



SAE-J1453










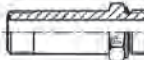





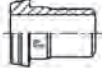

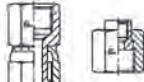


















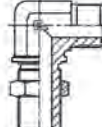
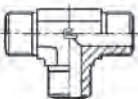
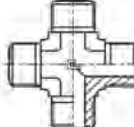
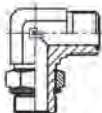
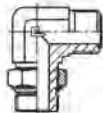



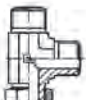
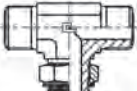
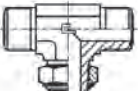
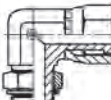
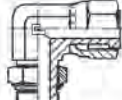
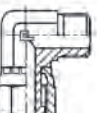

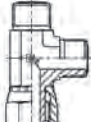
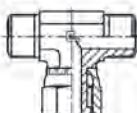





ORFS

AVAILABLE IN CARBON AND STAINLESS STEEL

40

FIGURATIVE INDEX – FITTINGS SAE J1453 - ISO 8434-3

General instructions	Quality assurance	Allowed temperatures	Finish treatments	Tubes to be used	Threaded ends	Prescriptions to comply with
Utilisation standards	Safety factors	Seals on threads	End treatments	Tables follow up	Gas - Metric UNF - NPT	Assembly instructions
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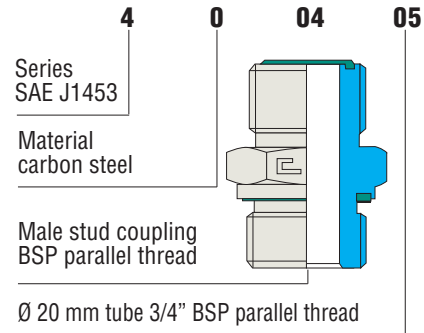
ORDERING EXAMPLES (Carbon steel)

ORDERING EXAMPLES (Stainless steel)

ORFS

- If you require a male stud coupling for a \varnothing 20 mm tube with 3/4" BSP parallel thread made of carbon steel with elastomeric NBR seal on the threaded end, order: 400405

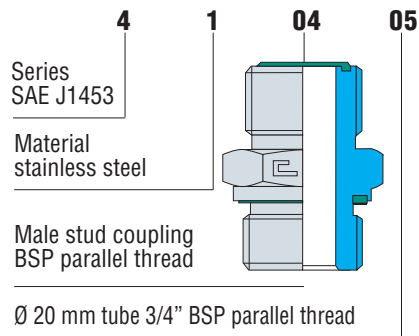
- If you require the VITON® seal, add "V" at the end.



ORFS

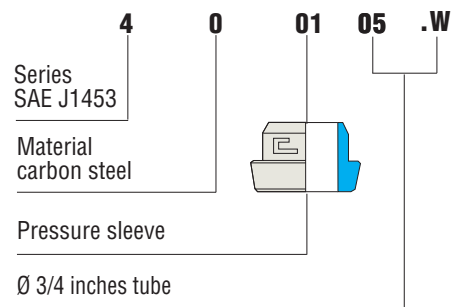
- If you require a male stud coupling for a \varnothing 20 mm tube with 3/4" BSP parallel thread made of stainless steel with elastomeric VITON® seal on the threaded end, order: 410405

- If you require the NBR seal, add ".N" at the end.



ORFS

- If you wish to use a steel tube with inch measurements, add the letter ".W" to the code of the pressure sleeve to order: 400105.W



DELIVERIES

- Cast S.p.A. fittings are delivered in the configurations shown in the tables of this catalogue.
- Available on scheduled orders only: it means that the article is slow moving and will be delivered within 90 days.
- Available on request only: it means that the article is not commonly in stock; please contact our offices for further delivery details.

VITON® is a DuPont Dow Elastomers Trade Mark

THEORY OF OPERATION-FLARED TUBE

The CAST fitting, manufactured according to ISO 8434-3/SAE J1453, is a mechanical fitting traditionally used for high pressure fluid-dynamic systems. The sealing is made between two flat surfaces, metal to metal, with no deformation of the components, plus an elastomeric sealing (O-Ring) placed into a groove on the front surface of the fitting.

The coupling between the body of the fitting and the flared tube is guaranteed by the tightening nut and by the sleeve on the inside. It helps fast assembly of removable tubes, avoids welding and tapping, thus assuring maximum simplicity for complex oleo-dynamic systems. Repeated assemblies do not alter the performance of the coupling.

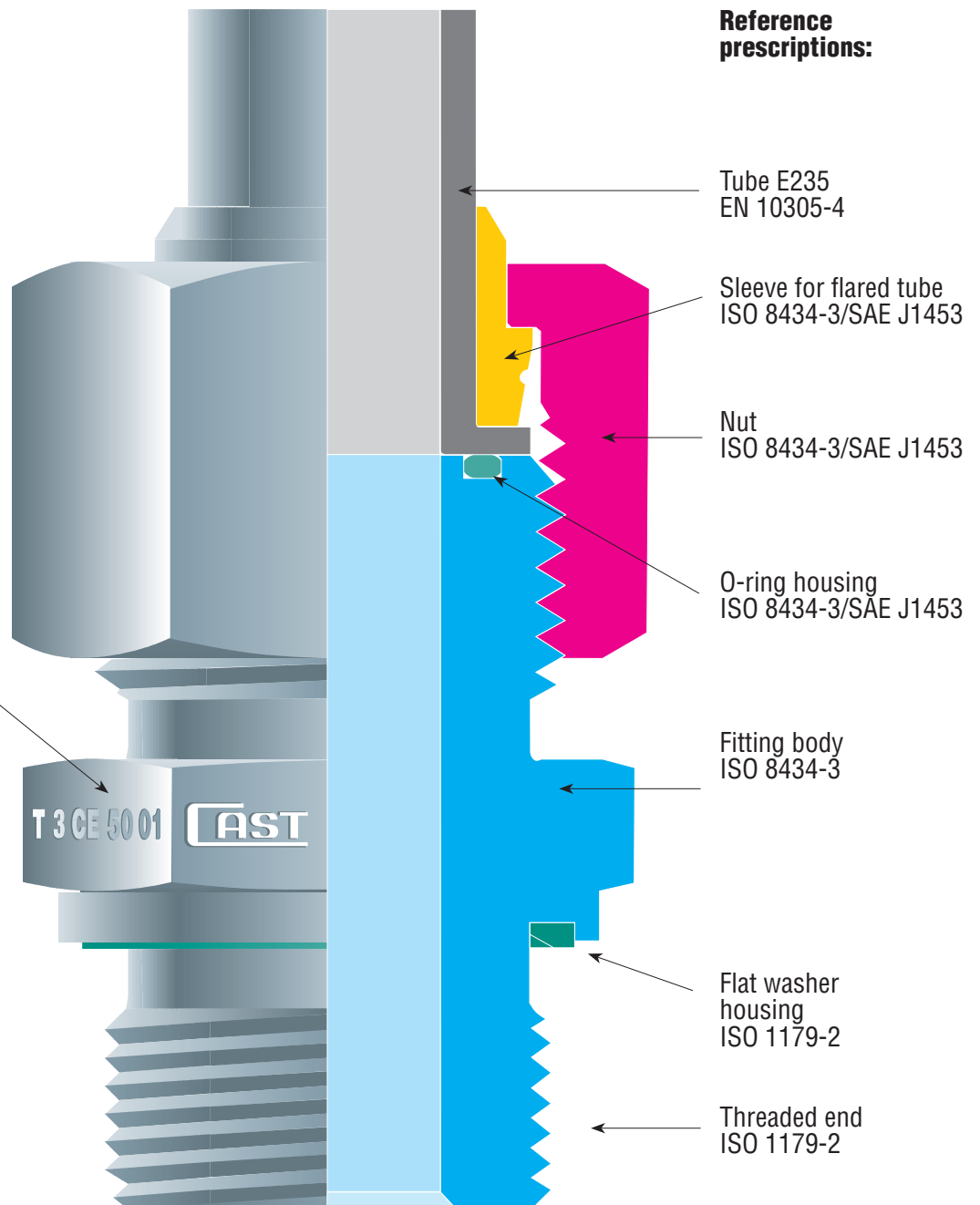
COUPLING SYSTEM SAE J1453

Reference prescriptions:

Traceability decoding:

CAST =
Logo of the Manufacturer

- T =
Production plant
- 3 =
Year of manufacture
- CE =
Made in EEC
- 50 =
Type of steel used
- 01 =
Heat number of the steel used



THEORY OF OPERATION - BRAZED TUBE

The CAST fitting, manufactured according to ISO 8434-3/SAE J1453, is a mechanical fitting traditionally used for high pressure fluid-dynamic systems. The sealing is made between two flat surfaces, metal to metal, with no deformation of the components, plus an elastomeric sealing (O-Ring) placed into a groove on the front surface of the fitting.

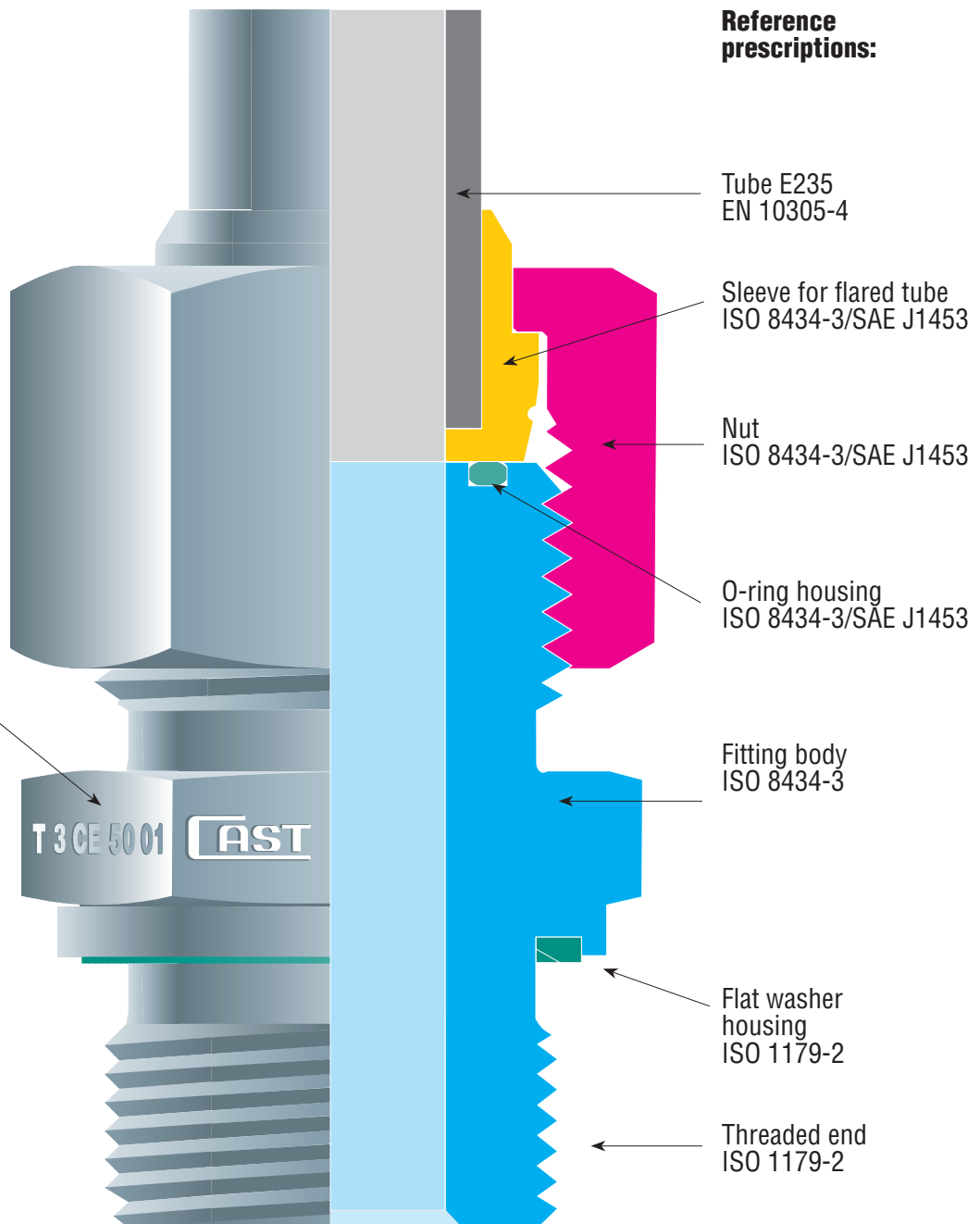
The coupling between the body of the fitting and the brazed tube is guaranteed by the tightening nut. It helps fast assembly of removable tubes, avoids flarings and tapping, thus assuring maximum simplicity for complex oleo-dynamic systems. Repeated assemblies do not alter the performance of the coupling.

COUPLING SYSTEM SAE J1453

Traceability decoding:

CAST =
Logo of the
Manufacturer

- T =
Production plant
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Made in EEC
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Type of steel used
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Heat number of the
steel used



TECHNICAL CHARACTERISTICS - FLARED TUBE

The CAST ORFS fittings assure perfect seal regardless of the fluid used, provided that no corrosive fluids be employed, the nominal pressures of the fittings and the indicated temperatures be respected and the prescriptions of the manufacturer be followed scrupulously.

These fittings are manufactured in a single series defined "UNIVERSAL" since the fitting body and the tightening nut remain the same also when switching from a metric tube at an inches sized tube. There are no doubles of diameters with different working pressures.

Normal vibrations do not alter the functionality of this type of fitting, also at the top quoted values. Therefore the fitting maintains its best characteristics of absolute guarantee, safety and reliability. For these specific reasons this fitting may be used in hard working conditions.

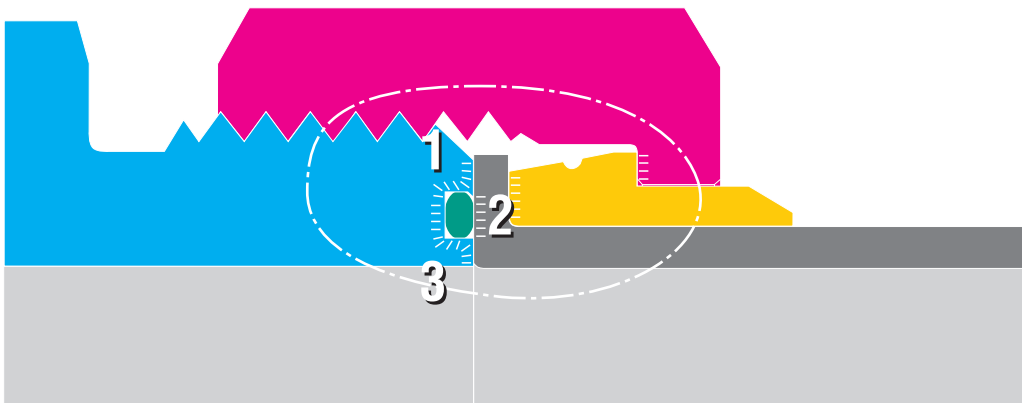
Under the mechanical strength given by the tightening of the nut on the fitting body, the part of the flared tube and the part of the brazed tube united with the sleeve couple with the front surface of the fitting body to provide a very effective metal to metal seal supported by the elastomeric seal as well.

The flared sleeve housed inside the tightening nut ensures the self-alignment of the flared tube to the axis of the fitting body, supports the tube during operation, lowers the vibrations and avoids damage to the tube while tightening.

Before assembly on the metal tube



After assembly on the metal tube



Field of force
- - - - -

Pressure surfaces
|||||

Sealing points
1-2-3

SEALING

The new ORFS fitting solves the total sealing problem in the following way:

- On the front side of the fitting a groove was created to insert an O-ring. This elastomeric seal guarantees a perfect seal at all times, as dry as dust.
- The particular shape of the groove, according to the new prescriptions of standards ISO 8434-3 and SAE J1453, guarantees the containment of the O-Ring inside its groove without the assistance of adhesives.
- The presence of the O-Ring groove improves the sealing metal to metal characteristics, since the groove divides the front seal surface of the fitting in two. The new ORFS fitting solves the problem of small leakages, leaks and sweating that are typical of a metal to metal sealing system on high pressure fittings.
- Strenuous tests carried out in our technical laboratory in Casalgrasso (CN) have clarified, beyond any doubt, the reliability of the sealing of this range of oleo-dynamic fittings.

GENERAL INSTRUCTIONS

- Before starting to flare the tubes, please check that all the tools to be used in the process conform to the standards. Carefully check the tools every 30-50 flarings.
- Before starting to braze the tubes, please check that all the tools to be used in the process conform to the standards. Always check the compliance of the brazing.
- Before assembling the preassembled tube to the equipment it is necessary to check that the tube and the fitting are aligned. Fittings should never be used to correct a wrong alignment or to be a support for the tube. Extremely long tubes or tubes undergoing high stress must be fixed by using some support to avoid excessive vibrations. A poor alignment could damage the operation of the system.
- The proper lubrication of the components involved in the tightening is essential for good system operation. We advise the use of mineral oils or torquen tension for carbon steel fittings, consisting of anti-seizing compound (Nickel based), Chesterton or similar, for stainless steel fittings.
- Indicated pressures are for steel tubes only.
- The fittings in this technical catalogue may be used for fluid-dynamic connections only.
- Mixing carbon and stainless steel components is not allowed.

UTILISATION STANDARDS

CARBON STEEL FITTINGS

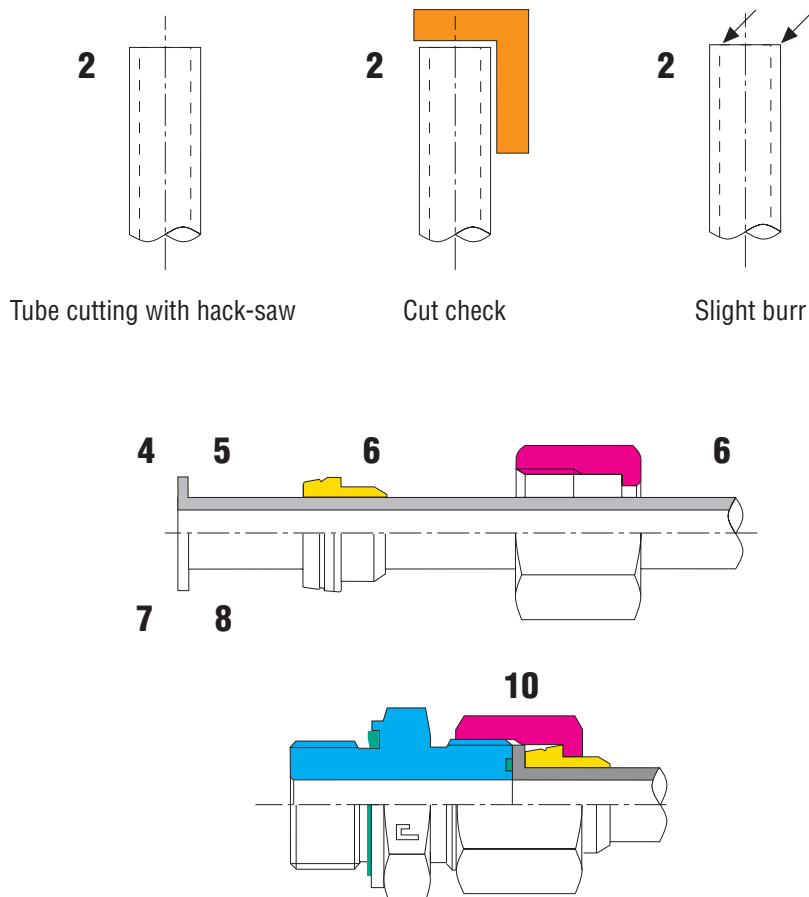
- High quality tubes must be employed to assure correct use and related technical performance of the carbon steel fitting. The use of tubes without the aforementioned characteristics may seriously impair the efficiency of the fitting. We recommend using the following tubes only: calibrated and polished, cold drawn seamless tubes, normalised with inert gas, in E235 material according to EN 10305-4 (ST 37.4 according to DIN 1630 I DIN 2391). The maximum hardness allowed on the outside diameter of the tube is 75 HRB.
- The flaring of the tube must be carried out with extreme care and precision. It is important that the flaring is concentric and perpendicular compared to the tube and sleeve.
- Brazing the tube must be carried out with suitable materials. It is important that the brazing is carried out in a way to ensure the perfect perpendicularity of the sleeve to the tube.
- In order to obtain a curve of the tube as close to the tightening point as possible (fitting body), the structural constructing ties that are typical of the ORFS fittings must be considered. This product forces the user to leave a part of the ending section of the tube perfectly straight. This part must be used during the flaring operation to block the tube. Please refer to the table on page 218 "C" quote.

STAINLESS STEEL FITTINGS

- High quality tubes must be employed to assure correct use and related technical performance of stainless steel fittings. The use of tubes without the aforementioned characteristics may seriously impair the efficiency of the fitting. We recommend using the following tubes only: calibrated and polished, cold drawn seamless tubes 1.4571 as per UNI EN 10216-5 or ASTM A 269; the maximum permitted hardness, measured on the outer diameter of the tube, is 85 HRB.
- The flaring of the tube must be carried out with extreme care and precision. It is important that the flaring is concentric and perpendicular compared to the tube and sleeve.
- Brazing the tube must be carried out with suitable materials. It is important that the brazing is carried out in a way to ensure the perfect perpendicularity of the sleeve to the tube.
- In order to obtain a curve of the tube as close to the tightening point as possible (fitting body), the structural constructing ties that are typical of the ORFS fittings must be considered. This product forces the user to leave a part of the ending section of the tube perfectly straight. This part must be used during the flaring operation to block the tube. Please refer to the table on page 218 "C" quote.

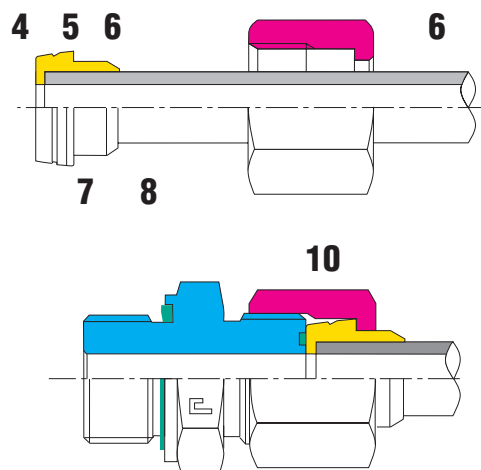
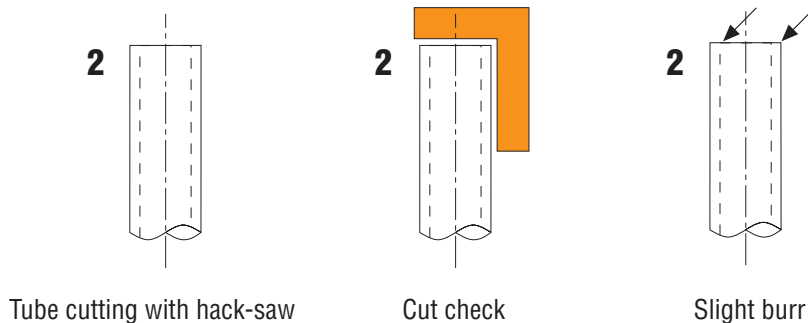
ASSEMBLY INSTRUCTIONS ACCORDING TO SAE J1453 FOR FLARED TUBES

1. Before starting the tube flaring and assembly operations, please check that all the tools to be used are in perfect working order. Substitute those not complying to the requirements.
2. Cut the tube square by using an appropriate hack-saw (do not use roller type tube cutters). Check that the cut is properly made at 90°. Remove any internal and external burrs with the suitable deburring tool.
3. To obtain the desired length of the tube please add the L1 quote to the desired length of the tube in the table on page 218.
4. Check for any leakage line and other structural defects that may impair the seal of the fitting body. Reject any non complying tube.
5. Thoroughly clean the part of the tube to be flared and lubricate it with appropriate products.
6. Assemble the nut and sleeve on the tube as shown below, taking care that the open part of the nut faces the end of the tube to be flared; likewise, the end of the tube to be flared must face the greater diameter of the sleeve.
7. Flare the tube using the appropriate flaring machine, carefully respecting all the indications in the table on page 218.
8. Check that the flaring of the tube has been done correctly and that no peeling of the material appears inside it.
9. Clean the nut, fitting and tube and lubricate with the suggested products.
10. Couple the flared tube and tighten by hand the nut on the body of the fitting to check the correct alignment of the parts; using a wrench tighten until reaching the contact of the sealing surfaces and tighten according to the table (tightening torques of page 219).
11. Repeated assembly and disassembly will not alter the functionality of the system which, each time is closed, will always provide an immediate seal, which will last over time, guaranteeing the required seal.

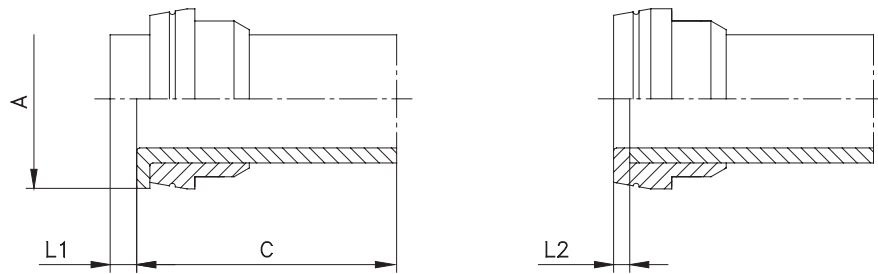


ASSEMBLY INSTRUCTIONS ACCORDING TO SAE J1453 FOR BRAZED TUBES

1. Before starting the tube brazing and assembly operations, please check that all the tools to be used are in perfect working order. Substitute those not complying to the requirements.
2. Cut the tube square by using an appropriate hack-saw (do not use roller type tube cutters). Check that the cut is properly made at 90°. Remove any internal and external burrs with the suitable deburring tool.
3. To obtain the desired length of the tube please subtract the L2 quote from the desired length of the tube in the table on page 218.
4. Check for any leakage line and other structural defects that may impair the seal of the fitting body. Reject any non complying tube.
5. Clean properly the sleeve and the part of the tube to be brazed.
6. Assemble the nut and sleeve on the tube taking care that the open part of the nut faces the end of the tube to be brazed and that the tube is inserted in the related groove obtained in the sleeve.
7. Then apply the mould on the tip of the tube making sure that the tube is completely in touch with the sleeve and carry out the brazing making sure not to overheat and carbonize the mould.
8. Clean the area where the brazing was carried out and check that the brazing seam is even along the entire external diameter of the tube.
9. Clean the nut, fitting and sleeve and lubricate with the suggested products.
10. Couple the brazed tube and tighten by hand the nut on the body of the fitting to check the correct alignment of the parts; using a wrench tighten until reaching the contact of the sealing surfaces and tighten according to the table (tightening torques of page 219).
11. Repeated assembly and disassembly will not alter the functionality of the system which, each time is closed, will always provide an immediate seal, which will last over time, guaranteeing the required seal.



TECHNICAL DATA FOR THE PREPARATION OF FLARED AND BRAZED TUBES



Ø tube Metric	Ø tube Inches	Ø flaring		L1	L2	C
		A min	A max			
6x1	1/4x0,035	12,10	12,75	-	1	32
6x1,5	1/4x0,065			-		
8x1	5/16x0,035	14,85	15,75	-	1	40
8x1,5	5/16x0,065			-		
10x1	3/8x0,035			2,5		
10x1,5	3/8x0,065	2	1,5	1	45	
10x2	3/8x0,083	1,5				
12x1	1/2x0,035	18	18,90	-	1	45
12x1,5	1/2x0,065			3		
12x2	1/2x0,083			2,5		
12x2,5	1/2x0,095			2		
14x1,5	-			-		
14x2	-	-	4,5	1,5	45	
14x2,5	-	-				
15x1,5	-	-				
15x2	-	4				
15x2,5	-	3,5				
16x1,5	5/8x0,065	22,20	23,45	4	1,5	45
16x2	5/8x0,083			3,5		
16x2,5	5/8x0,095			3		
16x3	5/8x0,120			2,5		
18x1,5	-			-		
18x2	-	26,60	27,85	5	1,5	50
18x2,5	-			4,5		
18x3	-			4		

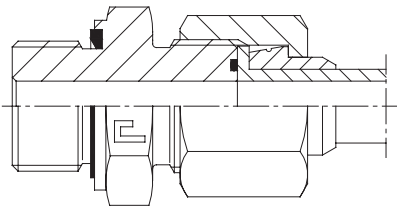
Ø tube Metric	Ø tube Inches	Ø flaring		L1	L2	C
		A min	A max			
20x2	3/4x0,083	26,60	27,85	4	1,5	50
20x2,5	3/4x0,095			3,5		
20x3	3/4x0,120			3		
20x3,5	3/4x0,134			2,5		
22x2	7/8x0,083	32,95	34,20	-	1,5	60
22x2,5	7/8x0,095			-		
22x3	7/8x0,120			-		
25x2,5	1x0,095			4,5		
25x3	1x0,120			4		
25x4	1x0,156	3	39,35	40,55	1,5	60
25x5	1x0,188	2				
28x2	-	-				
28x2,5	-	-				
28x3	-	-				
30x2	-	5,5	1,5	60		
30x2,5	-				5	
30x3	-				4,5	
30x4	-				4	
32x3	1 1/4x0,120	4	1,5	70		
32x4	1 1/4x0,156				-	
35x3	-	47,25	48,50	-	1,5	70
35x4	-			-		
38x3	1 1/2x0,120			7		
38x4	1 1/2x0,156			6		

FUNCTIONALITY

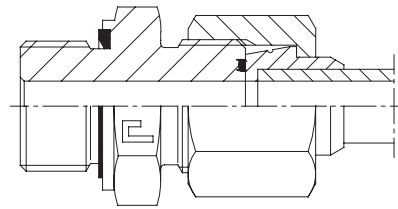
- The correct execution of the flaring and brazing is an essential condition for the functionality of the seal of the coupling.
- It is necessary to be aware of the importance of preparing the tubes, and total precision in the process is required.
- The quality of the processed tubes is a guarantee of safe functionality, easy assembly and a system created simply with an excellent yield.

TIGHTENING TORQUES FOR TUBE ENDS

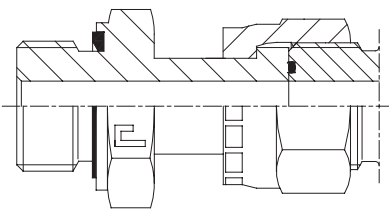
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BRAZED



TIGHTENING TORQUES FOR STAPLED SEAM ENDS



ASSEMBLY INSTRUCTIONS FOR FITTINGS WITH SWIVEL NUT

1. Before the assembly, check for the correct parameters of all the tools to be used and substitute those not complying to the requirements.
2. Clean the nut, fitting and tube and lubricate with the suggested products.
3. Check the correct alignment of the parts involved, then using a wrench tighten the stapled nut until reaching the contact of the seal surfaces and tighten according to the values of the table.
4. Repeated assembly and disassembly will not alter the functionality of the system which, each time is closed, will provide an immediate seal, which will last over time, guaranteeing the required seal.

Series	Ø tube Metric	Ø tube Inches	Thread UNF/UNS UN-2A	Tube side torque (Nm) ^{+10%} ₀	Stapled nut torque (Nm) ^{+10%} ₀
UNIVERSAL	6	1/4	9/16-18	25	25
	8-10	5/16-3/8	11/16-16	40	40
	12	1/2	13/16-16	55	55
	14-15-16	5/8	1-14	60	60
	18-20	3/4	1 3/16-12	90	90
	22-25	7/8-1	1 7/16-12	125	125
	28-30-32	1 1/4	1 11/16-12	170	170
35-38	1 1/2	2-12	200	200	

Notes:

The values in the tightening tables are approximate and derive from practical tests run at the laboratory in Casalgrasso (CN), which may vary based on the materials and tolerances of the components used.

All the values expressed in Newton Meters (Nm) for the tightening torques on the ORFS side tube represent the torquing moment, calculated on the maximum thickness of the utilisation tube, needed to obtain the correct tightness.

All the values expressed in Newton Meters (Nm) for the tightening torques on the ORFS stapled seam represent the torquing moment needed to obtain the correct tightness. The tightening torques indicated in the table refer to carbon steel fittings. For stainless steel fittings, use the tightening torque values at maximum tolerance.