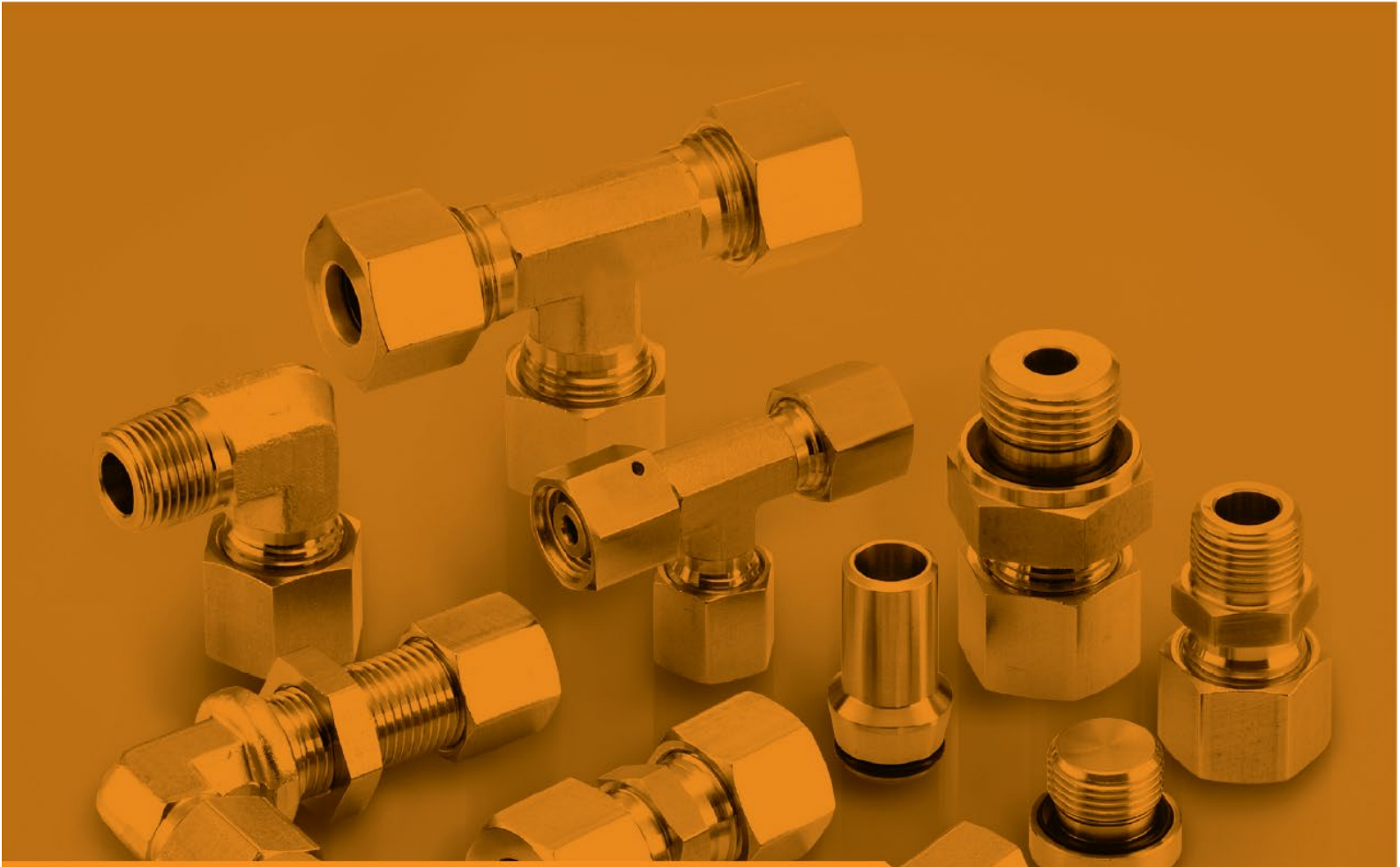
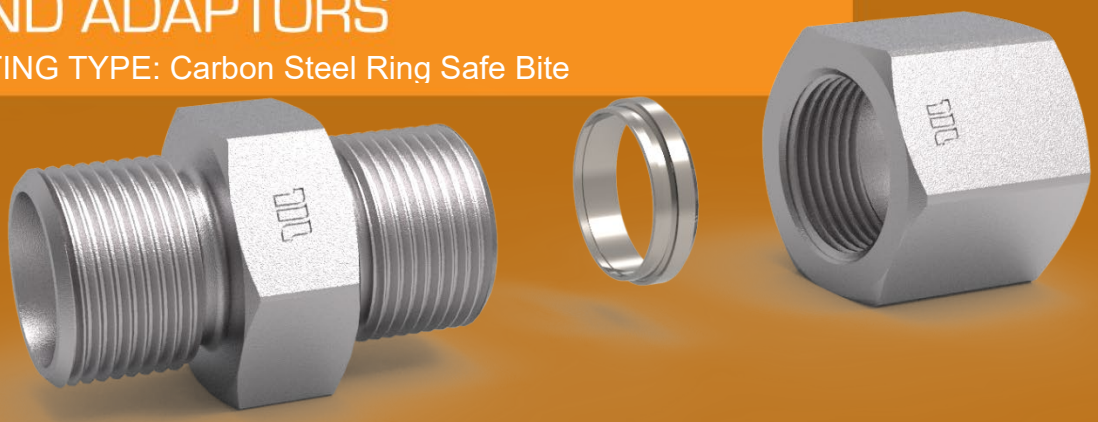


CERTIFICATE OF CONFORMITY

RING.SAFE

DIN 24° BITE RING FITTINGS AND ADAPTORS

FITTING TYPE: Carbon Steel Ring Safe Bite



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CERTIFICATE OF CONFORMITY

FITTING TYPE: Carbon Steel Ring Safe Bite

DIN24 metric fittings

COMPLYING WITH AND MANUFACTURED TO:

ISO8434-1:2018 - ISO 19879:2010 – DNV CP-0185

April, 13th 2022

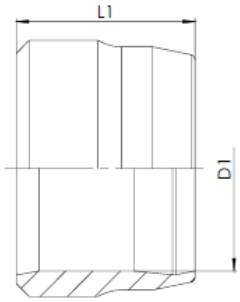
TEST SUMMARY vs ISO 19879:2010 and ISO8434-1:2018

Ref.	TEST DATA / TEST METHOD		TEST RESULT
	TYPE	SPECIFICATION	
ISO 19879 clause 5	Repeated Assembly Test	- Connection to be disassembled/re-assembled six times - Prior to each re-assembly, tube turned by 60° - After first and sixth re-assembly, perform a leakage test (15% WP) and a proof test (2 x WP) according to the related test methods - Pass/fail criterion: No leakage	PASSED
ISO 19879 clause 6	Leakage Test	- Test Pressure = 15% of the working pressure - Test duration= 3 minutes minimum - Pass/fail criterion: No leakage	PASSED
ISO 19879 clause 7	Proof Test	- Test Pressure = 2 x WP - Test duration= 60 seconds minimum - Pass/fail criterion: No leakage	PASSED
ISO 19879 clause 8	Burst Pressure Test	- Test Pressure = 4 x WP - Test duration= until failure - Pass/fail criterion: No leakage below the test pressure	PASSED
ISO 19879 clause 9	Cyclic Endurance (Impulse) Test	- Test Pressure = 133% of the working pressure - Frequency = 0,5 to 1,25 Hz - Test duration= 1.000.000 cycles - Pass/fail criterion: No leakage	PASSED
ISO 19879 clause 12	Vibration Test	- Test Pressure = Working Pressure - Bending stress level = 25% of the minimum tube yeld strength - Test frequency = 10 to 50 Hz - Test duration= 10.000.000 cycles - Pass/fail criterion: No leakage	PASSED
ISO 8434-1 clause 15.8.1	Overtightening Test	- Over torque = overload of 30% respect to the assembly torque - Pass/fail criterion: nut can be removed and swivels freely after breakaway, no cracks or visible deformations	PASSED
ISO 19879 clause 10	Vacuum Test	- Test Pressure = 6,5 kPa - Test duration = 5 min - Pass/fail criterion = increase in the absolute pressure not exceed 3kPa	PASSED
ISO 8434-1 clause 11.3	Corrosion Resistance (Zinc-Nickel Plating)	EN ISO9227:2012 Neutral spray test. 72 hrs target to red rust. Actual results: over 1000 hrs resistance to red rust  	PASSED

TEST SUMMARY vs DNV CP-0185

Ref.	TEST DATA / TEST METHOD		TEST RESULT
	TYPE	SPECIFICATION	
DNV CP-0185 clause 5.2	Repeated Assembly Test	- Connection to be disassembled/re-assembled 10 times - At the end, perform the tightness test	PASSED
DNV CP-0185 Clause 5.1	Tightness Test	- Test Pressure = working pressure or 70 bar max - Test duration= 5 minutes minimum	PASSED
DNV CP-0185 Clause 5.3	Burst Pressure Test	- Test Pressure = 4 x WP (but lower for WP > 200 bar) - Test duration= 5 minutes, then raise pressure till burst	PASSED
DNV CP-0185 Clause 5.5-5.6	Cyclic Impulse Test + Vibration Test	- Test Pressure = 150% of the working pressure - Bending stress level = 25% of the minimum tube yield strength - Impulse frequency = 0,5 to 1,67 Hz - Vibration frequency = 20 to 30 Hz - Test duration= 500.000 impulse cycles	PASSED
DNV CP-0185 clause	Cyclic Endurance (Impulse) Test	- Test Pressure = 133% of the working pressure - Frequency = 0,5 to 1,25 Hz - Test duration= 1.000.000 cycles - Pass/fail criterion: No leakage	PASSED
DNV CP-0185 Clause 5.9	Vacuum Test	- Test Pressure = 0,17 bar - Test duration = 5 min - Pass/fail criterion = no pressure increase	PASSED
DNV CP-0185 Clause 5.4	Pull-out Test	- Test Pressure = Working Pressure with Axial Load - Test duration = 5 min	PASSED
DNV CP-0185 Clause 5.7	Fire Resistance Test	- Test Method ISO 19921, to be performed only on a selection of nominal bores	PASSED

WORKING PRESSURE TABLE

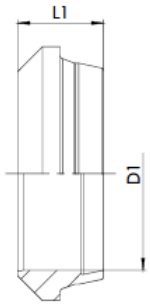


CUTTING RING

LL-SERIES

PART NUMBERS	DIMENSIONS (mm)

Complete	Series	D1	L1	PN	Weight (g)
					Total
E69019	LL	4	6	100	0,4
E69021	LL	6	7	100	0,8
E69022	LL	8	7	100	1,1
E69159	LL	10	7	100	1,3
E69024	LL	12	7,5	100	1,7



PROGRESSIVE RING

L AND S - SERIES

PART NUMBERS	DIMENSIONS (mm)

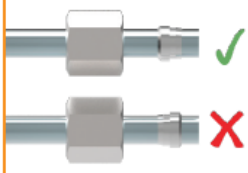
Complete	Series	D1	L1	PN	Weight (g)
					Total
E69025	L/S	6	9,5	500/800	2
E69026	L/S	8	9,5	500/800	3
E69027	L/S	10	10	500/800	4
E69028	L/S	12	10	400/630	5
E69030	L	15	10	400	6
E69032	L	18	10	400	8
E69034	L	22	11,5	250	11
E69036	L	28	11,5	250	13
E69038	L	35	13,5	250	24
E69040	L	42	13,5	250	28
E69029	S	14	10,5	630	7
E69031	S	16	10,5	630	7
E69033	S	20	12,5	420	13
E69035	S	25	12,5	420	16
E69037	S	30	13,5	420	22
E69039	S	38	13,5	420	26

DIRECT ASSEMBLY INSTRUCTIONS

PRE-ASSEMBLY OF CARBON STEEL CUTTING RING

Note: *This procedure requires the use of an appropriately sized* ***Hardened Pre-Assembly Tool***

1



- Assemble nut and cutting ring onto tube as shown

Ensure cutting ring orientation is correct

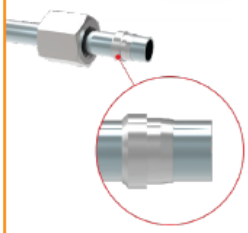
2

- Push tube fully into pre-assembly tool
- Tighten nut until the cutting ring makes contact with the tube surface - the torque required will increase noticeably

3

- After the cutting ring has contacted the tube surface, turn the nut another ½ turn

4



- Check the penetration of the cutting edge
- An accumulation of material should be visible in front of the cutting edge

5

- Cutting ring may be able to turn on the tube, but should not be able to be moved axially

6

- Insert the pre-assembled tube end into the fitting
- Screw on the nut until a definite increase in the tightening torque is felt

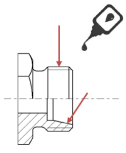
7

- Hold the fitting body firmly and turn the nut another ½ turn

Over- or under-tightening of the nut may result in reduced working pressure and / or service life of the connection

8

- Any time the connection has been loosened, re-assembly must be carried out with the same tightening recommendations.
- Use of a spanner to hold the fitting body is recommended



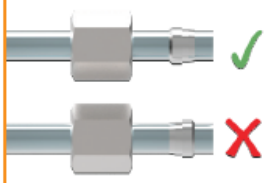
Note: we recommend to lubricate the thread and sealing cone of the adaptor.

DIRECT ASSEMBLY INSTRUCTIONS

DIRECT ASSEMBLY OF CARBON STEEL CUTTING RING

Note: *We strongly recommend pre-assembling with an appropriately sized* ***Hardened Pre-Assembly Tool***

1



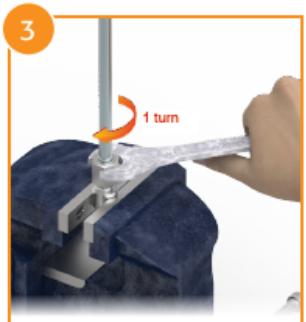
- Assemble nut and cutting ring onto tube as shown

Ensure cutting ring orientation is correct

2

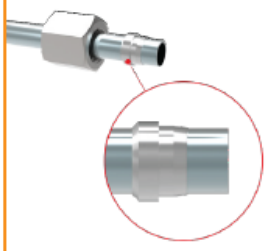
- Push tube fully into fitting
- Tighten nut until the cutting ring makes contact with the tube surface - the torque required will increase noticeably

3



- After the cutting ring has contacted the tube surface, mark the position of the nut
- Turn the nut another 1 turn

4



- Check the penetration of the cutting edge
- An accumulation of material should be visible in front of the cutting edge

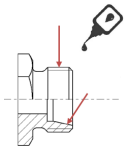
5

- Cutting ring may be able to turn on the tube, but should not be able to be moved axially

Each fitting should only be used once, to pre-set the cutting ring which it will be assembled to

6

- Any time the connection has been loosened, re-assembly must be carried out with the same torque as used during initial assembly
- Use of a spanner to hold the fitting body is recommended



Note: we recommend to lubricate the thread and sealing cone of the adaptor.

TECHNICAL NOTES

TERMINATION END IDENTIFICATION

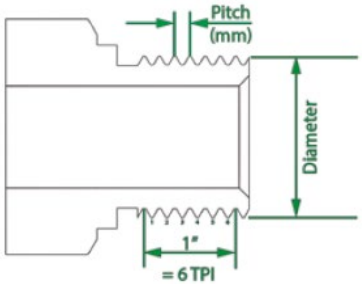
MEASURING TOOLS

Thread measurement tool kits are generally available from hose or fittings manufacturers to identify the fluid connectors termination ends. They usually include a seat angle gauge, thread pitch gauge and an I.D./O.D. calliper which, when used correctly allow you to make accurate measurements of commonly used connectors.

In some cases multiple tools are combined to make a single, multipurpose tool.

HOW ARE THREADS DEFINED?

Threads are designated by a diameter (external on the male and internal on the female) and by either the number of teeth per inch (TPI) for Imperial threads, or by the distance between each thread (pitch) in millimetres for metric threads.



The Imperial system is identified by a diameter in inches, followed by the TPI value.

The metric system is identified by prefixing the thread diameter with an “M” followed by the pitch of the thread.

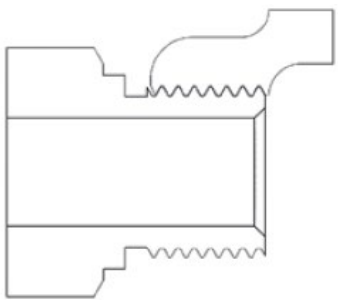
Examples:

3/8”-19 means thread diameter 3/8” and 19 teeth per inch

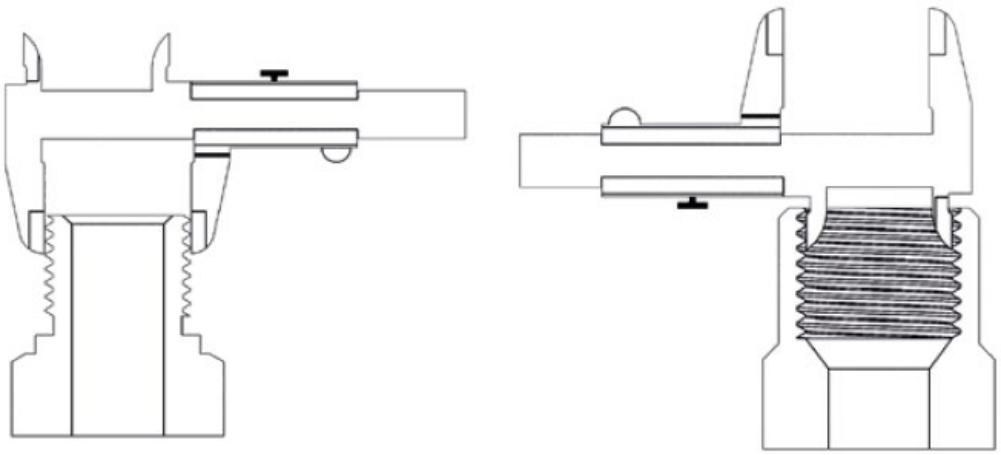
M22x1.5 means thread diameter 22mm with a thread pitch of 1.5mm

HOW TO MEASURE THREADS

1. Use a thread pitch gauge to determine the number of teeth per inch or the distance between threads in metric connections. Place the gauge on the threads until the fit is accurate - holding the thread pitch gauge and thread against a well lit background can help to ensure a precise reading.



2. Measure the thread diameter with an I.D./O.D. caliper.



How to Measure O.D.
(Male Threads)

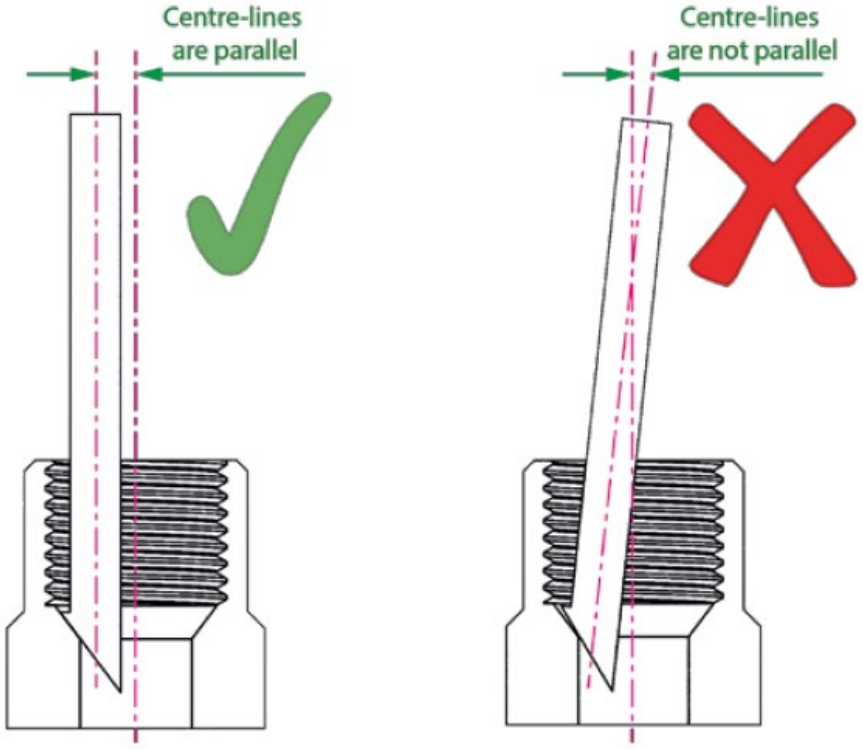
How to Measure I.D.
(Female Threads)

3. Match the measurements to the “End Thread Measurement Chart” at the end of this section.

HOW TO MEASURE SEALING SURFACE ANGLES

Female connections are usually measured by inserting the gauge into the connection and placing it on the sealing surface. If the centrelines of the connection and gauge are parallel, the correct angle has been determined.

Male flare type connectors are usually measured by placing the gauge on the sealing surface. If the centrelines of the connection and gauge are parallel, the correct angle has been determined.



END-THREAD MEASUREMENT CHART

After taking the measurements as described above, compare the diameter value obtained (in millimetres) with the middle column value. The relevant thread size can be read off depending on whether it is a male thread (left column) or a female thread (right column).

MALE O.D.	MM	FEMALE I.D.
-	8.5	3/8"-24 UNF
-	8.7	1/8"-28 GAS
-	9.2	1/8"-27 NPSM
3/8"-24 UNF	9.4	-
1/8"-28 GAS	9.6	-
M10x1	10.0	7/16"-20 UNF
1/8"-27 NPTF	10.4	-
-	10.5	M12x1.5
7/16"-20 UNF	11.0	-
-	11.4	1/2"-20 UNF
-	11.6	1/4"-19 GAS
M12x1.5	12.0	-
-	12.2	1/4"-18 NPSM
1/2"-20 UNF	12.5	M14x1.5
1/4"-19 GAS	13.0	9/16"-18 UNF
1/4"-18 NPTF	13.9	-
M14x1.5	14.0	-
9/16"-18 UNF	14.2	-
-	14.5	M16x1.5
-	14.6	5/8"-18 UNF
-	15.1	3/8"-19 GAS
-	15.5	3/8"-18 NPSM
5/8"-18 UNF	15.7	-
M16x1.5	16.0	11/16"-16 UN
-	16.5	M18x1.5
3/8"-19 GAS	16.6	-
3/8"-18 NPTF	17.3	-
11/16"-16 UN	17.4	3/4"-16 UNF
M18x1.5	18.0	-
-	18.5	M20x1.5
-	18.8	1/2"-14 GAS
3/4"-16 UNF	19.0	13/16"-16 UN
-	19.2	1/2"-14 NPSM
M20x1.5	20.0	-
-	20.3	7/8"-14 UNF
13/16"-16 UN	20.5	M22x1.5
1/2"-14 GAS	20.8	-
-	21.1	5/8"-14 GAS
1/2"-14 NPTF	21.6	-
M22x1.5	22.0	-
7/8"-14 UNF	22.2	-
-	22.5	M24x1.5
5/8"-14 GAS	22.8	-
-	23.8	1"-14 UNS
M24x1.5	24.0	-
-	24.5	M26x1.5
-	24.6	3/4"-14 GAS-NPSM
-	24.9	1.1/16"-12 UN

MALE O.D.	MM	FEMALE I.D.
-	25.0	M27x2
1"-14 UNS	25.3	-
M26x1.5	26.0	-
3/4"-14 GAS	26.3	-
1.1/16"-12 UN	26.7	-
3/4"-14 NPTF	26.9	-
M27x2	27.0	-
-	27.9	1.3/16"-12 UN
-	28.0	M30x2
M30x2	30.0	-
1.3/16"-12 UN	30.1	-
-	30.7	1"-11.5 NPSM
-	30.9	1"-11 GAS
-	31.0	M33x2
-	31.2	1.5/16"-12 UN
M33x2	33.0	-
1"-11 GAS	33.2	-
1.5/16"-12 UN	33.3	-
1"-11.5 NPTF	33.8	-
-	34.0	M36x2
M36x2	36.0	-
-	39.1	1.5/8"-12 UN
-	39.4	1.1/4"-11.5 NPSM
-	39.5	1.1/4"-11 GAS
-	40.0	M42x2
1.5/8"-12 UN	41.1	-
1.1/4"-11 GAS	41.7	-
M42x2	42.0	-
1.1/4"-11.5 NPTF	42.4	-
-	43.0	M45x2
M45x2	45.0	-
-	45.2	1.1/2"-11 GAS
-	45.5	1.1/2"-11.5 NPSM
-	45.7	1.7/8"-12 UN
-	46.0	M48x2
1.7/8"-12 UN	47.5	-
1.1/2"-11 GAS	47.7	-
M48x2	48.0	-
1.1/2"-11.5 NPTF	48.5	-
-	48.8	2"-12 UN
-	50.0	M52x2
2"-12 UN	50.7	-
M52x2	52.0	-
-	57.0	2"-11 GAS
2"-11 GAS	59.4	-
2"-11.5 NPTF	60.6	-
-	61.2	2.1/2"-12 UN
2.1/2"-12 UN	63.3	-

GENERAL SAFETY NOTES

- The products listed in this catalogue are intended for fluid engineering applications only, and cover a range of operating conditions from normal to extreme.
- The assembly instructions, operating conditions and tube recommendations provided are intended to ensure maximum levels of performance and functional reliability. Failure to follow these recommendations may impair the functionality of the product and lead to loss of claims under warranty.
- The hydraulic system must be fully depressurised before tightening or loosening any coupling elements. Failure to do so can cause serious injury or death.
- Piping and tubing lines should be designed so that they are not under tension in an unassembled state and all connectors can be easily assembled.
- Dirt and component damage can impair the function of components and the hydraulic system as a whole. Ensure all components are clean and handled in a clean environment.
- When using lubricants, ensure the instructions and information provided by the manufacturer is observed.

PRESSURE RATINGS

- The nominal Working Pressures (W.P.) specified in this catalogue indicate the maximum operating pressure of the coupling under static conditions. This specified value allows for a safety factor (burst pressure vs. working pressure) of 4:1.
- If couplings are subjected to increased loads during operation - for example, due to temperatures over +120°C or high pressure peaks - the baseline operating pressure should be reduced to maintain the 4:1 safety factor.
- The quoted W.P. value assumes that all assembly instructions provided have been correctly followed, including using the recommended torque values when tightening connections.
- The specified W.P. always refers to the Fluiconnecto coupling. In the case of the tubing, always observe the manufacturer's recommendations.

OPERATING TEMPERATURES

COUPLING MATERIALS

- For all steel couplings listed in this catalogue, an operating temperature range of -40°C to +120°C is permissible (cf. DIN 3859-1).
- If these temperature limits are exceeded, the pressure must be decreased accordingly.

SEAL MATERIALS

Seal Material	Operating Temperature Range	Dry Storage Temperature
NBR (70 - 90 Shore A)	-35°C to +120°C	Up to +25°C
FKM/FPM (75 - 85 Shore A)	-25°C to +200°C	Up to +25°C

SURFACE PROTECTION

- Ring.Safe couplings have a zinc-nickel (ZnNi) surface coating in order to provide extended corrosion resistance.

TIGHTENING TORQUES FOR THREADS

- Recommended tightening torques apply to steel threads with a ZnNi surface coating, and a steel mating material with a breaking stress of 350 N/mm².
- Steel threads with an increased pressure level require a mating material with a breaking stress of ≥ 600 N/mm².
- If other values for strength, modulus of elasticity and friction-surface combinations are used, the user must adapt the tightening torque empirically.
- All provided operating and assembly instructions must be followed in order for the components to fulfil their proper functions.
- Recommended tightening torques must be used in order for assemblies to provide the stated pressure rating and the appropriate safety level maintained.

RECOMMENDED STEEL TUBES

- The following table contains details of recommended tubes for use with the connectors listed in this catalogue.
- The values in the table refer to Class III dynamic loads at 120°C, calculated using the method described in DIN 2413. The tube material is 1.0255+N without corrosion factor supplement.
- There are several different international standards related to the calculation of the required dimensions for tubes under internal pressure. Recommended is DIN EN 13480-3, which explains the various load cases in great detail.

SPECIFICATIONS CONCERNING PERMISSIBLE STEEL TUBES

- Tubes must be seamless, cold-drawn and normalised precision steel tubing as specified in DIN EN 10305-4, material E235+N, mat. no. 1.0308+N or E355, mat. no. 1.0580.
- Tubes must be ordered by specifying the outside and inside diameters to respect the required application working pressure.

TUBE DIMENSIONS			DESIGN CALCULATION PRESSURES AS PER DIN 2413 (bar)				BURST PRESSURE (bar)	
			LOAD CASE I (STATIC, UP TO +120°C)		LOAD CASE III (DYNAMIC, UP TO +120°C)		AS PER ISO 10763	
O.D. (mm)	I.D. (mm)	T (mm)	E235	E355	E2352	E3553	E2355	E3556
6	4.5	0.75	338	491	303	310	1116	1525
6	4	1	450	655	391	400	1573	2149
6	3	1.5	675	983	551	563	2689	3674
6	2	2	900	1310	692	708	4263	5823
6	1.5	2.25	1013	1474	757	774	5379	7347
8	6	1	338	491	303	310	1116	1525
8	5	1.5	506	737	433	443	1824	2491
8	4	2	675	983	551	563	2689	3674
8	3	2.5	844	1228	659	673	3806	5198
10	8	1	270	393	248	253	866	1183
10	7	1.5	405	590	357	365	1384	1890
10	6	2	540	786	458	468	1982	2707
10	5	2.5	675	983	551	563	2689	3674
10	4	3	810	1179	638	652	3555	4856
12	10	1	225	328	209	214	707	966
12	9	1.5	338	491	303	310	1116	1525
12	8	2	450	655	391	400	1573	2149
12	7	2.5	563	819	474	484	2091	2857
12	6	3	675	983	551	563	2689	3674
12	5	3.5	823	1180	624	638	3397	4640
12	4	4	940	1348	692	708	4263	5823
14	12	1	193	281	181	185	598	817
14	11	1.5	289	421	264	270	936	1278
14	10	2	386	561	342	349	1306	1783
14	9	2.5	482	702	415	425	1714	2342
14	8	3	579	842	485	496	2171	2966
14	7	3.5	705	1011	551	563	2689	3674
15	13	1	180	262	170	174	555	758
15	12	1.5	270	393	248	253	866	1183
15	11	2	360	524	321	329	1203	1644
15	10	2.5	450	655	391	400	1573	2149
15	9	3	540	786	458	468	1982	2707
16	14	1	169	246	160	163	518	708
16	13	1.5	253	368	233	239	806	1100
16	12	2	338	491	303	310	1116	1525
16	11	2.5	422	614	370	378	1454	1986
16	10	3	506	737	433	443	1824	2491
16	8	4	705	1011	551	563	2689	3674
18	16	1	150	218	143	146	457	624
18	15	1.5	225	328	209	214	707	966
18	14	2	300	437	273	279	975	1332
18	13	2.5	375	546	333	341	1263	1725
18	12	3	450	655	391	400	1573	2149
18	10	4	627	899	500	511	2281	3115
20	17	1.5	203	295	190	194	631	861
20	16	2	270	393	248	253	866	1183
20	15	2.5	338	491	303	310	1116	1525
20	14	3	405	590	357	365	1384	1890
20	13	3.5	494	708	408	417	1671	2283
20	12	4	564	809	458	468	1982	2707
20	10	5	705	1011	551	563	2689	3674

TUBE DIMENSIONS			DESIGN CALCULATION PRESSURES AS PER DIN 2413 (bar)				BURST PRESSURE (bar)	
			LOAD CASE I (STATIC, UP TO +120°C)		LOAD CASE III (DYNAMIC, UP TO +120°C)		AS PER ISO 10763	
O.D. (mm)	I.D. (mm)	T (mm)	E235	E355	E2352	E3553	E2355	E3556
22	20	1	123	179	118	121	370	505
22	19	1.5	184	268	173	177	569	777
22	18	2	245	357	227	232	779	1064
22	17	2.5	307	447	278	285	1000	1366
22	16	3	368	536	328	335	1236	1688
22	15	3.5	449	643	376	384	1486	2030
22	14	4	513	735	422	431	1754	2396
25	22	1.5	162	236	154	157	496	678
25	21	2	216	314	201	206	676	924
25	20	2.5	270	393	248	253	866	1183
25	19	3	324	472	292	299	1065	1455
25	18	3.5	395	566	336	343	1275	1741
25	17	4	451	647	378	386	1496	2044
25	16	4.5	508	728	418	428	1732	2365
25	15	5	564	809	458	468	1982	2707
28	25	1.5	145	211	138	141	440	601
28	24	2	193	281	181	185	598	817
28	23	2.5	241	351	223	228	763	1043
28	22	3	289	421	264	270	936	1278
28	21	3.5	353	506	303	310	1116	1525
28	20	4	403	578	342	349	1306	1783
30	26	2	180	262	170	174	555	758
30	25	2.5	225	328	209	214	707	966
30	24	3	270	393	248	253	866	1183
30	23	3.5	329	472	285	291	1031	1408
30	22	4	376	539	321	329	1203	1644
30	20	5	470	674	391	400	1573	2149
30	18	6	564	809	458	468	1982	2707
35	32	1.5	121	173	111	114	348	475
35	31	2	161	231	147	150	471	643
35	30	2.5	201	289	181	185	598	817
35	29	3	242	347	215	220	730	997
35	27	4	322	462	280	286	1007	1375
35	25	5	403	578	342	349	1306	1783
38	34	2	148	213	136	139	432	589
38	33	2.5	186	266	168	171	547	748
38	32	3	223	319	199	203	667	911
38	30	4	297	426	260	265	917	1253
38	28	5	371	532	318	325	1185	1619
38	26	6	445	639	373	382	1472	2011
38	24	7	519	745	427	436	1783	2436
38	22	8	594	851	478	488	2121	2897
42	39	1.5	101	144	93	96	288	393
42	38	2	134	193	123	126	388	530
42	37	2.5	168	241	153	156	492	672
42	36	3	201	289	181	185	598	817
42	34	4	269	385	237	242	820	1120
42	32	5	336	481	290	297	1055	1441

MEDIA COMPATIBILITY

- Ring.Safe 24° couplings are designed for use with normal commercially available hydraulic fluids at temperatures up to +120°C.
- If intended to be used with non-standard media - eg: low-flammability pressure fluids - please consult our technical helpdesk.