Monti & Barabino

Technical Supplies
For Industrial and Naval field
Since 1880

TECHNICAL HANDBOOK

Monti & Barabino, established in 1880, is based in Genoa and operates in the field of Technical Items supplies for the Industrial and Maritime Sectors.

The extremely wide experience matured in more than 135 years of activity and its highly qualified personnel composed by technicians, marine engineers, naval architects etc., enables the Company to offer the most complete and efficient technical and commercial assistance.

Moreover, the products stocked in its large warehouse allows it to promptly satisfy any kind of enquiry, while its workshop is able to manufacture all types of packings and gaskets comprising the moulding of rubber and elastomer of various types, including silicon, Fluoropolymer, Polyurethane, etc.

Since February 2004, Monti & Barabino S.p.A. improved its Quality Management System in accordance with **UNI EN ISO 9001** regulations, obtaining the certification through **R.I.NA.** This prestigious acknowledgement is a confirmation of our constant effort in offering excellent quality and service to all those Customers who have chosen and will choose our Company as their supplier.

Our workshop, acting as Parker Official distributor, is able to offer:

- FLEXIBLE HOSES FOR LOW, MEDIUM AND VERY HIGH PRESSURE
- MED APPROVED FLEXIBLE HOSES
- TYPE APPROVED SHIP TO SHORE AND INDUSTRIAL COMPOSITE HOSES
- HIGH PRESSURE STEAM HOSES
- HIGH PRESSURE CLEANING HOSES
- RUBBER, STAINLESS STEEL AND TEXTILE EXPANSION JOINTS

Moreover:

- HYDRAULIC TEST FACILITIES
- MANAGEMENT OF TESTING PROCEDURES IN PRESENCE OF CLASSIFICATION BODIES
- PRESSED FITTINGS ON LARGE BORE RUBBER HOSES UP TO 10”

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MECHANICAL WORKSHOP and **PIPE WORKSHOP** are available for the execution of customized processes on our semi-finished products. Thanks to the wide availability of **WAREHOUSE** we are able to satisfy your needs in a short time, organizing and managing your shipments in a very short time.

We perform CNC turning and cutting on rubber and metal semi-finished products; we mold details and rubber gaskets.

We produce gaskets in any material, even according to Customer's design, including padded copper and spiral wound gaskets.

We sew and assemble insulating mats and textile joints: wide choice of fabrics for high temperatures.

Laser marking of finished products and components

We are an authorized Parker assembling center, hydraulic hoses up to 3" and industrial hoses up to 10".
Ask for our **FLEXIBLE HOSES** and **ACCESSORIES CATALOG**

Approved welders able to manufacture special fittings according to Customer's specifications.

We perform internal hydrostatic tests, also in the presence of an external Certifying Body.

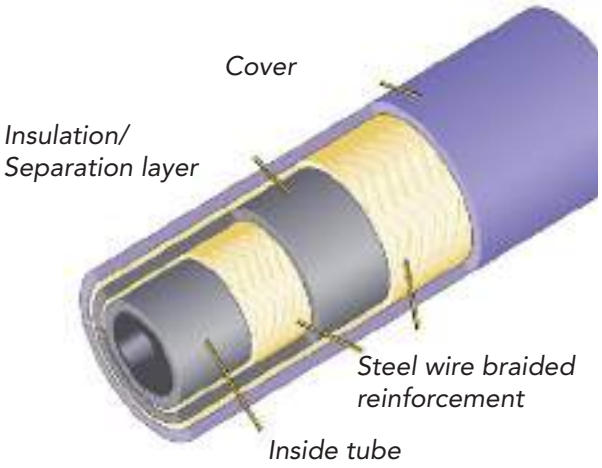
Hose and Fittings Terminology

The basics

Selecting the right hose and fittings combination usually belongs to the last steps in the design of a hydraulic system and its importance is often overlooked and underestimated.
The right hose and fitting combination is however, vital for the overall functionality and long term service life of the complete system.
This technical handbook and catalogue will provide a guide to correct hose and fitting selection, as well as highlighting the important safety aspects to their usage as hose assemblies in the field.

Hose

Typically a rubber hose is constructed of an extruded inside synthetic rubber tube that has the sole purpose to keep the conveyed fluid in the hose.
The elastomeric nature of rubber requires that a reinforcement layer be wound or braided around the tube in order to hold the internal pressure.
The reinforcement layer(s) are either textile or steel (or both).
To protect these inner layers of the hose from the ambient conditions, an outer synthetic rubber cover is extruded around the reinforcement.



Hose Assemblies

Hose Assemblies Installation

The combination of a hose and hose fitting(s) to make a hose assembly, is a critical process that needs to be carried out by professionally trained personnel who follow strict assembly instructions.
Improperly assembled hose fittings can separate from the hose and may cause serious injury or property damage from whipping hose, or from fire or explosion of vapor expelled from the hose.
The hose assembly must be operated within specific limits to maximise a safe and long term service life. These limits are defined in this catalogue and also by both governmental standards and institutional organisation's and specifications such as the ISO 17165-2, SAE J1273 or EN982.

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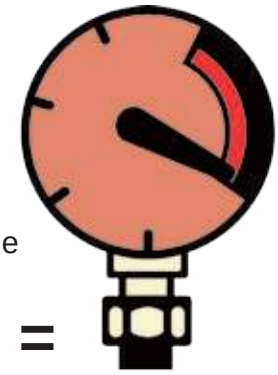
Working Pressure

Hose and fitting selection must be made so that the published maximum recommended working pressure of the Hose and fitting are equal to, or greater than the maximum system pressure. Surge pressures or peak transient pressures in the system must be below the maximum working pressure of the hose assembly.
Surge pressures and peak pressures can usually only be determined by sensitive electrical instrumentation that measures and indicates pressures at mili-second intervals. Mechanical pressure gauges indicate only average pressures and cannot be used to determine surge pressures or peak transient pressures.

Proof Pressure Test

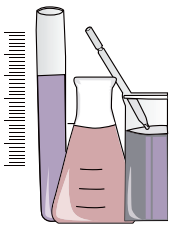
This test is typically carried out on customer request according to a method defined by the ISO 1402 standard. The test should be made at normal ambient temperature with a proof test bench using water or another suitable liquid. The hose assembly should be pressurised for between 30 to 60 seconds at twice the working pressure of the hose assembly. There should be no leakage or pressure drop. A complete test report should be provided together with the hose assembly to the customer.

Burst Pressure



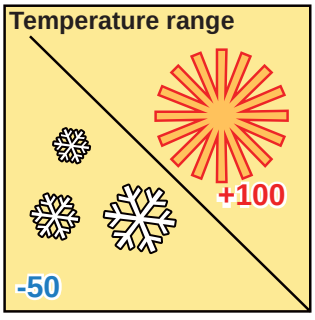
All hoses in this catalogue have a pressure design factor of 4:1, implying therefore that the burst pressure (hose destruction) is minimum 4 times the published working pressure. Published burst pressure ratings for hose are for manufacturing test purposes only – burst pressure should never play a role in the selection of a hose.

Fluid Compatibility



The hose assembly (hose inner tube, hose outer cover and hose fittings) must be chemically compatible to both the fluid being conveyed by the hose as well as the medium surrounding it (the chemical resistance table contained in the catalogue, indicates only the resistance of the hose innertube to the respective fluid).

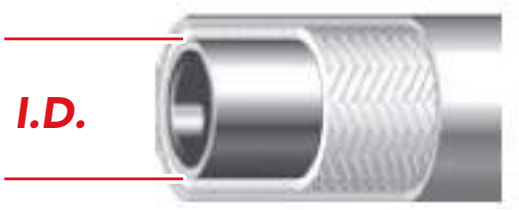
Temperature Range



In order not to negatively effect the properties of the rubber hoses it should be made certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the hose as published in the catalogue. Temperatures below and above the recommended limit will degrade the hose and failure may occur and release fluid. The mechanical properties of the hose are also influenced by low or high temperatures and should be considered when designing the system.

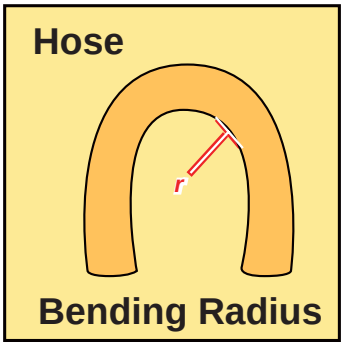
Hose Size

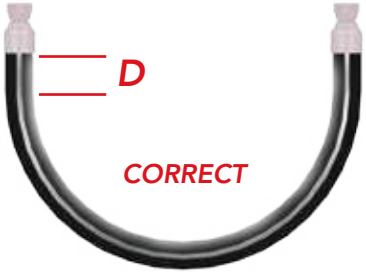
The power transmitted by means of a pressurised fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure drops to a minimum and avoid aging due to heat generation or excessive fluid velocity.
Parker uses the internationally recognised hose dash size as a measurement of the size of their hoses. This size is a measurement of the inside tube of the hose – not the wall outer diameter.



Hose Bending Radius

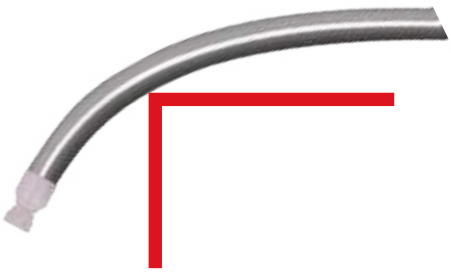
The minimum bend radius of a hose refers to the minimum radius that the hose may be bent through whilst operating at the maximum allowable published working pressure.
Bending radius is not a measurement or indicator of hose flexibility.
The catalogue specified values of bending radii are based on international or Parker specifications and have been proven through rigorous impulse testing of the hose assemblies.
Bending the hose below the minimum bending radius leads to loss of mechanical strength and hence possible hose failure.
A minimum straight length of 1,5 times the hose's outside diameter (D) shall be allowed between the hose fitting and the point at which the bend starts.





Hose Assembly Routing

The routing of a hose assembly in such a manner so as to avoid any damage to the hose by stretching, compression, kinking or abrasion over sharp edges is essential, to assure maximum service life and safety.



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The **routing** of the hose assembly and the environment in which the hose assembly operates directly influence the service life of the hose assembly. The following diagrams indicate the correct routing of hose assemblies that will maximise its service life and assure a safe working functionality.

When hose installation is straight, it must be assured that there is enough slack in the hose to allow for changes in length that occur when pressure is applied. When pressurized, hose that is too short may pull loose from its hose fittings or stress the hose fitting connections, causing premature metallic or seal failures.

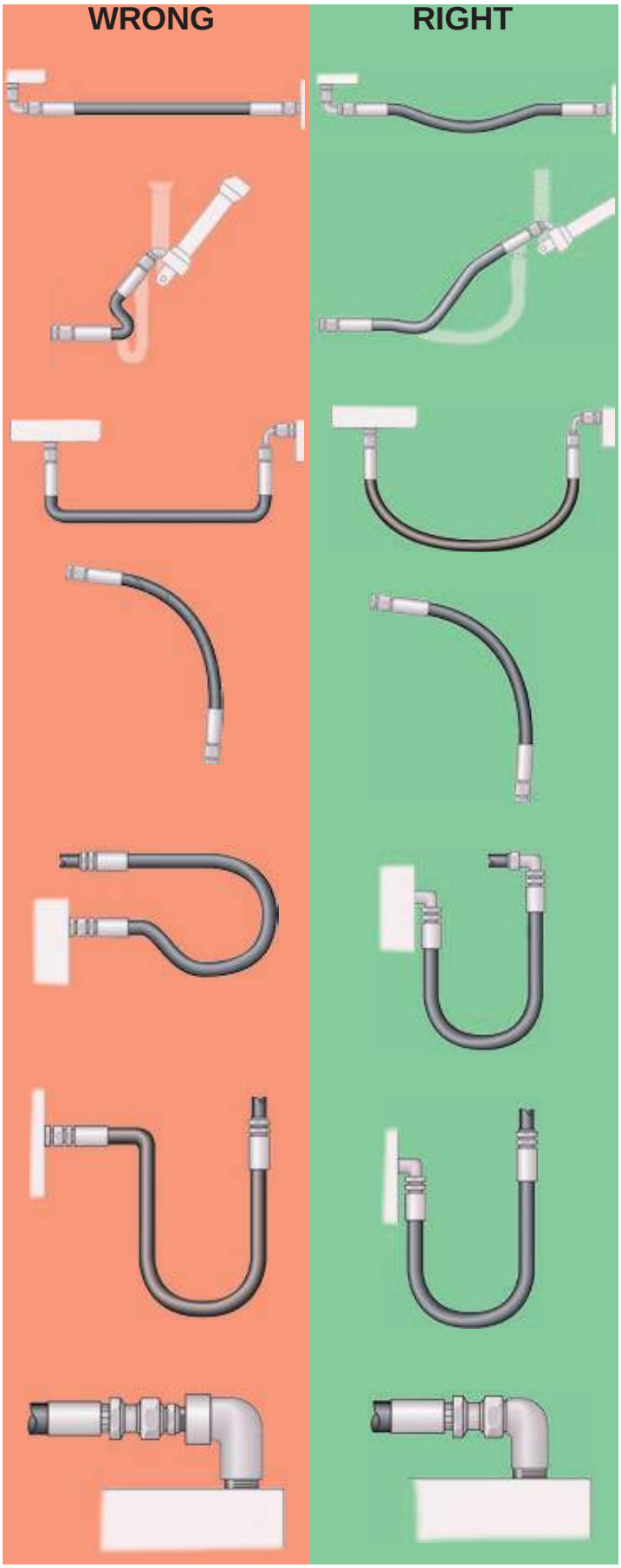
The **hose length** must be determined so that the hose assembly has enough slack to allow the system components to move or vibrate without creating tension in the hose.

However, care needs to be taken not to allow too much slack and therefore introduce the risk of the hose snagging on other equipment or rubbing on other components.

Mechanical straining of the hoses needs to be avoided, so the hose must not be bent below its minimum bending radius or twisted during installation.
The minimum bending radii for each hose is stated in the hose tables in the catalogue.

The plane of movement must also be considered and the hose routing selected accordingly.

Hose routing also plays an important role on the selection of the hose fittings, as the correct fittings can avoid straining the hoses, unnecessary hose length or multiple threaded joints.

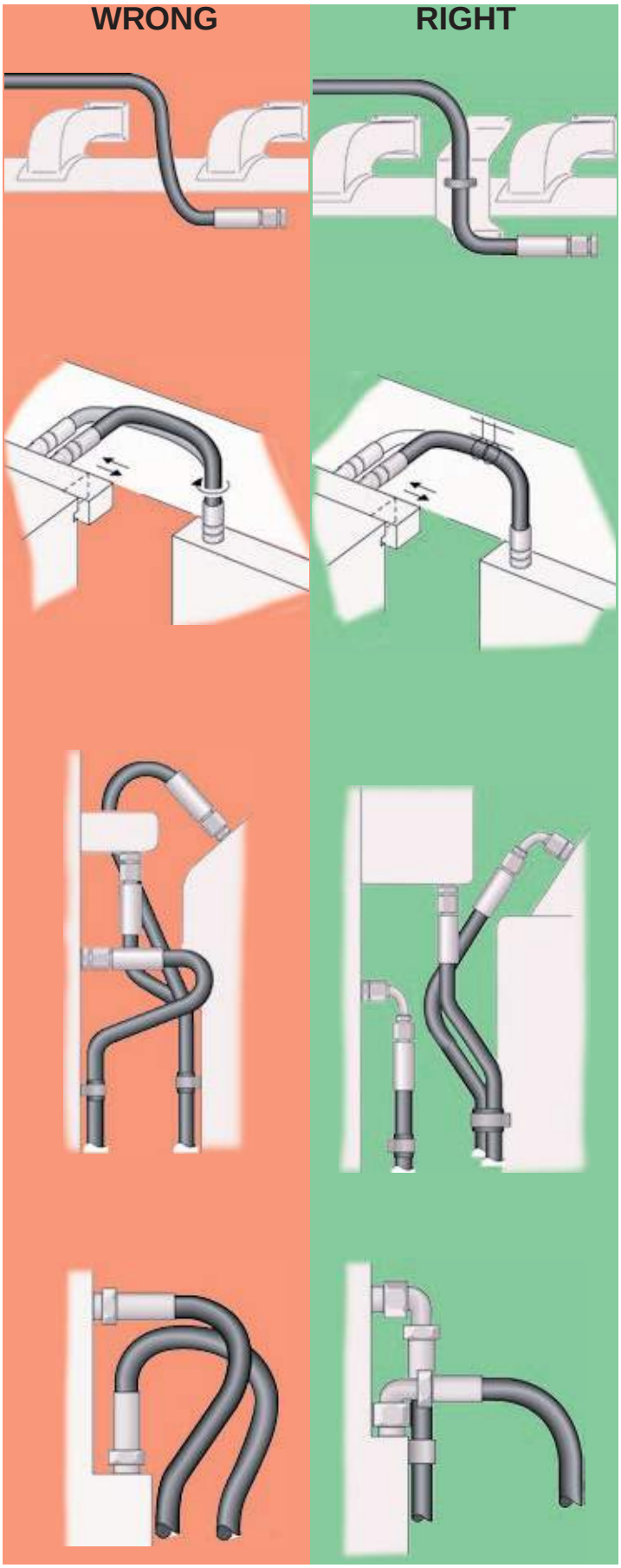


Correct clamping (holding/supporting) of the hose should be exercised to securely route the hose or to avoid the hose contacting surfaces that will cause the hose damage.
It is however, vital that the hose be allowed to keep its functionality as a “flexible-pipe” and not be restricted from changing in length when under pressure.

It should also be noted that hoses for high- and low-pressure lines shall not be crossed or clamped together, as the difference in changes in length could wear the hose covers.
Hose should not be bent in more than one plane. If hose follows a compound bend, it shall be coupled into separate segments or clamped into segments that each flex in only one plane.

Hoses should be kept away from hot parts as high ambient temperatures shorten hose life.
Protective insulation may need to be used in unusually high ambient temperature areas.

Whilst the importance of the functionality is primate the aesthetics and practicality of the installation should also be considered in the design.
It should be considered that maintenance might be necessary at some stage in the future, so prohibitive design routings should be avoided.



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Abrasive influences

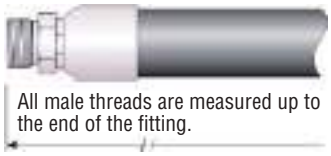
In general care should be taken that the hose is not exposed to direct surface contact that will cause abrasive wearing of the outer cover (either hose to object or hose to hose contact). If however, the application is such that this cannot be avoided, either a hose with a higher abrasion resistant hose cover or a protective sleeve need to be used.

Parker **TOUGH COVER** (TC) or **SUPER TOUGH** (ST) covers offer 80 times or respectively 1000 times the abrasion resistance of standard rubber covers.

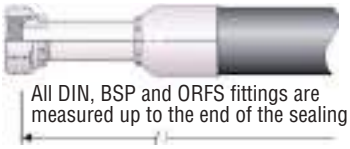
Cutting and hose length

Hose is cut to the desired length according to specifications. The correct hose cutting tool ensures a square, clean cut without damaging the pressure reinforcement. Depending on the hose type, different kinds of blades must be used: 1) smooth blade, 2) scolloped blade

Parker representatives can support you with training or advice!



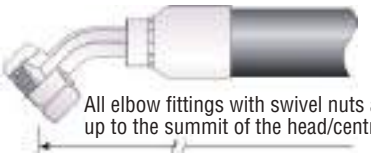
All male threads are measured up to the end of the fitting.



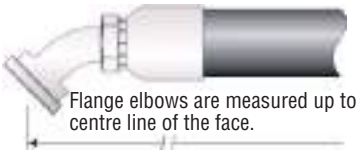
All DIN, BSP and ORFS fittings are measured up to the end of the sealing head.

US fittings (JIC, SAE, NPSM), except ORFS fittings, are measured up to the end of the nut.

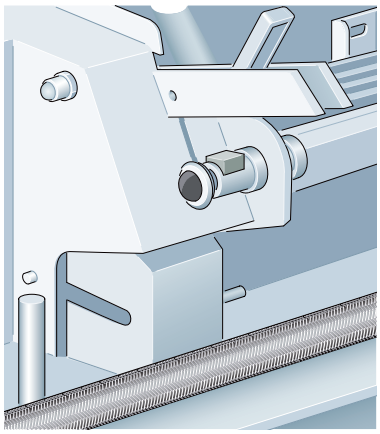
Straight flange fittings are measured up to the face.



All elbow fittings with swivel nuts are measured up to the summit of the head/centre line.



Flange elbows are measured up to the centre line of the face.

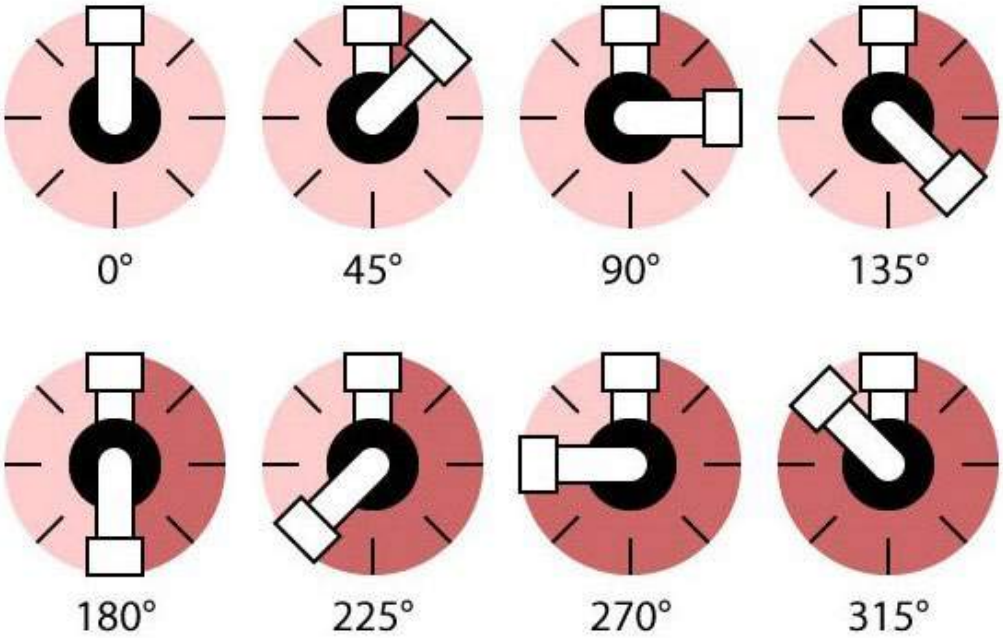


Tolerances for hose assemblies

Length tolerance according to DIN 20066:2002-10 and EN 853 to EN 857

Hose assembly length	up to DN25 (size-16)	from DN32 (size-20) up to DN50 (size-32)	from DN60 (size-40)
up to 630	+7 -3	+12 -4	+25 -6
over 630 up to1250	+12 -4	+20 -6	
over 1250 up to 2500	+20 -6	+25 -6	
over 2500 up to 8000		+1,5% -0,5%	
over 8000		+3% -1%	

FITTING POSITIONS



Description	Construction	Standard	GL	DNV	RINA	LR	ABS	MED
Parker 301SN	2 braids, wire	DIN EN 853-2SN SAE 100R2AT	✓	✓	✓	✓	✓	
Parker 421SN	1 braids, wire	DIN EN 853-1SN-ISO 1436 SAE 100R1AT	✓	✓	✓	✓	✓	
PARKER 462-TC	2 spiral, wire	Exceeds DIN EN 857-2SC – ISO 11237-2SC	✓	✓	✓	✓	✓	
Parker H-31	4 spiral, wire	Exceeds DIN EN856-4SP ISO3862-4SP	✓	✓	✓	✓	✓	
Parker H-29	4 spiral, wire	Exceeds DIN EN856-4SH ISO3862-4SH	✓	✓		✓	✓	
Parker R-42	4/6 spiral, wire	Exceeds DIN EN856-4SH ISO3862-4SH	✓	✓			✓	
MB Carbur-Oil	2 braids, wire, silica and inox sleeve	ISO 15540, ISO 15541			✓			✓
MB Lube Oil Silver 301	2 braids, wire, and inox sleeve	ISO 15540, ISO 15541			✓			✓
MB Lube Oil Gold 29	4 spiral, wire and inox sleeve	ISO 15540, ISO 15541			✓			✓
MB Lube Oil Gold 31	4 spiral, wire and inox sleeve	ISO 15540, ISO 15541			✓			✓
MB Lube Oil Platinum 42	4/6 spiral, wire and inox sleeve	ISO 15540, ISO 15541			✓			✓
MB Chem-Oil	PTFE, glass and inox sleeve							
MB HFO FUEL	1 braid, wire, silica and inox sleeve				✓			✓

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Classification Bodies

The mission of classification bodies is to contribute to the development and implementation of technical standards for the protection of life, property and the environment.

(1) Germanischer Lloyd (GL)
German independant organisation of technical experts approving products for the german merchandise marine and the energy sector - GLIS (oil and gas, wind energy, etc...)

(2) Det Norske Veritas (DNV)
Norwegian service company for managing risk in ship classification, off-shore industry, etc...

(3) RINA (Registro Italiano Navale)
Italian company offering certification, verification, control, assistance in marine, energy & process, transport and industry.

(4) Deutsche Bahn (DB) - German Standard DIN 5510 - Part 2
The German rail authority (DB) approves the behaviour of the products in respect to their resistance to burning and their ability to self extinguish after a flaming, according the DIN 5510-2 requirements.

(5) Lloyd's Register (LR)
English independent organisation providing certification around the world. Marine services, Rail services and Energy services are their main activities.

(6) Ministry of Defence (MOD)
British ministry of defence providing approvals for military equipment according the MOD DefStan (Defence Standard) 47-2 specification.

(7) American Bureau of Shipping (ABS)
US company providing rules for safety in the marine environment.

(8) US Department of Transportation (DOT)
USA organisation providing certifications to ensure a fast, safe, efficient, accessible and convenient transportation system in this country.

(9) USCoast Guard (USCG)
Provides maritime safety,law enforcement,recreational boating safety, and environmental protection information for merchant mariners. The approved hoses are not accepted for all applications automatically. If the column contain "H", the hose is accepted for Hydraulic Systems only and not for Fuel and lube systems.

(10) Mine Safety and Health Administration (MSHA)
US organisation for safety in the mining industry

(11) Bureau Veritas (BV)
Bureau Veritas is today the most widely recognized certification body in the world, offering solutions in the key strategic fields of operations: Quality, Health & Safety, Environment and Social Responsibility.

(12) French Standard NF F-16-101/102 (NF)
Tests the fire behaviour and fire effluents of the hose cover material for rail applications.

(13) British Standard (BS 6853)
Tests the fire behaviour and fire effluents of the hose cover material for rail applications.

(14) MarED
MarED is the Group of Notified Bodies for the Implementation of the Marine Equipment Directive.

EN European Norm
ISO International Organisation for Standardization
SAE Society of Automotive Engineers (US organisation)

CONVERSION CHART

	Unit	Base Unit	Conversion Unit	Factor
Length	1 inch	in	mm	25,4
	1 milllimetre	mm	in	0,03934
	1 foot	ft	m	0,3048
	1 metre	m	ft	3,28084
Area	1 square-inch	sq in	cm^2	6,4516
	1 square-centimetre	cm^2	sq in	0,1550
Volume	1 gallon (UK)	gal	l	4,54596
	1 litre	l	gal (UK)	0,219976
	1 gallon (US)	gal	l	3,78533
	1 litre	l	gal (US)	0,264177
Weight	1 pound	lb	kg	0,453592
	1 kilogramme	kg	lb	2,204622
Torque	1 pound foot	lb • ft	kg • m	1,488164
	1 newton metre	kg • m	lb • ft	0,671969
Pressure	1 pound per square inch	psi	bar	0,06895
	1 bar	bar	psi	14,5035
	1 pound per square inch	psi	MPa	0,006895
	1 mega pascal	MPa	psi	145,035
	1 kilo pascal	kPa	bar	0,01
	1 bar	bar	kPa	100
	1 mega pascal	MPa	bar	10
	1 bar	bar	MPa	0,1
Velocity	1 foot per second	ft / s	m / s	0,3048
	1 metre per second	m / s	ft / s	3,28084
Flow rate	1 gallon per minute (UK)	gal / min.	l / min.	4,54596
	1 litre per minute	l / min.	gal / min. (UK)	0,219976
	1 gallon per minute (US)	gal / min.	l / min.	3,78533
	1 litre per minute	l / min.	gal / min. (US)	0,264178
Temperature	Fahrenheit degree	°F	°C	5/9 • (°F-32)
	Celsius degree	°C	°F	°C • (9 /5) +32

(UK) Unit of United Kingdom
(US) Unit of USA

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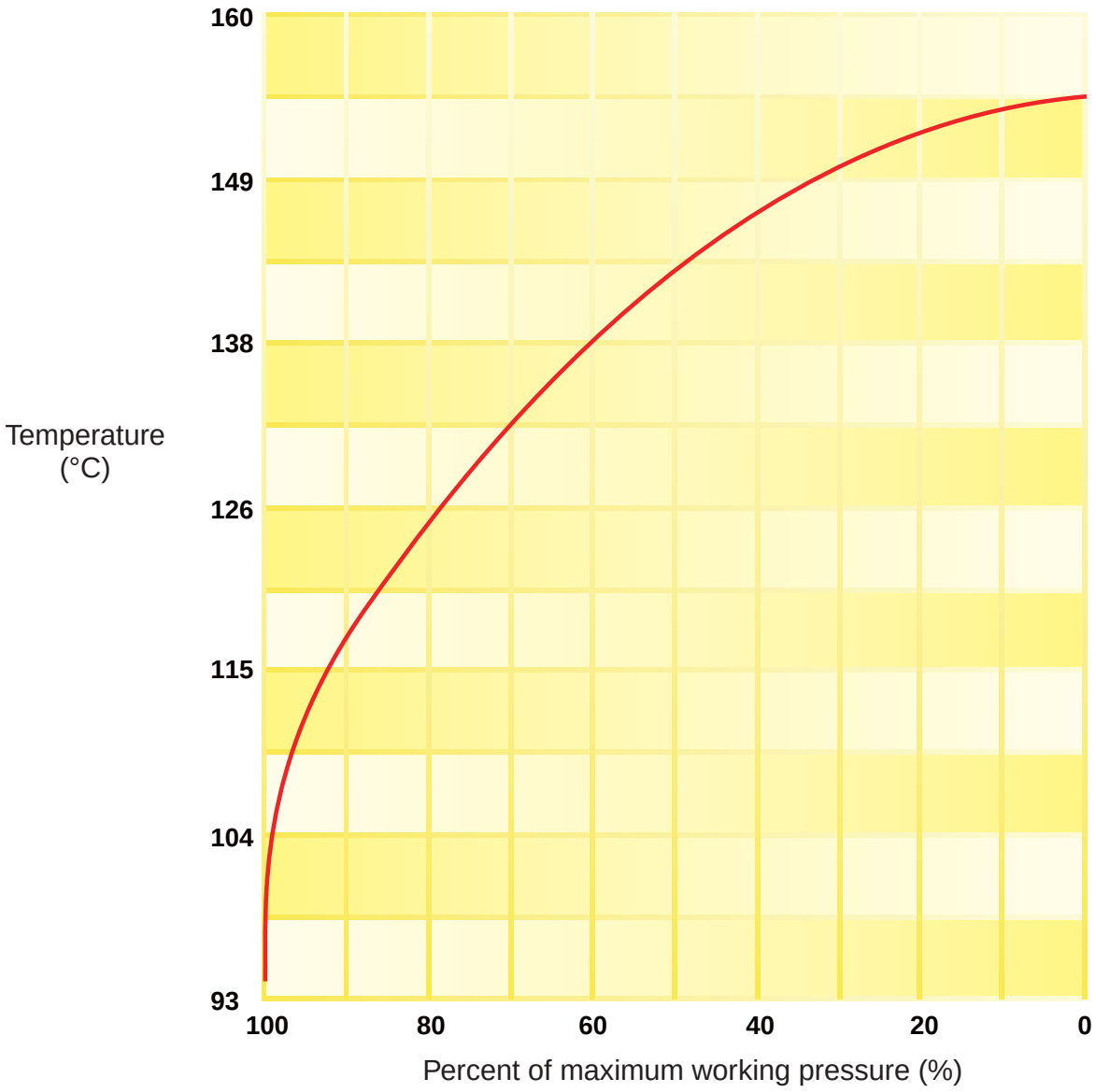
TEMPERATURE / PRESSURE CHART

Reference 201, 206, 213 and 293 hose.



EXAMPLE: 201-8 hose to be used at 121 °C

Maximum Working Pressure up to 100 °C		Multiplication Factor from Chart		Maximum Working Pressure at 121 °C
13,8 MPa (2000 psi)	**x**	85%	**=**	11,7 MPa (1700 psi)

FLOW CAPACITY NOMOGRAM

Flow Capacities of Parker Hose at Recommended Flow Velocities

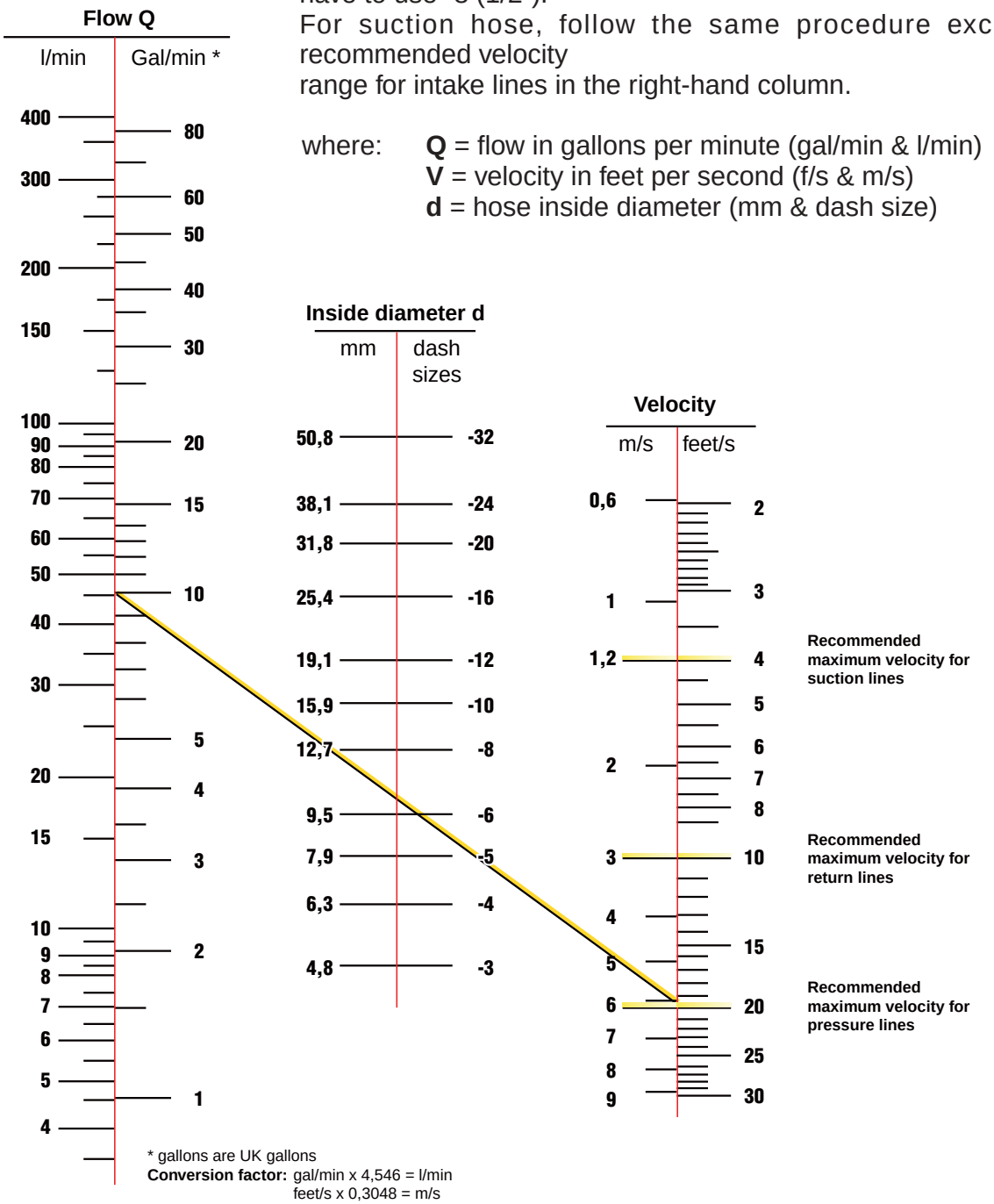
The chart below is provided as an aid in the determination of the correct hose size.

Example: at 10 gallons per minute (gal/min), what is the proper hose size within the recommended velocity range for pressure lines?

Locate 10 gallons per minute in the left-hand column and 20 feet per second in the right-hand column (the maximum recommended velocity range for pressure lines). Lay a straight line across these two points. The inside diameter shown in the centre column is above -6 so we have to use -8 (1/2").

For suction hose, follow the same procedure except use recommended velocity range for intake lines in the right-hand column.

where: **Q** = flow in gallons per minute (gal/min & l/min)
V = velocity in feet per second (f/s & m/s)
d = hose inside diameter (mm & dash size)



* gallons are UK gallons
Conversion factor: gal/min x 4,546 = l/min
feet/s x 0,3048 = m/s

* Recommended velocities are according to hydraulic fluids of maximum viscosity 315 S.S.U. at 38°C working at roomtemperature within 18° and 68°C.

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The Correct Method to Fit Female Swivel Ends

To ensure a leakproof seal between swivel female hose ends shown in this catalogue and the appropriate adaptors it is necessary to follow the procedure below which is different from hydraulic tube assembly.

Flats From Wrench Resistance (FFWR)

Parker's recommended assembly method for JIC 37° flare, SAE 45° flare and ORFS swivel female is Flats From Wrench Resistance (FFWR). The torque values assingned by size are for reference only, and are only applicable to Parker system components using the FFWR method with trivalent chromate passivation on zinc plating of carbon steel components without lubrication.

Metal-to-metal seal

Screw the nut up hand tight and then tighten further with a spanner according to the values mentioned in the table below. Ensure that in all cases the hose is correctly aligned before tightening the nut onto the corresponding adaptor.

Spanner torque values

Metric swivel female

Thread metric	Tube O.D.	Nm nominal	Nm min. - max.
M12x1,5	06L	16	15-17
M14x1,5	08L	16	15-17
M16x1,5	10L	26	25-28
M18x1,5	12L	37	35-39
M22x1,5	15L	47	45-50
M26x1,5	18L	89	85-94
M30x2	22L	116	110-121
M36x2	28L	137	130-143
M45x2	35L	226	215-237
M52x2	42L	347	330-363
M14x1,5	06S	26	25-28
M16x1,5	08S	42	40-44
M18x1,5	10S	53	50-55
M20x1,5	12S	63	60-66
M22x1,5	14S	79	75-83
M24x1,5	16S	84	80-88
M30x2	20S	126	120-132
M36x2	25S	179	170-187
M42x2	30S	263	250-275
M52x2	38S	368	350-385

BSP swivel female

Thread BSPP		Nm nominal	Nm min. - max.
G1/4	-4	20	15-25
G3/8	-6	34	27-41
G1/2	-8	60	42-76
G5/8	-10	69	44-94
G3/4	-12	115	95-135
G1	-16	140	115-165
G1.1/4	-20	210	140-280
G1.1/2	-24	290	215-365
G2	-32	400	300-500

JIC 37° swivel female

Thread UNF	size	Flats From Wrench Resistance (FFWR)	Swivel Nut Torque Nm (Ref)
7/16-20	-4	2	18
1/2-20	-5	2	23
9/16-18	-6	1-1/2	30
3/4-16	-8	1-1/2	57
7/8-14	-10	1-1/2	81
1.1/16-12	-12	1-1/4	114
1.5/16-12	-16	1	160
1.5/8-12	-20	1	228
1.7/8-12	-24	1	265
2.1/2-12	-32	1	360

ORFS swivel female

Thread UNF	size	Flats From Wrench Resistance (FFWR)	Swivel Nut Torque Nm (Ref)
9/16-18	-4	1/2to3/4	26
11/16-16	-6	1/2to3/4	42
13/16-16	-8	1/2to3/4	57
1-14	-10	1/2to3/4	85
1.3/16-12	-12	1/3to1/2	122
1.7/16-12	-16	1/3to1/2	156
1.11/16-12	-20	1/3to1/2	200
2-12	-24	1/3to1/2	256
2-1/2x12	-32	–	–

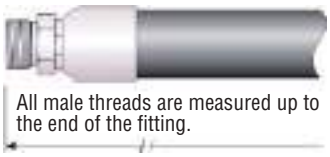
Note: The assembly torques listed are higher than the test torques published in SAE J1453.
The torque values for other materials are as follows:

- Brass fittings and adapters
  – 65 % of the torque value for steel.
- Stainless steel and Monel
  – Use 5% higher than listed for steel.
  Threads to be lubricated for these materials.
- Dissimilar metals
  – Use torque value designated for the lower of the two metals.
- All fittings are dry except as noted above.

Note: Values given in tables are typical to achieve the recommended assembly methods when fitting material is steel zinc plated. For other materials different values will be applicable. (see our recommendations for other materials on this page)

MEASURING A HOSE ASSEMBLY

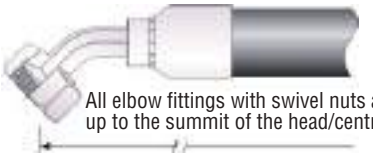
FLUID		
PRESSURE		bar
TEMPERATURE		°C
QUANTITY		
ND		“
COUPLING A		
COUPLING B		
POSITIONING		
LENGTH		mm
CERTIFICATION	Type Approval ❑	MED ❑
TEST REQUIRED	YES ❑	NO ❑
CLASSIFICATION BODY		
NOTE		

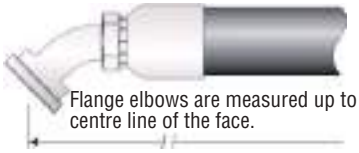

All male threads are measured up to the end of the fitting.

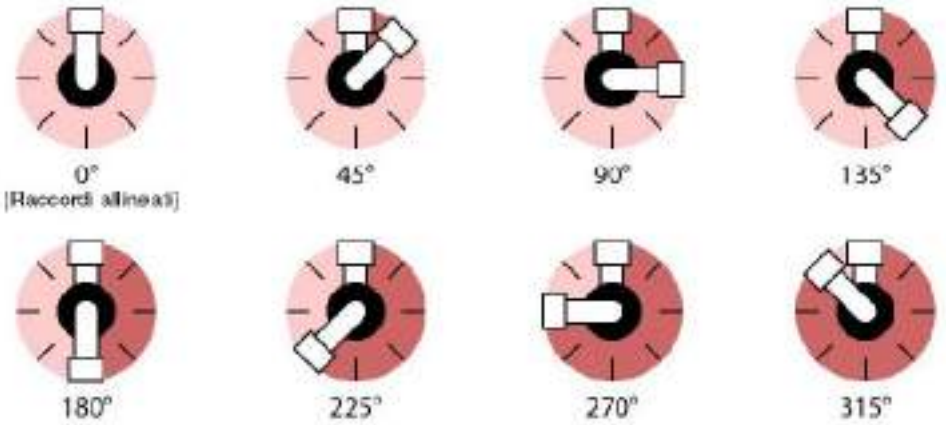

All DIN, BSP and ORFS fittings are measured up to the end of the sealing head.


US fittings (JIC, SAE, NPSM), except ORFS fittings, are measured up to the end of the nut.


Straight flange fittings are measured up to the face.


All elbow fittings with swivel nuts are measured up to the summit of the head/centre line.


Flange elbows are measured up to the centre line of the face.



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Notes

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