



# TWIN / DOUBLE FERRULE FITTINGS

## Literature



## Introduction:



Figure 1 Double Ferrule Fittings

Tube Fittings are designed to meet the specifications required by industrial applications. These fittings are normally supplied, for shipbuilding, pharmaceutical, chemical processing, power generation, and oil and gas applications. Twin Ferrule fittings are also known as Double Ferrule fittings or instrumentation fittings.

A double ferrule fitting is made up of four components, which are fitting body, back ferrule, front ferrule, and nut. The two ferrule design provides outstanding leak-tight connections as it has better tube-gripping action and improved resistance to vibration. In a twin ferrule fitting design, the back ferrule moves the front ferrule forward to spring-load the fitting assembly and seal with the fitting body, and create the tubing seal. The back ferrule also swages the tube to provide the grip needed to keep the fitting and tubing in place.

## Material:

Double Ferrule tube fittings are available in Stainless Steel, Steel and Brass Material. Additional processing had been carried out, to protect fittings from corrosion. The additional process is passivization (stainless steel), white zinc electroplating with chrome VI free (steel), and acid cleaning (brass).

## Size Range & Pressure Rating:

Twin Ferrule fittings are measured in metric (mm) and inches sizes ("OD). The metric sizes range from 2mm to 50mm, while inch sizes range from 1 1/16"OD to 2"OD. The pressure rating is determined by the tubes' wall thickness, with varying tube materials. For more information regarding the working pressure, please refer to HSME M Tube Fittings.

## Fitting Assembly Instruction:

Before inserting the tube into the fittings, make sure that the tube ends are well prepared, and then lightly deburr the inner and outer diameters. After that, insert the tube, until it reaches the ends of the fitting shoulder, and hand-tighten with the nut. Scribe the nut vertically at 6 o'clock position, and the wrench tighten with 1 1/4 turns horizontally, while holding the body firmly with a second wrench.

### Tube Fittings Pressure Rating:

Working Pressure of the fittings is rated to the working pressure of tubing as listed in the tubing tables. Pressure ratings are based on fully annealed seamless stainless steel tubing ASTM A269/A213 and TP 316/316L, 304/304L or equivalent. Tubes are to be free from scratches and suitable for bending and flaring with hardness 90 HRB or less.

Allowable working pressures are calculated using S value of 20 000psi (1378 bar) for ASTM A269 tubing at -20 to 100°F (-28 to 37°C) as listed in ASME B31.3 Process Piping Code and ASME B31.1 Power Piping Code.

**Table 1. Fractional Seamless Stainless Steel Tubing**

Working pressures are shown in psi.

Tube OD (in)	WT(in) 0.028"	WT(in) 0.035	WT(in) 0.049	WT(in) 0.065	WT(in) 0.083	WT(in) 0.095	WT(in) 0.109	WT(in) 0.120	WT(in) 0.134	WT(in) 0.156	WT(in) 0.188
1/8	8500	10900									
3/16	5400	7000	10200								
1/4	4000	5100	7500	10200							
5/16		4000	5800	8000							
3/8		3300	4800	6500	8600						
1/2		2600	3700	5100	6700						
5/8			2900	4000	5200	6000					
3/4			2400	3300	4200	4900	5800	6400			
1				2400	3100	3600	4200	4700	5300	6200	
1 1/4					2400	2800	3300	3600	4100	4900	
1 1/2						2300	2700	3000	3400	4000	4900
2							2000	2200	2500	2900	3600

**Table 2. Metric Seamless Stainless Steel Tubing**

Working pressures are shown in bar.

Tube OD (mm)	WT(mm) 1.0	WT(mm) 1.5	WT(mm) 2.0	WT(mm) 2.5	WT(mm) 3.0	WT(mm) 3.5	WT(mm) 4.0	WT(mm) 4.5	WT(mm) 5.0
6	420	670							
8	310	490							
10	240	380							
12	200	310	430						
14	180	280	390						
15	170	260	360						
16		240	330						
18		210	290	370					
20		190	260	330					
22		170	230	300					
25			200	260	320				
28			180	230	280	330			
30			170	210	260	310			
32			160	200	240	290	330		
38				170	200	240	280	310	
42					180	210	250	280	
50					150	180	200	230	260

### Tube Fittings Temperature Rating:

Tube Fittings temperature ratings vary in accordance to the body material as per below:

### Body Material Temperature Rating

There are reductions in the nominal pressure (PN) caused by the temperature of the fluid medium or surroundings. Please refer to the table below:

38°C	93°C	149°C	204°C	260°C	316°C	343°C	371°C
1	1	0.97	0.9	0.85	0.84	0.82	0.81

399°C	427°C	454°C	482°C	510°C	538°C	566°C	593°C
0.81	0.80	0.79	0.78	0.77	0.77	0.73	0.62

621°C	649°C	677°C
0.49	0.37	0.28

### Elastomer's Temperature Rating:

When combining seal material, the temperature rating of the seal may become the limiting factor on the fitting's temperature rating. Kindly refer to the temperature rating below:

<b>NBR</b>	-25°C to 110°C (Default Option)
<b>Viton</b>	-28°C to 204°C
<b>PTFE</b>	-30°C to 315°C

### IMPA Code: Stainless Steel Flareless Fittings:

Twin Ferrule Fittings, which are also called flareless fittings can be found in the IMPA Marine Stores Guide, which is the world's leading reference guide for maritime purchasing and supply. For details on the reference codes of flareless fittings, please kindly see below:

## Stainless Steel Flareless Male Connectors



IMPA CODE	Details
734301	6MM OD x 1/8" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734302	6MM OD x 1/4" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734303	6MM OD x 3/8" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734304	6MM OD x 1/2" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734305	8MM OD x 1/8" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734306	8MM OD x 1/4" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734307	8MM OD x 3/8" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734308	8MM OD x 1/2" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734309	10MM OD x 1/4" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734310	10MM OD x 3/8" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734311	10MM OD x 1/2" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734312	12MM OD x 1/4" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734313	12MM OD x 3/8" NPT SS316 MALE CONNECTOR (TWIN FERRULE)
734314	12MM OD x 1/2" NPT SS316 MALE CONNECTOR (TWIN FERRULE)

## Stainless Steel Flareless Male Elbows



IMPA CODE	Details
734321	6MM OD x 1/8" NPT SS316 MALE ELBOW (TWIN FERRULE)
734322	6MM OD x 1/4" NPT SS316 MALE ELBOW (TWIN FERRULE)
734323	6MM OD x 3/8" NPT SS316 MALE ELBOW (TWIN FERRULE)
734324	6MM OD x 1/2" NPT SS316 MALE ELBOW (TWIN FERRULE)
734325	8MM OD x 1/8" NPT SS316 MALE ELBOW (TWIN FERRULE)
734326	8MM OD x 1/4" NPT SS316 MALE ELBOW (TWIN FERRULE)
734327	8MM OD x 3/8" NPT SS316 MALE ELBOW (TWIN FERRULE)
734328	8MM OD x 1/2" NPT SS316 MALE ELBOW (TWIN FERRULE)
734329	10MM OD x 1/4" NPT SS316 MALE ELBOW (TWIN FERRULE)
734330	10MM OD x 3/8" NPT SS316 MALE ELBOW (TWIN FERRULE)
734331	10MM OD x 1/2" NPT SS316 MALE ELBOW (TWIN FERRULE)
734332	12MM OD x 1/4" NPT SS316 MALE ELBOW (TWIN FERRULE)
734333	12MM OD x 3/8" NPT SS316 MALE ELBOW (TWIN FERRULE)
734334	12MM OD x 1/2" NPT SS316 MALE ELBOW (TWIN FERRULE)

## Stainless Steel Flareless Female Connectors



IMPA CODE	Details
734371	6MM OD x 1/8" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734372	6MM OD x 1/4" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734373	6MM OD x 3/8" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734374	6MM OD x 1/2" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734375	8MM OD x 1/4" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734376	8MM OD x 3/8" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734377	8MM OD x 1/2" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734378	10MM OD x 1/4" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734379	10MM OD x 3/8" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734380	10MM OD x 1/2" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734381	12MM OD x 1/4" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734382	12MM OD x 3/8" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)
734383	12MM OD x 1/2" NPT SS316 FEMALE CONNECTOR (TWIN FERRULE)



### Stainless Steel Flareless Unions



IMPA CODE	Details
734401	6MM OD SS316 UNION COUPLING (TWIN FERRULE)
734402	8MM OD SS316 UNION COUPLING (TWIN FERRULE)
734403	10MM OD SS316 UNION COUPLING (TWIN FERRULE)
734404	12MM OD SS316 UNION COUPLING (TWIN FERRULE)

### Stainless Steel Flareless Reducing Unions



IMPA CODE	Details
734406	6MM OD x 8MM OD SS316 UNION COUPLING (TWIN FERRULE)
734407	8MM OD x 10MM OD SS316 UNION COUPLING (TWIN FERRULE)
734408	10MM OD x 12MM OD SS316 UNION COUPLING (TWIN FERRULE)

### Stainless Steel Flareless Bulkhead Unions



IMPA CODE	Details
734411	6MM OD SS316 BULKHEAD UNION (TWIN FERRULE)
734412	8MM OD SS316 BULKHEAD UNION (TWIN FERRULE)
734413	10MM OD SS316 BULKHEAD UNION (TWIN FERRULE)
734414	12MM OD SS316 BULKHEAD UNION (TWIN FERRULE)

### Stainless Steel Flareless Tee Unions



IMPA CODE	Details
734416	6MM OD SS316 UNION TEE (TWIN FERRULE)
734417	8MM OD SS316 UNION TEE (TWIN FERRULE)
734418	10MM OD SS316 UNION TEE (TWIN FERRULE)
734419	12MM OD SS316 UNION TEE (TWIN FERRULE)

### Stainless Steel Flareless Nut



IMPA CODE	Details
734431	6MM OD SS316 UNION NUT (TWIN FERRULE)
734432	8MM OD SS316 UNION NUT (TWIN FERRULE)
734433	10MM OD SS316 UNION NUT (TWIN FERRULE)
734434	12MM OD SS316 UNION NUT (TWIN FERRULE)

### Stainless Steel Front Ferrule



IMPA CODE	Details
734436	6MM OD SS316 FRONT FERRULE (TWIN FERRULE)
734437	8MM OD SS316 FRONT FERRULE (TWIN FERRULE)
734438	10MM OD SS316 FRONT FERRULE (TWIN FERRULE)
734439	12MM OD SS316 FRONT FERRULE (TWIN FERRULE)

### Stainless Steel Rear Ferrule



IMPA CODE	Details
734441	6MM OD SS316 BACK FERRULE (TWIN FERRULE)
734442	8MM OD SS316 BACK FERRULE (TWIN FERRULE)
734443	10MM OD SS316 BACK FERRULE (TWIN FERRULE)
734444	12MM OD SS316 FRONT FERRULE (TWIN FERRULE)

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