6	15.1	16.7	14.1	41.5	6020	83	12035	165	23295	3.54	90	0.32
6.3	1/4	-4	6.2	7.0	12.1	13.3	16.7	18.3	15.7	40	5800	80	11600	160	23200	3.94	100	0.36
8	5/16	-5	7.7	8.5	13.7	14.9	18.3	19.9	17.3	35	5075	70	10150	140	20300	4.53	115	0.45
10	3/8	-6	9.3	10.1	16.1	17.3	20.6	22.2	19.7	33	4785	66	9570	132	19140	5.12	130	0.54
12.5	1/2	-8	12.3	13.5	19.0	20.6	23.8	25.4	23.0	27.5	3990	55	7975	110	15950	7.09	180	0.68
16	5/8	-10	15.5	16.7	22.2	23.8	27.0	28.6	26.2	25	3625	50	7250	100	14500	7.87	200	0.80
19	3/4	-12	18.6	19.8	26.2	27.8	31.0	32.6	30.1	21.5	3120	43	6235	85	12350	9.45	240	0.94
25	1	-16	25.0	26.4	34.1	35.7	38.5	40.9	38.9	16.5	2390	32.5	4710	65	9425	11.81	300	1.35
31.5	1 1/4	-20	31.4	33.0	43.3	45.7	49.2	52.4	49.5	12.5	1810	25	3625	50	7250	16.54	420	2.15
38	1 1/2	-24	37.7	39.3	49.6	52.0	55.6	58.8	55.9	9	1305	18	2310	36	5220	19.69	500	2.65
51	2	-32	50.4	52.0	62.3	64.7	68.2	71.4	68.6	8	1160	16	2320	32	4640	24.80	630	3.42

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, two braids of steel wire reinforcement, and an weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +100°C.

DIN EN854 1TE

One textile fiber braid

SIZE			I.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	bar	psi	bar	psi	bar	psi	inch	mm	kg/m
5	3/16	-3	4.4	5.2	10.0	11.6	25	363	50	725	100	1450	1.378	35	0.093
6	1/4	-4	5.9	6.9	11.6	13.2	25	363	50	725	100	1450	1.772	45	0.114
8	5/16	-5	7.4	8.4	13.1	14.7	20	290	40	580	80	1160	2.559	65	0.133
10	3/8	-6	9.0	10.0	14.7	16.3	20	290	40	580	80	1160	2.953	75	0.15
12	1/2	-8	12.1	13.3	17.7	19.7	16	232	32	464	64	928	3.543	90	0.19
16	5/8	-10	15.3	16.5	21.9	23.9	16	232	32	464	64	928	4.528	115	0.277

CONSTRUCTION:
This hose consists of an oil water resistant synthetic rubber lining, one of suitable textile yarn and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
Hydraulic fluids in accordance with ISO6743-4 with the exception of HRD R, HFD S and HFD T at temperatures range of -40°C ~ +100C.

DIN EN854 2TE

Two textile fiber braid. Abrassion and weather resistant cover

SIZE			I.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	bar	psi	bar	psi	bar	psi	inch	mm	kg/m
5	3/16	-3	4.4	5.2	11	12.6	80	1160	160	2320	320	4640	1.378	35	0.117
6	1/4	-4	5.9	6.9	12.6	14.2	75	1088	150	2176	300	4352	1.575	40	0.139
8	5/16	-5	7.4	8.4	14.1	15.7	68	986	136	1972	272	3944	1.969	50	0.157
10	3/8	-6	9.0	10.0	15.7	17.3	63	914	126	1828	252	3656	2.362	60	0.183
12	1/2	-8	12.1	13.3	18.7	20.7	58	841	116	1682	232	3364	2.756	70	0.222
16	5/8	-10	15.3	16.5	22.9	24.9	50	725	100	1450	200	2900	3.543	90	0.316
19	3/4	-12	18.2	19.8	26	28	45	653	90	1306	180	2612	4.331	110	0.37
25	1	-16	24.6	26.2	32.9	35.9	40	580	80	1160	160	2320	5.118	130	0.547

CONSTRUCTION:
This hose consists of an oil water resistant synthetic rubber lining, two of suitable textile yarn and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
Hydraulic fluids in accordance with ISO6743-4 with the exception of HRD R, HFD S and HFD T at temperatures range of -40ºC ~ +100C.

DIN EN854 3TE

Two textile fiber braid. Oil and weather resistant cover

SIZE			I.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	bar	psi	bar	psi	bar	psi	inch	mm	kg/m
5	3/16	-3	4.4	5.2	12.0	13.6	160	2320	320	4640	640	9280	1.57	40	0.129
6	1/4	-4	5.9	6.9	13.6	15.2	145	2103	290	4206	580	8412	1.77	45	0.153
8	5/16	-5	7.4	8.4	16.1	17.7	130	1885	260	3770	520	7540	2.16	55	0.210
10	3/8	-6	9.0	10.0	17.7	19.3	110	1595	220	3190	440	6380	2.75	70	0.241
12	1/2	-8	12.1	13.3	20.7	22.7	93	1349	186	2698	372	5396	3.35	85	0.299
16	5/8	-10	15.3	16.5	24.9	26.9	80	1160	160	2320	320	4640	4.13	105	0.405
19	3/4	-12	18.2	19.8	28.0	30.0	70	1015	140	2030	280	4060	5.12	130	0.470
25	1	-16	24.6	26.2	34.4	37.4	55	798	110	1596	220	3192	5.91	150	0.633
31	1 1/4	-20	30.8	32.8	40.8	43.8	45	653	90	1306	180	2612	7.48	190	0.774
38	1 1/2	-24	37.1	39.1	47.6	51.6	40	580	80	1160	160	2320	9.45	240	0.973
51	2	-32	49.8	51.8	60.3	64.3	33	479	66	958	132	1916	11.81	300	1.246

CONSTRUCTION:
This hose consists of an oil water resistant synthetic rubber lining, two of suitable textile yarn and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
Hydraulic fluids in accordance with ISO6743-4 with the exception of HRD R, HFD S and HFD T at temperatures range of -40ºC ~ +100C.

DIN EN856 4SP

Four wire reinforced. Oil and weather resistant cover

SIZE			I.D		W.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	min	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
6.3	1/4	-4	6.2	7.0	14.1	15.3	17.1	18.7	45	6525	90	13050	180	26100	5.91	150	0.64
10	3/8	-6	9.3	10.1	16.9	18.1	20.6	22.2	44.5	6450	89	12905	178	25810	7.09	180	0.75
12.5	1/2	-8	12.3	13.5	19.4	21.0	23.8	25.4	41.5	6020	83	12035	166	24070	9.06	230	0.89
16	5/8	-10	15.5	16.7	23.0	24.6	27.4	29.0	35	5075	70	10150	140	20300	9.84	250	1.10
19	3/4	-12	18.6	19.8	27.4	29.0	31.4	33.0	35	5075	70	10150	148	21460	11.81	300	1.50
25	1	-16	25.0	26.4	34.5	36.1	38.5	40.9	28	4060	56	8120	112	16240	13.39	340	2.00
31.5	1 1/4	-20	31.4	33.0	45.0	47.0	49.2	52.4	21	3045	42	6090	84	12180	18.11	460	3.00
38	1 1/2	-24	37.7	39.3	51.4	53.4	55.6	58.8	18.5	2680	37	5365	74	10730	22.05	560	3.40
51	2	-32	50.4	52.0	64.3	66.3	68.2	71.4	16.5	2390	33	4785	66	9570	25.98	660	4.35

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, four spiral plies of steel wire wrapped in alternating directions, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +100°C.

DIN EN856 4SH

Four wire reinforced. Oil and weather resistant cover

SIZE			I.D		W.D		O.D		W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	min	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
19	3/4	-12	18.6	19.8	27.6	29.2	31.4	33.0	42	6090	84	12180	168	24360	11.02	280	1.70
25	1	-16	25.0	26.4	34.4	36.0	37.5	39.9	38	5510	76	11020	152	22040	13.39	340	2.50
31.5	1 1/4	-20	31.4	33.0	40.9	42.9	43.9	47.1	32.5	4710	65	9425	130	18850	18.11	460	3.00
38	1 1/2	-24	37.7	39.3	47.8	49.8	51.9	55.1	29	4205	58	8410	116	16820	22.05	560	3.60
51	2	-32	50.4	52.0	62.2	64.2	66.5	69.7	25	3625	50	7250	100	14500	27.56	700	5.00

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, four spiral plies of steel wire wrapped in alternating directions, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +100°C.

DIN EN857 1SC

One wire braid. NBR tube and cover

SIZE			I.D		W.D		O.D	W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
6.3	1/4	-4	6.1	6.9	9.6	10.8	13.5	22.5	3260	45	6525	90	13050	2.95	75	0.20
8	5/16	-5	7.7	8.5	10.9	12.1	14.5	21.5	3120	43	6235	86	12470	3.35	85	0.15
10	3/8	-6	9.3	10.1	12.7	14.5	16.9	18	2610	36	5220	72	10440	3.54	90	0.19
12.5	1/2	-8	12.3	13.5	15.9	18.1	20.4	16	2320	32	4640	64	9280	5.12	130	0.23
16	5/8	-10	15.5	16.7	19.8	21.0	23.0	13	1885	26	3770	52	7540	5.91	150	0.29
19	3/4	-12	18.6	19.8	23.2	24.4	26.7	10.5	1520	21	3045	42	6090	7.09	180	0.34
25	1	-16	25.0	26.4	30.7	31.9	34.9	8.8	1280	17.6	2550	35.2	5100	9.06	230	0.49

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, a single steel wire braid reinforcement, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +100°C.

DIN EN857 2SC

Two wire braid. NBR tube and cover

SIZE			I.D		W.D		O.D	W.P		P.P		B.P		min B.R		W.T
mm	inch	dash	min	max	min	max	max	Mpa	psi	Mpa	psi	Mpa	psi	inch	mm	kg/m
6.3	1/4	-4	6.1	6.9	10.6	11.7	14.2	40	5800	80	11600	160	23200	2.95	75	0.30
8	5/16	-5	7.7	8.5	12.1	13.3	16.0	35	5075	70	10150	140	20300	3.35	85	0.34
10	3/8	-6	9.3	10.1	14.4	15.6	18.3	33	4785	66	9570	132	19140	3.54	90	0.42
12.5	1/2	-8	12.3	13.5	17.5	19.1	21.5	27.5	3990	55	7975	110	15950	5.12	130	0.54
16	5/8	-10	15.5	16.7	20.5	22.3	24.7	25	3625	50	7250	100	14500	6.69	170	0.68
19	3/4	-12	18.6	19.8	24.6	26.4	28.6	21.5	3120	43	6235	86	12470	7.87	200	0.80
25	1	-16	25.0	26.4	32.5	34.3	36.6	16.5	2390	33	4785	66	9570	9.84	250	1.15

CONSTRUCTION:
This hose consists of an inner tube of oil resistant synthetic rubber, two braids of steel wire reinforcement, and an oil and weather resistant synthetic rubber cover.

APPLICATIONS:
This section covers hose for use with petroleum base hydraulic fluids within a temperature range of -40°C ~ +100°C.

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