



CERTIFICATE NUMBER  
17-SG1604397-PDA

DATE  
30 Mar 2017

ABS TECHNICAL OFFICE  
Singapore Engineering Services

# CERTIFICATE OF DESIGN ASSESSMENT

This is to certify that a representative of this Bureau did, at the request of  
**FLUID CONTROLS PVT LTD**

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product: **Tube Fittings**

Model: **End Closure, Union, Connector, Elbow, Tee, Reducer, Adaptor, Plug**

This Product Design Assessment (PDA) Certificate 17-SG1604397-PDA, dated 30/Mar/2017 remains valid until 29/Mar/2022 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

AMERICAN BUREAU OF SHIPPING

  
Vibin Chandrabose

Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by the terms and conditions as contained in ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010).

**FLUID CONTROLS PVT LTD**

J.V PATEL ITI COMPOUND I B. MADHURKAR MARG

MUMBAI

India 400013

Telephone: +91-22-433 380 00

Fax: +91-22-433 380 01

Email: sophie@fluidcontrols.com

Web: www.fluidcontrols.com

**Tier: 2 - PDA Issued**

---

**Product:** Tube Fittings**Model:** End Closure, Union, Connector, Elbow, Tee, Reducer, Adaptor, Plug**Intended Service:**

Marine and Offshore Hydraulic/Pneumatic Applications - Tubing/Piping Systems.

**Description:**

Item: End Closure, Union, Connector, Elbow, Tee, Reducer, Adaptor, Plug

Size: 1/16" to 2" (2 – 50mm);

Material: ASTM A182 (F304, F304L, F316, F316L), ASTM A276 (304, 304L, 316, 316L), ASTM A105, ASTM B16/B16M(C360), ASTM B124/B124M(C377), IS319/320

**Rating:**

For pressure ratings, sizes, configurations, materials refer to attached tubing charts

**Service Restriction:**

Unit Certification is not required for this product. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

Brass fittings are not to be used to convey flammable fluids or fluids having a temperature greater the 200 °C.

**Comments:**

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

Threaded fittings where used in Classes I and II Piping Systems are to be subject to the requirements of 4-6-2/5.5.5 of the ABS Steel Vessel Rules or Offshore Support Vessels Rules. Threaded fittings where used in Classes I Systems are to be subject to the requirements of or 4-4-2/13.1 of the ABS Steel Vessels Under 90 Meters (295 Feet) in Length. Pressure rating of threaded end is to be suitable for the piping system design pressure.

Socket welded joints where used in Classes I and II Piping Systems are to be subject to the requirements of 4-6-2/5.5.2 of the ABS Steel Vessel Rules or Offshore Support Vessels Rules. Socket welded joints where used in Classes I are to be subject to the requirements 4-4-2/13.1 of the ABS Steel Vessels Rules Under 90 Meters (295 Feet) in Length. Fillet weld leg size between socket-welding fittings and pipes is to be at least 1.1 times the nominal thickness of the pipe. Welding gap and minimum flat dimensions for socket-welding fittings are to comply with ASME B16.11-2011. Pressure rating of socket-welded end is to be suitable for the piping system design pressure.

Butt welded joints, where complete penetration at the root is achieved, may be used for all classes of piping. Degree of verification of sound root penetration is to be in accordance with 2-4-4/5 of the Rules for Materials and Welding.

**Notes/Drawing/Documentation:**

Drawing No. -, Type of Fittings, Revision: 00, Pages: 1

Drawing No. --, Annexure- I Pressure rating of Fittings, Revision: 00, Pages: 2

Drawing No. ---, Test Certificates (ASTM F1387), Revision: 00, Pages: 4

Drawing No. 45 DEG.MALE ELBOW NPT-inch, 45 DEG.MALE ELBOW NPT-inch, Revision: 1, Pages: 1

Drawing No. 45 DEG.POSITIONABLE MALE ELBOW -SAE, 45 DEG.POSITIONABLE MALE ELBOW -SAE, Revision: 1, Pages: 1

Drawing No. 45 DEG.POSITIONABLE MALE ELBOW BSPP, 45 DEG.POSITIONABLE MALE ELBOW BSPP, Revision: 1, Pages: 1

Drawing No. 45 DEGREE MALE ELBOW, 45 DEGREE MALE ELBOW, Revision: 1, Pages: 1

Drawing No. ABS and ASTM, ABS and ASTM F1387 Four Test clarification 1, Revision: 1, Pages: 1

Drawing No. ASTM F1387, ASTM F1387-Test calculations and details Part 2, Revision: 1, Pages: 1

Drawing No. ASTM F1387 Test reports - Brass 1-16 and 2 Inch, ASTM F1387 Test reports - Brass Fractional fittings 1-16 in and 2 in dated 18 Jul 2013, Revision: 0, Pages: 1

Drawing No. ASTM F1387 Test reports - Brass Metric fittings, ASTM F1387 Test reports - Brass Metric fittings dated 26 Jul 2013, Revision: 0, Pages: 1

Drawing No. ASTM F1387 Test reports - CS Metric fittings, ASTM F1387 Test reports - CS Metric fittings dated 3 Aug 2013, Revision: 0, Pages: 1

**FLUID CONTROLS PVT LTD**

J.V PATEL ITI COMPOUND I B. MADHURKAR MARG

MUMBAI

India 400013

Telephone: +91-22-433 380 00

Fax: +91-22-433 380 01

Email: sophie@fluidcontrols.com

Web: www.fluidcontrols.com

**Tier: 2 - PDA Issued**

---

Drawing No. ASTM F1387 Test reports - CS Fractional fittings, ASTM F1387 Test reports - CS Fractional fittings dated 10 Feb 2014, Revision: 0, Pages: 1  
Drawing No. ASTM F1387 Test reports - Brass Fractional fittings, ASTM F1387 Test reports - Brass Fractional fittings dated 16 Jul 2013, Revision: 0, Pages: 1  
Drawing No. ASTM F1387 Test reports - SS Fractional fittings, ASTM F1387 Test reports - SS Fractional fittings dated 17 Jul 2013, Revision: 0, Pages: 1  
Drawing No. ASTM F1387 Test reports - SS Metric fittings, ASTM F1387 Test reports - SS Metric fittings dated 18 Jul 2013, Revision: 0, Pages: 1  
Drawing No. As per attached document no.FC-ABS-Fittings-03, FC-ABS-Fittings-03-Sample drawing of each type and each series of fittings, Revision: 00, Pages: 3  
Drawing No. Fluid Controls Catalogue, Fluid Controls Catalogue Fittings, Revision: 1, Pages: 1  
Drawing No. MALE CONNECTOR, MALE CONNECTOR, Revision: 1, Pages: 1  
Drawing No. MALE ELBOW, MALE ELBOW, Revision: 1, Pages: 1  
Drawing No. O SEAL MALE ADAPTER, O SEAL MALE ADAPTER, Revision: 1, Pages: 1  
Drawing No. O SEAL MALE CONNECTOR, O SEAL MALE CONNECTOR, Revision: 1, Pages: 1  
Drawing No. POSITIONABLE MALE BRANCH TEE-BSPP, POSITIONABLE MALE BRANCH TEE-BSPP, Revision: 1, Pages: 1  
Drawing No. POSITIONABLE MALE BRANCH TEE-SAE, POSITIONABLE MALE BRANCH TEE-SAE, Revision: 1, Pages: 1  
Drawing No. POSITIONABLE MALE ELBOW BSPP, POSITIONABLE MALE ELBOW BSPP, Revision: 1, Pages: 1  
Drawing No. POSITIONABLE MALE ELBOW SAE-INCH, POSITIONABLE MALE ELBOW SAE-INCH, Revision: 1, Pages: 1  
Drawing No. POSITIONABLE MALE RUN TEE BSPP, POSITIONABLE MALE RUN TEE BSPP, Revision: 1, Pages: 1  
Drawing No. POSITIONABLE MALE RUN TEE SAE, POSITIONABLE MALE RUN TEE SAE, Revision: 1, Pages: 1  
Drawing No. Pneumatic and Hydrotest report, Pneumatic and Hydrotest report dated 20 Sep 2014, Revision: 0, Pages: 1  
Drawing No. Pressure Rating Chart for Fittings, Pressure Ratings for Fittings, Revision: 2, Pages: 1  
Drawing No. REDUCER, REDUCER, Revision: 1, Pages: 1  
Drawing No. REDUCING BRANCH TEE, REDUCING BRANCH TEE, Revision: 1, Pages: 1  
Drawing No. REDUCING RUN BRANCH TEE, REDUCING RUN BRANCH TEE, Revision: 1, Pages: 1  
Drawing No. REDUCING RUN TEE, REDUCING RUN TEE, Revision: 1, Pages: 1  
Drawing No. REDUCING UNION, REDUCING UNION, Revision: 1, Pages: 1  
Drawing No. SOCKET WELD TUBE CONNECTOR, SOCKET WELD TUBE CONNECTOR, Revision: 1, Pages: 1  
Drawing No. SOCKET WELD TUBE ELBOW CONNECTOR, SOCKET WELD TUBE ELBOW CONNECTOR, Revision: 1, Pages: 1  
Drawing No. TUBE END CLOSURE, TUBE END CLOSURE, Revision: 1, Pages: 1  
Drawing No. UNION, UNION, Revision: 1, Pages: 1  
Drawing No. UNION CROSS, UNION CROSS, Revision: 1, Pages: 1  
Drawing No. UNION ELBOW, UNION ELBOW, Revision: 1, Pages: 1  
Drawing No. UNION TEE, UNION TEE, Revision: 1, Pages: 1

**Terms of Validity:**

This Product Design Assessment (PDA) Certificate 17-SG1604397-PDA, dated 30/Mar/2017 remains valid until 29/Mar/2022 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS

**FLUID CONTROLS PVT LTD**

J.V PATEL ITI COMPOUND I B. MADHURKAR MARG

MUMBAI

India 400013

Telephone: +91-22-433 380 00

Fax: +91-22-433 380 01

Email: sophie@fluidcontrols.com

Web: www.fluidcontrols.com

**Tier: 2 - PDA Issued**

---

Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

**STANDARDS****ABS Rules:**

Rules for Conditions of Classification 2017: 1-1-4/7.7, 1-1-Appendix 3 and 1-1-Appendix 4

Steel Vessel Rules 2017: 4-6-1/7.5.2 Table 1 &amp; 2, 4-6-2/5.9;

Steel Vessels Under 90 Meters (295 Feet) in Length 2017: 4-1-1/3.3, 4-7-1/5.39;

Offshore Support Vessels 2017: 4-1-1/3.3, 4-6-1/7.1.2, 4-6-2/5.9

Mobile Offshore Drilling Units Rules 2017: 1-1-4/9.7, 1-1-Appendix 2 and 3, 4-2-1/11.13

Facilities on Offshore Installations 2017: 1-1-4/9.7, 1-1-Appendix 2 and 3

**National:**

NA

**International:**

ANSI/ASME B31.1(2016), ANSI/ASME B31.3 (2016)

Threading: ANSI B 1.20.1(2013)/ ISO-228(2000) /ISO-7/1(1994);

Testing: ASTM F1387 (2012)

**Government:**

NA

**EUMED:**

NA

**OTHERS:**

NA

TABLE-1										
FRACTIONAL STAINLESS STEEL SEAMLESS TUBING										
Allowable working pressure are calculated from an S value of 20000 psi for ASTM A269 tubing at -20 to 100° F(-28 to 27°C), as listed in ASME B31.3 Multiply stainless steel rating by .0.94 for working pressure accordance with ASME B31.1										
TUBE OD (INCH)	TUBE WALL THICKNESS (INCHES)									
	0.016	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.12	0.134
WORKING PRESSURE (PSIG)										
1/16"	10484									
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	7500				
1/2			2600	3700	5100	6700				
5/8				2900	4000	5200	6000			
3/4				2400	3300	4200	4900	5800		
7/8				2000	2800	3600	4200	4800		
1					2400	3100	3600	4200	4700	
1 1/4						2400	2800	3300	3600	4100
1 1/2							2300	2700	3000	3400
2"								2027	2242	2519

Table -2														
METRIC STAINLESS STEEL SEAMLESS TUBING														
Allowable working pressure are calculated from an S value of 20000 psi for EN ISO 1127 tubing (D4, T4 tolerance for 3 to 12 mm; D4, T3 tolerance for 14 to 50 mm) at -20														
TUBE OD (MM)	TUBE WALL THICKNESS (MM)													
	0.8	1	1.2	1.5	1.8	2	2.2	2.5	2.8	3	3.5	4	4.5	5
WORKING PRESSURE (PSIG)														
3	10063	14035	18569											
4	7248	9927	12869											
6	4645	6258	7970	10742	13793	16003	18187	21750	25705					
8	3415	4568	5770	7678	9720	11164	12563	14785	17172	18863				
10	2699	3595	4521	5972	7502	8570	9593	11197	12890	14072				
12	2231	2963	3715	4885	6108	6953	7758	9010	10316	11220				
14	1900	2519	3153	4133	5150	5849	6512	7536	8599	9329				
15	1769	2343	2931	3837	4775	5418	6027	6966	7937	8603				
16	1654	2190	2738	3581	4451	5047	5610	6477	7371	7982				
18	1464	1937	2419	3158	3919	4438	4927	5678	6449	6975				
20	1313	1736	2166	2824	3500	3960	4392	5054	5732	6193				
22	1190	1572	1960	2553	3160	3572	3960	4551	5155	5566	6620	7714	8851	10034
25	1042	1376	1715	2231	2758	3115	3450	3960	4479	4831	5732	6662	7625	8620
28	927	1223	1524	1981	2446	2761	3056	3504	3960	4268	5054	5863	6696	7555
30	863	1139	1418	1843	2275	2566	2839	3254	3675	3960	4684	5428	6193	6980
32						2397	2651	3037	3429	3693	4365	5054	5761	6486
38						2001	2212	2531	2854	3071	3623	4186	4762	5349
42						1802	1991	2277	2566	2761	3254	3756	4268	4789
50						1503	1659	1896	2136	2296	2702	3115	3534	3960

Table 3										
FRACTIONAL CARBON STEEL TUBING										
Allowable working pressure are calculated from an S value of 15700 psi for ASTM A 179 tubing at -20 to 100°F (-28 to 27°C), as listed in ASME B 31.3. Multiply carbon steel rating by 0.75 for working pressure in accordance with ASME B31.1										
TUBE OD (INCH)	TUBE WALL THICKNESS (INCHES)									
	0.016	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.12	0.134
WORKING PRESSURE (PSIG)										
1/16"	9352									
1/8		8000	10200							
3/16		5100	6600	9600						
1/4		3700	4800	7000	9600					
5/16			3700	5500	7500					
3/8			3100	4500	6200					
1/2			2300	3200	4500	5900				
5/8			1800	2600	3500	4600	5300			
3/4				2100	2900	3700	4300	5100		
7/8				1800	2400	3200	3700	4300		
1				1500	2100	2700	3200	3700	4100	
1 1/4					1600	2100	2500	2900	3200	3600
1 1/2						1800	2000	2400	2600	2900
2"								1767	1956	2199

Table 4														
METRIC CARBON STEEL SEAMLESS TUBING														
Allowable working pressures are based on equation from ASME B31.3 for DIN 2391 tubing using a stress value of 16400 psi.														
TUBE OD (MM)	TUBE WALL THICKNESS (MM)													
	0.8	1	1.2	1.5	1.8	2	2.2	2.5	2.8	3	3.5	4	4.5	5
WORKING PRESSURE (PSIG)														
3	9091	12398	16189											
4	6490	8681	11094											
6	4124	5424	6805	9043	11510	13299	15219	18378	21925					
8	3021	3942	4905	6433	8070	9228	10444	12052	14126	15604				
10	2382	3095	3833	4990	6211	7063	7948	9102	10564	11589				
12	1965	2547	3145	4075	5047	5720	6414	7495	8628	9216				
14	1757	2250	2665	3443	4250	4805	5375	6258	7176	7809				
15	1634	2092	2559	3195	3939	4449	4972	5780	6618	7194				
16	1528	1954	2389	3060	3670	4142	4625	5370	6141	6670				
18	1351	1727	2109	2696	3300	3713	4059	4703	5367	5820				
20	1211	1546	1887	2409	2945	3310	3616	4183	4765	5163				
22	1097	1400	1707	2178	2659	2986	3318	3766	4285	4638	5546	6492	7480	8510
25	960	1225	1493	1902	2320	2603	2890	3327	3722	4024	4799	5603	6436	7301
28	1089	1327	1689	2057	2307	2559	2943	3335	3553	4229	4927	5647	6391	8510
30		1014	1235	1571	1913	2144	2378	2733	3095	3296	3919	4548	5207	5886
32						1960	2177	2506	2840	3066	3642	4234	4842	5467
38						1636	1816	2088	2364	2550	3022	3506	4000	4506
42						1452	1613	1856	2103	2269	2689	3119	3557	4005
50						1211	1344	1546	1750	1887	2234	2586	2945	3310

Table-5										
FRACTIONAL COPPER TUBING										
Based on the ultimate tensile strength 30000 PSI. For metal temperature not to exceed -20° to 100° F. Allowable working pressure loads calculated from S values of 6000 psi for ASTM B 75 tubing as specified by ANSI B31.3 code.										
TUBE OD (INCH)	TUBE WALL THICKNESS (INCHES)									
	0.016	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.12	0.134
WORKING PRESSURE (PSIG)										
1/16"	3131									
1/8		2700	3600							
3/16		1800	2300	3400						
1/4		1300	1600	2500	3500					
5/16			1300	1900	2700					
3/8			1000	1600	2200					
1/2			800	1100	1600	2100				
5/8				900	1200	1600	1900			
3/4				700	1000	1300	1500	1800		
7/8				600	800	1100	1300	1500		
1				500	700	900	1100	1300	1500	
1.1/2							740	864		
2"								637	701	793

Table-06														
METRIC COPPER SEAMLESS TUBING														
Allowable working pressures are calculated from an S value of 6000 psi for ASTM B75 & ASTM B88 tubing at -20 to 100°F (-28 to 37°C), as listed in ASME B31.3														
TUBE OD (MM)	TUBE WALL THICKNESS (MM)													
	0.8	1	1.2	1.5	1.8	2	2.2	2.5	2.8	3	3.5	4	4.5	5
WORKING PRESSURE (PSIG)														
3	3478	4756	6225											
4	2553	3317	4247											
6	1612	2063	2593	3453	4368	5054	5752	6959	8314					
8	1176	1495	1864	2450	3056	3500	3941	4684	5486	6059				
10	924	1171	1454	1897	2349	2675	2996	3528	4092	4487				
12	760	961	1190	1547	1906	2164	2415	2828	3261	3562				
14	645	815	1007	1305	1603	1816	2022	2360	2710	2952				
15	599	757	935	1210	1485	1680	1870	2179	2499	2719				
16	560	706	872	1128	1383	1564	1739	2024	2318	2520				
18	494	615	761	985	1207	1364	1508	1753	2006	2179				
20	441	550	680	879	1076	1215	1342	1558	1780	1932				
22	399	497	614	794	971	1095	1209	1402	1600	1735	2060	2419	2757	3147
25	349	434	536	692	846	954	1052	1219	1389	1504	1782	2087	2372	2700
28						844	930	1076	1225	1326	1568	1833	2079	2362
30						784	864	999	1137	1230	1452	1696	1922	2180
32						731	806	932	1060	1146	1353	1578	1787	2025
38						609	671	775	880	951	1121	1305	1475	1668
42						549	603	696	791	854	1006	1170	1321	1492
50						460	505	581	657	709	833	968	1092	1231