EO-Tubes for fitting- & flange systems

Industrial- and Mobile-Applications
Marine- and Offshore-Applications

Parker

ENGINEERING YOUR SUCCESS.

For your safety!

Under certain circumstances, tubes, fittings and flanges can be subjected to extreme loadings such as vibration and uncontrolled pressure peaks.

Only by using genuine Parker components and following Parker assembly instructions you can be assured of the reliability and safety of the products and their conformity to the applicable standards.

Failure to follow this rule can adversely affect the functional safety and reliability of products, cause personal injury, property damage, and result in loss of your guarantee rights.

Subject to alteration

Content

Tubes for fluid, hydraulic and pneumatic applications

The world of tubes

Your choice for high pressure.

The tube programme from Parker Hannifin gives all possibilities for usage in hydraulic applications. Tubes for fitting- and flange-systems, tubes for mobile and stationary systems. Different dimensions, carbon- and stainless-steel tubes as well as different surfaces are available.

Approved quality.

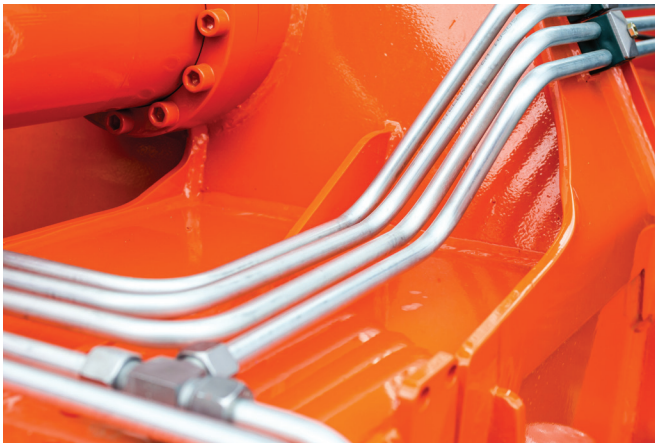
Parker tubes are designed for the special requirements in several markets. Continuous tests in laboratories and on the benches ensure the high quality level of the material. Certifications from independent institutes such as ABS, LR, BV or DNV confirm the adherence to high standards. This opens into reliability and longevity of the hydraulic application.

Worldwide connections.

The Parker Hannifin tube-warehouse with its worldwide network provides a close and prompt supply of high precision tubes; thus, international customers can also rely on us. Efficient, reliable, environmentally friendly and on-time deliveries are available in almost every country in the world.

All around tubes.

This brochure provides all relevant information regarding hydraulic lines in a structured and clear way. Which parameters are important, what kind of tubes and dimensions fit the construction and specifications, and which materials are in use in special applications. With Parker order codes you can start right away…



Certificates

Parker is certified acc. ISO 9001 (Quality management), ISO 14001 (Environment management) and ISO/TS 16949 (Quality management).
On request our tubes & pipes have the relevant certificates for your markets. Please ask for details.

ABS TYPE APPROVED PRODUCT

Lloyd's Register

BUREAU VERITAS 1828 BUREAU VERITAS

DNV·GL

Parker

Complete Piping Solutions and System Supplier

Added Value maximizes your performance

CPS – Complete Piping Solutions.

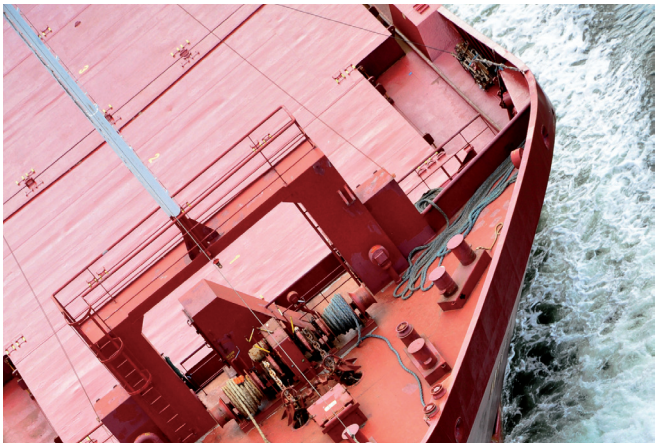
Just tubes! But it gets even better. Many customers like to have the complete Parker programme, and that's what we deliver worldwide based on our "Complete Piping Solutions"-concept. Technical support, reengineering, prefabrication, delivery and installation. These five steps give an effective and environmentally friendly solution from one source

Our integrated knowledge, quality products, contemporary production methods and installation-experience guarantee perfect complete solutions for hydraulic systems. Integration in existing systems is also available. We help our customers right from their project start to highest productivity and timeliness.

Advantages as a system supplier.

Parker Hannifin is the world's leading diversified manufacturer of motion and control technology. The company offers a product portfolio that is exemplary in the breadth and depth, and in constantly keeping quality. Through an international distribution network, the components are delivered quickly.

System solutions are tailored to the customer's situation. Whether DIN or SAE and available anywhere in the world. It will match everything together with a system, and the global design production is nothing in the way to the last detail. Efficient, sustainable and progressive.



Tube and pipe specification

Recommended carbon steel tubes and pipes
Parker recommends the use of cold drawn seamless and regular annealed (abbreviation +N) hydraulic tubes and pipes acc.: DIN-EN 10305 (old DIN 2391) and ISO 3304.
For the assembly of steel fittings, steel tubes made of material E235 (ST37.4 +N) and E355 (ST52.4 +N) are recommended.

+ precision dimension/shape
+ high pressure capability
+ clean inside
+ excellent scaling surface after roll flaring

Recommended stainless steel tubes and pipes
Parker reccommends the use of seamless cold drawn stainless steel tubes and pipes acc. to:
DIN EN 10216-5, ASTM A269/A213, ASTM A312.

EO precision stainless steel tube meets and exceeds these standards. The tolerances of the pipe outer diameter and wall thickness are even closer to ensure a safe interplay with our fitting systems.

For the assembly of stainless steel tube fittings, EO precision stainless steel tubes made of material 316 Ti and 316L are recommended.

+ precision dimension/shape
+ high pressure capability
+ excellent scaling surface after roll flaring

Welded tubes and pipes
Tubes and pipes acc. to below specification but welded and cold redrawn instead of seamless drawn are usually suitable.
Pressure capability might be reduced due to the welding seam zone.
Welding seam quality might effect roll flaring surface results.

Hot rolled pipes
Hot rolled pipes are not recommended for the following reasons:
Hot rolled pipes do not have precision dimensions and may slip in machine dies.
They have scales inside and outside. The inside scales effect the cleanliness level of the fluid and reduces fatigue levels. Used in roll flaring process the scales will contaminate the flaring tools (high cleaning effort) and cause poor flare surface quality.

The required maximum working pressure is calculated either acc. to DIN or DNV.

Material specifications & values

E235+N / St.37.4 (1.0308) acc. to DIN EN 10305-4	
Tensile strength	min. 340 N/mm²
Yield strength	min. 235 N/mm²
Fatigue strength	225 N/mm² [1]
Elongation at break	min.. 25%

E355+N / St.52.4 (1.0580) acc. to DIN EN 10305-4	
Tensile strength	min. 490 N/mm²
Yield strength	min. 355 N/mm²
Fatigue strength	265 N/mm² [2]
Elongation at break	min.. 22 %

316Ti (1.4571) cold drawn (CFA) acc. to DIN EN 10216-5 **316L (1.4404) cold drawn (CFA)[3] acc. to DIN EN 10216-5**	
Tensile strength	min. 500 N/mm²
0.2 % proof stress	min. 210 N/mm²
1 % proof stress	min. 245 N/mm²
Fatigue strength	220 N/mm² [2]
Elongation at break	min. 35 %

316L (1.4404) acc. to ASTM A269 / A213 (CFD) **316L (1.4404) acc. to ASTM A312 / A530**	
Tensile strength	min. 485 N/mm²
Yield strength	min. 170 N/mm²
0.2 % proof stress / 1.6	106 N/mm²
Fatigue strength	220 N/mm² [2]
Elongation at break	min. 35 %

Due to Parker's high quality standards, the DNV-calculation assumes higher values.
(see page 10)

[1] DIN 2413, 6.331
[2] No standard value, Experience value
[3] Strength increase due to cold forming following 1.4571

Tube calculation for industrial and mobile applications acc. to DIN rules

DIN 2413 I, only for static load

Calculation of working pressure of steel tubes for static stress up to 120°C. Corrosion - additional allowancess are not considered for the calculation of pressures. Tubes with a diameter of OD/ ID > 2 are calculated for static stress in accordance with DIN 2413 III, but with K = yield strength.

$$P = \frac{20 * K * s * c}{S * D}$$

P = permissible working pressure [bar]
K = yield strength [N/mm²]
s = tube wall thickness [mm]
c = factor for wall thickness allowance
= 0.8 for Tube-OD 4-5
= 0.85 for Tube-OD 6-8
= 0.9 from Tube-OD 10
= 0.9 for all stainless steel tubes
S = Safety factor = 1.5
D = tube outside diameter [mm]

Burst pressure calculation

Calculation of static burst pressure for seamless tubes acc. to Faupel-von-Mises.

$$BP = R_{p0.2} * 10 \frac{2}{\sqrt{3}} \ln \frac{D}{d} * (2 - \frac{R_{p0.2}}{R_m})$$

BP = Min. static burst pressure [bar]
R = tensile strength [N/mm²]
R_{p02} = 0.2% proof stress, yield strength [N/mm²]
D = Tube outside diameter [mm]r
d = Tube inside diameter [mm]

DIN 2413 III, for dynamic load

Calculation of working pressure of steel tubes for dynamic stress up to 120°C.
Corrosion - additional allowances are not considered for the calculation of pressures.

$$P = \frac{20 * K * s * c}{S * (D + s * c)}$$

P = permissible working pressure [bar]
K = fatigue strength [N/mm²]
s = tube wall thickness [mm]
c = factor for wall thickness allowance
= 0.8 for Tube-OD 4-5
= 0.85 for Tube-OD 6-8
= 0.9 for Tube-OD 10-80
= 0.9 for all stainless steel tubes
S = safety factor = 1.5
D = tube outside diameter [mm]

Tube calculation for marine and offshore acc. to DNV rules

Calculation of working pressure of steel and stainless steel tubes for ship building acc. to DNV Part 4, Chapter 6, Section 6.

$$P = \frac{20 * \sigma_t * e * t_0}{D - t_0}$$

Calculation of burst pressure:

$$BP = \frac{20 * R_m * t_n * a}{D - t_n * a}$$

P = permissible working pressure [bar]
BP = approximate burst pressure [bar]
σ_t = permissible stress [N/mm²] calculated from the lower value off:

stainless steel: $\sigma_t = \frac{R_m}{2.7}$ or $\frac{K}{1.6}$

carbon steel: $\sigma_t = \frac{R_m}{2.7}$ or $\frac{K}{1.8}$

t_0 = tube wall thickness without allowences [mm]

$t_0 = t_n \cdot a - c - b$

t_n = tube wall thickness nominal [mm]
a = factor for wall thickness allowence
= 0.8 for Tube-OD 4-5, 0.85 for Tube-OD 6-8, 0.9 for Tube-OD >=10
= 0.875 for Schedule Pipes
= 0.9 for all stainless steel tubes
b = bending allowence

$$b = \frac{1}{2.5} * \frac{D}{R} * t_0$$

$b = 0.1333 * t_0$ (at R/D=3) $\rightarrow$ $t_0 = \frac{t_n * a - c}{1.1333}$

c = corrosion tolerance, c = 0.3 mm for hydraulic steel tube, c = 0 mm for SS tubes
e = strength ratio: for seamless tubes e = 1
D = tube outside diameter [mm]
R_m = min. tensile strength [N/mm²]
K = min. yield strength or min 0.2% proof stress [N/mm²]

Pressure reductions and temperatures

Required pressure reductions (depending on the material) with reference to the catalogue pressures for higher temperatures.
Both metal fitting material and elastomeric sealing compound have to be selected according to the temperature range of the system.

DNV may require different pressure reduction based on application

Material	Pressure reduction of permissible operating temperatures TB in °C														
	-60	-50	-40	-35	-25	+20	+50	+100	+120	+150	+175	+200	+250	+300	+400
Steel fittings			0%							11%	19%		28%		
Steel flange-systems			10%			0%				11%	19%				
Steel, tubes			0%							19%			27%		
Stainless steel fittings	0%								19%				27%		
Stainless steel flange-systems	0%						5%	15%	23%		29%		33%	37%	42%
Stainless steel, tubes	0%						5,5%	11,5%	21,5%				29%		34%
Sealing material NBR (e.g. Perbunan)															
Sealing material FKM															
Sealing material Polyurethan (P5008)															

Permissible
Ambient temperature of hydraulic and pneumatic applications
Temperature not permissible

Calculation example:
Temperature = 200°C
Material = Stainless steell
Pressure reduction = 29%
Pressure reduction tubes = 21.5%
PN tube 16x2.5/71. DIN2413 III = 362 bar

Formula:

$$PN_{200°C} = \frac{400\ \text{bar}}{100\%} \times (100\% - 29\%) = 284\ \text{bar}$$

$$PN_{\text{tube } 200°C} = \frac{362\ \text{bar}}{100\%} \times (100\% - 21.5\%) = 284\ \text{bar}$$

Flow diameter of tube lines

Determining tube sizes for hydraulic systems

Proper tube material, type and size for a given application and type of fitting are critical for efficient and trouble-free operation of the fluid system. Selection of proper tubing involves choosing the right tube material, and determining the optimum tube size (O.D. and wall thickness).

Proper sizing of the tube for various parts of a hydraulic system results in an optimum combination of efficient and cost effective performance.

A tube that is too small causes high fluid velocity, which has many detrimental effects. In pressure lines, it causes high friction losses and turbulence, both resulting in high pressure drops and heat generation. High heat accelerates wear in moving parts and rapid aging of seals and hoses, all resulting in reduced component life. High heat generation also means wasted energy, and hence, low efficiency. Too large tubes increase system cost. Thus, optimum tube sizing is very critical. The following is a simple procedure for sizing tubes.

Determine required flow diameter
Use table to determine recommended flow diameter for the required flow rate and type of line.

The table is based on the following recommended flow rates that are common in the shipbuilding and offshore engineering.

Pressure lines – 3 →7.2 $\left[\frac{m}{s}\right]$

Return lines – 2 →4.5 $\left[\frac{m}{s}\right]$

Suction lines – 1 →1.8 $\left[\frac{m}{s}\right]$

Avoid flow rates > 8 m/s!
The resulting forces are high and can destroy the tube lines.

If you desire to use different velocities than the above, use the following formula to determine the required flow diameter.

$$\text{Tube – I.D. [mm]} = 4{,}61 \times \sqrt{\frac{\text{Flow } \left[\frac{\text{ltr.}}{\text{min}}\right]}{\text{Velocity } \left[\frac{m}{s}\right]}}$$

Determine required wall thickness

Use tube/pressure calculation tables shown in the tube chapter to determine recommended wall thickness for the required working pressure and flow diameter of the line.
Therefore choose a working pressure which is equal or higher than the required working pressure.

Flow characteristics

Hydraulic systems are in most cases only rated with a flow velocity defined on the basis of experience. The pressure losses in lines are not taken into account, or measured later on when testing the system. As the pressure losses increase porportionally greater than the flow resistance, it is important to achieve the best rating of the system, so that they are already taken into account when planning the tube connections. Calculation is not as difficult as it is often thought, and this chapter is intended to provide a guideline. Besides, it provides information on how excessive pressure losses can be avoided, because pressure losses result in losses in performance and excessive heat. Noise occurs and possibly cavitation in suction lines.

Medium

All indication given with regard to flow restrictions and to flow properties refer exclusively to liquids. For gaseous media, the variable density of the gas must additionally be taken into account.

Units

c = Flow velocity $\left[\frac{m}{s}\right]$

d = Pipe inside diameter [m]
L = Pipe length [m]
p = Pressure [Pa], 1 bar = 100000 Pa

$\dot{V}$ = Flow rate $\left[\frac{m^3}{s}\right]$, $1\frac{m^3}{s} = 60000\frac{l}{min}$
λ = Pipe friction factor

$\upsilon(T)$ = Kinematic viscosity of the medium depending on temperature $\left[\frac{m^2}{s}\right]$

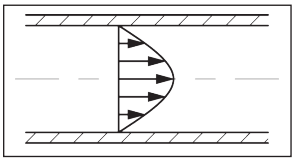
$\rho(T)$ = Density of the medium depending on temperature $\left[\frac{kg}{m^3}\right]$

ζ = Individual pressure loss coefficient

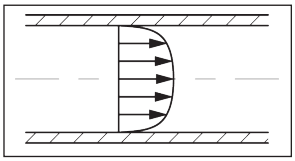
Only base units have been used. This has the advantage that the formula do not contain correction factors and there is no danger of confusion, e.g. that values are used with the wrong unit. In case values are given in other units - the flow rate is e.g. often given in l/min - it is advisable to convert them into the base units before starting calculation.

Pressure losses in pipe lines

To calculate pressure losses in pipe lines, it must first be determined whether there is a laminar or a turbulent flow. Laminar flow is homogenous and without turbulance. In case of turbulent flow, the losses increase much more quickly.



Flow profile
with laminar flow



Flow profile
with turbulent flow

The kind of flow is defined by the Reynolds' number. With a Reynolds' number of more than 2320, the flow changes to turbulent. The Reynolds' number is calculated according to the formula:

$$Re = \frac{c \cdot d}{\upsilon(T)}$$

The Reynolds' number is a non-dimensional number. The critical fluid velocity at which the flow regime can change, is thus calculated from:

$$c_{cr} = 2320 \cdot \frac{\upsilon(T)}{d} \left[\frac{m}{s}\right]$$

With a given flow rate, the fluid velocity can be calculated according to the formula:

$$c = \frac{\dot{V} \cdot 4}{d^2 \cdot \pi} \left[\frac{m}{s}\right]$$

Subsequenctly, the pipe friction factor λ can be calculated. The pipe friction factor λ is a function of the Reynolds' number and also depends on the roughness of the pipe. As hydraulically smooth pipes can generally be assumed in hydraulic applications, the pipe friction factor λ is calculated according to the following formula:

$$\text{laminar flow, } (Re < 2320): \lambda = \frac{64}{Re}$$

$$\textit{turbulent flow, } (Re > 2320): \lambda = \frac{0.3164}{\sqrt[4]{Re}}$$

Finally, if all factors are known, the pressure loss in a certain pipe line can be calculated according to the formula:

$$\Delta p = \lambda \cdot \frac{L}{d} \cdot \frac{\rho(T) \cdot c^2}{2} \text{ [Pa]}$$

Calculation of individual losses

A hydraulic system does not only incorporate pipes, but also valves, fittings, pipe bends etc. that cause flow losses. These individual losses are often much higher than the pipe losses and are calculated according to the following formula:

$$\Delta p = \zeta \cdot \rho(T) \cdot \frac{c^2}{2} \text{ [Pa]}$$

Notes

Material specifications & values for DNV-calculation

Due to Parker's high quality standards, the DNV-calculation assumes higher values for tensile strength and yield strength. These values are experience values. Nominal pressure calculation based on these mechanical properties requires a certification in accordance with 3.1 - EN 10204, which confirms the mechanical properties.

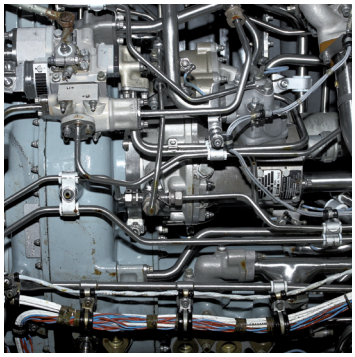
E235+N / St.37.4 (1.0308) acc. to DIN EN 10305-4	
Tensile strength	390 N/mm²
Yield strength	min 235 N/mm²
Proof stress (Yield strength / 1.8)	130.5 N/mm²

E355+N / St.52.4 (1.0580) acc. to DIN EN 10305-4	
Tensile strength	533 N/mm²
Yield strength	min 355 N/mm²
Proof stress (Yield strength / 1.8)	197 N/mm²

316Ti (1.4571) cold drawn (CFA) acc. to DIN EN 10216-5 **316L (1.4404) cold drawn (CFA)[1] acc. to DIN EN 10216-5** **316L (1.4404) acc. to ASTM A269 / A213 (CFD)**	
Tensile strength	530 N/mm²
Yield strength	min 276 N/mm²
Proof stress (0,2 % Yield strength / 1.6)	172.5 N/mm²

316L (1.4404) acc. to ASTM A312 / A530	
Tensile strength	515 N/mm²
Yield strength	min 234 N/mm²
Proof stress (0,2 % Yield strength / 1,6)	146 N/mm²

[1] Strength increase due to cold forming following 1.4571



EO-Tubes for fitting systems

Industrial- and Mobile-Applications

Overview EO-Fitting systems

EO-PSR/DPR

Fitting system with progressive stop ring

The advantages

- Special design of the PSR ring with 2 cutting edges for safe, fast and easy assembly
- Special design of the PSR-ring with noticeable end point of assembly by stop contour
- Spring effect compensates subsidences of tube bite and threads - no retightening necessary

As the inventor of the cutting ring (patent of 1934), Parker is looking back on a long history of this milliontimes proven system.

EO-2®

Fitting system with elastomeric seal

The advantages

- Permanently reliable function due to the leak-free elastomeric seal
- Optimized installation space - Prevention of gap extrusion / abrasion
- Protection of over-/underassembly, due to the "Hit-home-feel"
- Clear assembly result by visual pre-assembly inspection

The common feature of all EO-2 fittings is elastomeric seals on all joints. These are also available in FKM for applications with higher temeratures or aggressive media.

EO2-FORM

High pressure formed tube fitting

The advantages

- Absolutely tear-out proof and thus very reliable function
- Significant time and cost savings compared to welding
- Maximum system performance with minimum component, assembly and storage costs

EO2-FORM is based on the EO-2 product family and is therefore an optimal system solution for all hydraulic applications.

O-Lok®

Tube fitting with O-ring face seal

The advantages

- Reliable function and leak-free operation, due to the specially protected O-ring seal
- Higher lifetime and improved corrosion resistant surface
- Easy assembly due to reduced assembly-torques

O-Lok® fittings consist of a nut, a body, an O-ring and a sleeve. The tube is flanged to 90° using the Parflange® system.

Triple-Lok®

Versatile 37°-flare fitting

The advantages

- Wide range of application due to increased nominal pressures
- Sealing surface is protected separately during transport
- More constructive possibilities through the most comprehensive standard programme.

Triple-Lok® fittings convince due to the simple, reliable design, compact design, easy assembly and worldwide availability.

Overview EO steel tubes for fitting systems

Material				Fitting systems			
E235+N / St.37.4 (1.0308)		E355+N / St.52.4 (1.0580)		DPR PSR EO-2	EO2 FORM	O-Lok®	Triple-Lok®
Surface		Surface					
Phosphated and oiled	Cr(VI)-free	Phosphated and oiled	Cr(VI)-free				
Order code		Order code					
R04X0.5	**R04X0.5CF**			X	-	-	-
	R04X0.75CF			X	-	-	-
R04X1	**R04X1CF**			X	-	-	-
	R05X1CF			X	-	-	-
	R06X0.75CF			X	-	-	-
R06X1	**R06X1CF**			X	X	X	X
R06X1.5	**R06X1.5CF**			X	X	X	X
	R06X2CF			X	X	-	-
R06X2.25	**R06X2.25CF**			X	-	-	-
R08X1	**R08X1CF**			X	X	X	X
R08X1.5	**R08X1.5CF**			X	X	X	X
R08X2	**R08X2CF**			X	X	X	-
	R08X2.5CF			X	X	-	-
R10X1	**R10X1CF**			X	X	X	X
R10X1.5	**R10X1.5CF**			X	X	X	X
R10X2	**R10X2CF**		**R10X2ST52CF**	X	X	X	-
R10X2.5	**R10X2.5CF**			X	-	-	-
	R10X3CF			X	X	-	-
R12X1	**R12X1CF**			X	X	X	X
R12X1.5	**R12X1.5CF**		**R12X1.5ST52CF**	X	X	X	X
R12X2	**R12X2CF**		**R12X2ST52CF**	X	X	X	X
	R12X2.5CF			X	X	-	-
	R12X3CF			X	X	-	-
	R12X3.5CF			X	-	-	-
	R14X1.5CF			X	-	-	-
R14X2	**R14X2CF**			X	-	-	-
R14X2.5	**R14X2.5CF**			X	-	-	-
	R14X3CF			X	-	-	-
R15X1	**R15X1CF**			X	X	X	X
R15X1.5	**R15X1.5CF**		**R15X1.5ST52CF**	X	X	X	X
R15X2	**R15X2CF**		**R15X2ST52CF**	X	X	X	X
R16X1.5	**R16X1.5CF**		**R16X1.5ST52CF**	X	-	X	X
R16X2	**R16X2CF**	**R16X2ST52**	**R16X2ST52CF**	X	X	X	X
R16X2.5	**R16X2.5CF**		**R16X2.5ST52CF**	X	X	X	X
R16X3	**R16X3CF**			X	X	X	-
R18X1	**R18X1CF**			X	-	-	-
R18X1.5	**R18X1.5CF**		**R18X1.5ST52CF**	X	X	X	X
R18X2	**R18X2CF**		**R18X2ST52CF**	X	X	X	X
R18X2.5	**R18X2.5CF**			X	-	-	X
	R18X3CF			X	-	-	X
	R20X1.5CF			X	-	-	-
R20X2	**R20X2CF**		**R20X2ST52CF**	X	X	X	X
R20X2.5	**R20X2.5CF**		**R20X2.5ST52CF**	X	X	X	X
R20X3	**R20X3CF**		**R20X3ST52CF**	X	X	X	X
	R20X3.5CF			X	X	-	-
	R20X4CF			X	-	-	-
R22X1.5	**R22X1.5CF**		**R22X1.5ST52CF**	X	X	X	X
R22X2	**R22X2CF**		**R22X2ST52CF**	X	X	X	X
R22X2.5	**R22X2.5CF**			X	X	X	X
	R22X3CF			X	-	-	X
R25X2	**R25X2CF**			X	X	X	X
R25X2.5	**R25X2.5CF**		**R25X2.5ST52CF**	X	X	X	X
R25X3	**R25X3CF**	**R25X3ST52**	**R25X3ST52CF**	X	X	X	X
R25X4	**R25X4CF**		**R25X4ST52CF**	X	X	X	-
	R25X4.5CF			X	-	-	-
R28X1.5	**R28X1.5CF**			X	-	X	X
R28X2	**R28X2CF**		**R28X2ST52CF**	X	X	X	X
R28X2.5	**R28X2.5CF**			X	X	X	X
R28X3	**R28X3CF**			X	-	X	X

Overview EO steel tubes for fitting systems

Material				Fitting systems			
E235+N / St.37.4 (1.0308)		E355+N / St.52.4 (1.0580)					
Surface		Surface					
Phosphated and oiled	Cr(VI)-free	Phosphated and oiled	Cr(VI)-free	PSR EO-2	EO2-FORM	O-Lok®	Triple-Lok®
Order code		Order code					
	R30X2CF			**X**	**-**	**X**	**X**
R30X2.5	**R30X2.5CF**			**X**	**-**	**X**	**X**
R30X3	**R30X3CF**	**R30X3ST52**	**R30X3ST52CF**	**X**	**X**	**X**	**X**
R30X4	**R30X4CF**		**R30X4ST52CF**	**X**	**X**	**X**	-
R30X5	**R30X5CF**		**R30X5ST52CF**	**X**	**X**	**-**	**-**
R35X2	**R35X2CF**			**X**	**X**	**X**	**X**
R35X2.5	**R35X2.5CF**			**X**	**-**	**X**	**X**
R35X3	**R35X3CF**		**R35X3ST52CF**	**X**	**X**	**X**	**X**
	R35X4CF			**X**	**-**	**-**	**-**
	R38X2.5CF			**X**	**-**	**X**	**X**
R38X3	**R38X3CF**		**R38X3ST52CF**	**X**	**X**	**X**	**X**
R38X4	**R38X4CF**	**R38X4ST52**	**R38X4ST52CF**	**X**	**X**	**X**	**X**
R38X5	**R38X5CF**		**R38X5ST52CF**	**X**	**X**	**X**	**-**
	R38X6CF		**R38X6ST52CF**	**X**	**X**	**-**	**-**
	R38X7CF			**X**	**X**	**-**	**-**
R42X2	**R42X2CF**			**X**	**X**	**-**	**X**
R42X3	**R42X3CF**		**R42X3ST52CF**	**X**	**X**	**-**	**X**
R42X4	**R42X4CF**		**R42X4ST52CF**	**X**	**X**	**-**	**-**
			R42X5ST52CF	**X**	**-**	**-**	**-**

Other sizes on request!

Overview EO stainless steel tubes for fitting systems

Material			Fitting systems			
316Ti (1.4571)	316L (1.4404)					
Surface			DPR EO-2	EO2-FORM	O-Lok®	Triple-Lok®
bright annealed	pickled	bright annealed				
Order code						
R04X171		**R04X1-316BA**	**(X)**	**-**	**-**	**-**
R06X171		**R06X1-316BA**	**X**	**X**	**X**	**X**
R06X1.571		**R06X1.5-316BA**	**X**	**X**	**X**	**X**
R08X171		**R08X1-316BA**	**X**	**X**	**X**	**X**
R08X1.571			**X**	**X**	**X**	**X**
R10X171		**R10X1-316BA**	**X**	**X**	**X**	**X**
R10X1.571		**R10X1.5-316BA**	**X**	**X**	**X**	**X**
R10X271		**R10X2-316BA**	**X**	**X**	**X**	**-**
R12X171		**R12X1-316BA**	**X**	**X**	**X**	**X**
R12X1.571		**R12X1.5-316BA**	**X**	**X**	**X**	**X**
R12X271		**R12X2-316BA**	**X**	**X**	**X**	**X**
R14X1.571			**X**	**-**	**-**	**-**
R14X271			**X**	**-**	**-**	**-**
R14X2.571			**X**	**-**	**-**	**-**
R15X171			**X**	**X**	**X**	**X**
R15X1.571		**R15X1.5-316BA**	**X**	**X**	**X**	**X**
R15X271			**X**	**X**	**X**	**X**
R16X1.571			**X**	**-**	**X**	**X**
R16X271	**R16X2-316**		**X**	**X**	**X**	**X**
R16X2.571	**R16X2.5-316**		**X**	**X**	**X**	**X**
R16X371			**X**	**X**	**X**	**-**
R18X1.571	**R18X1.5-316**		**X**	**X**	**X**	**X**
R18X271	**R18X2-316**		**X**	**X**	**X**	**X**
R20X271	**R20X2-316**		**X**	**X**	**X**	**X**
R20X2.571	**R20X2.5-316**		**X**	**X**	**X**	**X**
R20X371			**X**	**X**	**X**	**X**
R22X1.571			**X**	**X**	**X**	**X**
R22X271	**R22X2-316**		**X**	**X**	**X**	**X**
R25X271	**R25X2-316**		**X**	**X**	**X**	**X**
R25X2.571	**R25X2.5-316**		**X**	**X**	**X**	**X**
R25X371	**R25X3-316**		**X**	**X**	**X**	**X**
R28X1.571			**X**	**-**	**X**	**X**
R28X271	**R28X2-316**		**X**	**X**	**X**	**X**
R28X2.571			**X**	**X**	**X**	**X**
R30X2.571	**R30X2.5-316**		**X**	**-**	**X**	**X**
R30X371	**R30X3-316**		**X**	**X**	**X**	**X**
R30X471			**X**	**X**	**X**	**-**
R35X271			**X**	**X**	**X**	**X**
R35X2.571			**X**	**-**	**X**	**X**
R35X371	**R35X3-316**		**X**	**X**	**X**	**X**
R38X2.571			**X**	**-**	**X**	**X**
	R38X3-316		**-**	**X**	**X**	**X**
R38X471	**R38X4-316**		**X**	**X**	**X**	**X**
	R38X5-316		**X**	**X**	**X**	**-**
	R38X6-316		**X**	**X**	**-**	**-**
R42X271			**X**	**X**	**-**	**X**
R42X371	**R42X3-316**		**X**	**X**	**-**	**X**

(x) DPR available, EO-2 not available

Other sizes on request!

Overview EO stainless steel tubes for fitting systems

Material 316L (1.4404) / Surface bright annealed / Order code	Fitting systems			
	DPR EO-2	EO2-FORM	O-Lok®	Triple-Lok®
R1/8X0.028TP316/I	-	-	**on request**	**on request**
R5/16X0.035TP316/L	-	-	**on request**	**on request**
R1/4X0.035TP316/L	-	-	**on request**	**on request**
R1/4X0.049TP316/L	-	-	**on request**	**on request**
R1/4X0.065TP316/L	-	-	**on request**	**on request**
R3/8X0.035TP316/L	-	-	**on request**	**on request**
R3/8X0.049TP316/L	-	-	**on request**	**on request**
R3/8X0.065TP316/L	-	-	**on request**	**on request**
R1/2X0.035TP316/L	-	-	**on request**	**on request**
R1/2X0.049TP316/L	-	-	**on request**	**on request**
R1/2X0.065TP316/L	-	-	**on request**	**on request**
R1/2X0.083TP316/L	-	-	**on request**	**on request**
R5/8X0.049TP316/L	-	-	**on request**	**on request**
R5/8X0.065TP316/L	-	-	**on request**	**on request**
R3/4X0.049TP316/L	-	-	**on request**	**on request**
R3/4X0.065TP316/L	-	-	**on request**	**on request**
R3/4X0.083TP316/L	-	-	**on request**	**on request**
R3/4X0.095TP316/L	-	-	**on request**	**on request**
R3/4X0.109TP316/L	-	-	**on request**	**on request**
R1X0.065TP316/L	-	-	**on request**	**on request**
R1X0.083TP316/L	-	-	**on request**	**on request**
R1X0.095TP316/L	-	-	**on request**	**on request**
R1X0.126TP316/L	-	-	**on request**	-

Other sizes on request!

Seamless EO steel tubes | Material E235+N / St.37.4 (1.0308)

Acc. to DIN EN 10305-4

1. DIN 2413 I: Tubes with a diameter of OD/ID>2 are calculated for static stress in accordance with DIN 2413 III but with K=yield strength.
2. Evaluated in Parker Lab and Test Field. ( ) = Burst pressure (B.P.) acc. to Faupel-von-Mises

Material E235+N / St.37.4 (1.0308)		d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Desgin pressure 1 DIN 2413 I static PN bar	Desgin pressure DIN 2413 III dynamic PN bar	2 Burst pressure bar	Weight kg/m
Surface: Phosphated and oiled	Surface: Cr(VI)-free								
Order code									
R04X0.5	**R04X0.5CF**	04		0.50	3.0	313	273	1160	0.047
	R04X0.75CF	04	±0.08	0.75	2.5	470	391	1820	0.063
R04X1	**R04X1CF**	04		1.00	2.0	627	500	2700	0.074
	R05X1CF	05	±0.08	1.00	3.0	501	414	2120	0.099
	R06X0.75CF	06		0.75	4.5	333	288	1150	0.103
R06X1	**R06X1CF**	06		1.00	4.0	444	372	1650	0.123
R06X1.5	**R06X1.5CF**	06	±0,08	1.50	3.0	666	526	2550	0.166
	R06X2CF	06		2.00	2.0	692	662	>3500	0.197
R06X2.25	**R06X2.25CF**	06		2.25	1.5	757	725	>3500	0.208
R08X1	**R08X1CF**	08		1.00	6.0	333	288	1175	0.173
R08X1.5	**R08X1.5CF**	08	±0.08	1.50	5.0	499	412	1925	0.240
R08X2	**R08X2CF**	08		2.00	4.0	666	526	2500	0.296
	R08X2.5CF	08		2.50	3.0	658	630	2650	0.339
R10X1	**R10X1CF**	10		1.00	8.0	282	248	900	0.222
R10X1.5	**R10X1.5CF**	10		1.50	7.0	423	357	1450	0.314
R10X2	**R10X2CF**	10	±0.08	2.00	6.0	564	458	2025	0.395
R10X2.5	**R10X2.5CF**	10		2.50	5.0	705	551	2675	0.462
	R10X3CF	10		3.00	4.0	666	638	>3500	0.518
R12X1	**R12X1CF**	12		1.00	10.0	235	209	750	0.271
R12X1.5	**R12X1.5CF**	12		1.50	9.0	353	303	1150	0.388
R12X2	**R12X2CF**	12	±0.08	2.00	8.0	470	391	1600	0.493
	R12X2.5CF	12		2.50	7.0	588	474	2025	0.586
	R12X3CF	12		3.00	6.0	705	551	2600	0.666
	R12X3.5CF	12		3.50	5.0	651	624	(3109)	0.734
	R14X1.5CF	14		1.50	11.0	302	264	975	0.462
R14X2	**R14X2CF**	14	±0.08	2.00	10.0	403	342	1325	0.592
R14X2.5	**R14X2.5CF**	14		2.50	9.0	504	415	1650	0.709
	R14X3CF	14		3.00	8.0	604	485	2200	0.814
R15X1	**R15X1CF**	15		1.00	13.0	188	170	575	0.345
R15X1.5	**R15X1.5CF**	15	±0.08	1.50	12.0	282	248	950	0.499
R15X2	**R15X2CF**	15		2.00	11.0	376	321	1275	0.641
R16X1.5	**R16X1.5CF**	16		1.50	13.0	264	233	850	0.536
R16X2	**R16X2CF**	16	±0.08	2.00	12.0	353	303	1175	0.691
R16X2.5	**R16X2.5CF**	16		2.50	11.0	441	370	1500	0.832
R16X3	**R16X3CF**	16		3.00	10.0	529	433	1850	0.962
R18X1	**R18X1CF**	18		1.00	16.0	157	143	450	0.419
R18X1.5	**R18X1.5CF**	18		1.50	15.0	235	209	700	0.610
R18X2	**R18X2CF**	18	±0.08	2.00	14.0	313	273	975	0.789
R18X2.5	**R18X2.5CF**	18		2.50	13.0	392	333	1300	0.956
	R18X3CF	18		3.00	12.0	470	391	1575	1.111

Surface finish:
- Tubes with I.D. 1.5-5 mm: outside and inside oiled.
- Tubes from 6 mm I.D.: outside and inside phosphated and oiled.

- Cr(VI)-free:
These dimensions are externally thick coat passivated (thickness of coat 8-12µm), inside oilded.

Seamless EO steel tubes (continued) | Material E235+N / St.37.4 (1.0308)

Acc. to DIN EN 10305-4

1. DIN 2413 I: Tubes with a diameter of OD/ID>2 are calculated for static stress in accordance with DIN 2413 III but with K=yield strength.
2. Evaluated in Parker Lab and Test Field.

Material E235+N / St.37.4 (1.0308)		d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure		2 Burst pressure bar	Weight kg/m
Surface						1 DIN 2413 I static PN bar	DIN 2413 III dynamic PN bar		
Phosphated and oiled	Cr(VI)-free								
Order code									
	R20X1.5CF	20	±0.08	1.50	17.0	212	190	675	0.684
R20X2	**R20X2CF**	20		2.00	16.0	282	248	900	0.888
R20X2.5	**R20X2.5CF**	20		2.50	15.0	353	303	1100	1.079
R20X3	**R20X3CF**	20		3.00	14.0	423	357	1400	1.258
	R20X3.5CF	20		3.50	13.0	494	408	1650	1.424
	R20X4CF	20		4.00	12.0	564	458	2000	1.578
R22X1.5	**R22X1.5CF**	22	±0.08	1.50	19.0	192	173	550	0.758
R22X2	**R22X2CF**	22		2.00	18.0	256	227	775	0.986
R22X2.5	**R22X2.5CF**	22		2.50	17.0	320	278	1025	1.202
	R22X3CF	22		3.00	16.0	385	328	1175	1.406
R25X2	**R25X2CF**	25	±0.08	2.00	21.0	226	201	725	1.134
R25X2.5	**R25X2.5CF**	25		2.50	20.0	282	248	850	1.387
R25X3	**R25X3CF**	25		3.00	19.0	338	292	1025	1.628
R25X4	**R25X4CF**	25		4.00	17.0	451	378	1500	2.072
	R25X4.5CF	25		4.50	16.0	508	418	1625	2.275
R28X1.5	**R28X1.5CF**	28	±0.08	1.50	25.0	151	138	425	0.980
R28X2	**R28X2CF**	28		2.00	24.0	201	181	600	1.282
R28X2.5	**R28X2.5CF**	28		2.50	23.0	252	223	750	1.572
R28X3	**R28X3CF**	28		3.00	22.0	302	264	900	1.850
	R30X2CF	30	±0.08	2.00	26.0	188	170	575	1.381
R30X2.5	**R30X2.5CF**	30		2.50	25.0	235	209	725	1.695
R30X3	**R30X3CF**	30		3.00	24.0	282	248	850	1.998
R30X4	**R30X4CF**	30		4.00	22.0	376	321	1175	2.565
R30X5	**R30X5CF**	30		5.00	20.0	470	391	1600	3.083
R35X2	**R35X2CF**	35	±0.15	2.00	31.0	161	147	450	1.628
R35X2.5	**R35X2.5CF**	35		2.50	30.0	201	181	600	2.004
R35X3	**R35X3CF**	35		3.00	29.0	242	215	700	2.367
	R35X4CF	35		4.00	27.0	322	280	960	3.058
	R38X2.5CF	38	±0.15	2.50	33.0	186	168	550	2.189
R38X3	**R38X3CF**	38		3.00	32.0	223	199	675	2.589
R38X4	**R38X4CF**	38		4.00	30.0	297	260	900	3.354
R38X5	**R38X5CF**	38		5.00	28.0	371	318	1150	4.069
	R38X6CF	38		6.00	26.0	445	373	1425	4.735
	R38X7CF	38		7.00	24.0	519	427	1700	5.352
R42X2	**R42X2CF**	42	±0.20	2.00	38.0	134	123	375	1.973
R42X3	**R42X3CF**	42		3.00	36.0	201	181	575	2.885
R42X4	**R42X4CF**	42		4.00	34.0	269	237	850	3.749

Other sizes on request!

Seamless EO steel tubes | Material E355+N / St.52.4 (1.0580)

Acc. to DIN EN 10305-4

1. DIN 2413 I: Tubes with a diameter of OD/ID>2 are calculated for static stress in accordance with DIN 2413 III but with K=yield strength.
2. Burst pressure (B.P.) acc. to Faupel-von-Mises

Material E355+N / St.52.4 (1.0580)		d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure		2 Burst pressure bar	Weight kg/m
Surface						1 DIN 2413 I static PN bar	DIN 2413 III dynamic PN bar		
Phosphated and oiled	Cr(VI)-free								
Order code									
	R10X2ST52CF	10	±0.08	2.00	6.0	852	539	2671	0.395
	R12X1.5ST52CF	12	±0.08	1.50	9.0	533	357	1504	0.388
	R12X2ST52CF	12		2.00	8.0	710	461	2120	0.493
	R15X1.5ST52CF	15	±0.08	1.50	12.0	426	292	1167	0.499
	R15X2ST52CF	15		2.00	11.0	568	379	1622	0.641
	R16X1.5ST52CF	16		1.50	13.0	399	275	1086	0.536
R16X2ST52	**R16X2ST52CF**	16	±0.08	2.00	12.0	533	357	1504	0.691
	R16X2.5ST52CF	16		2.50	11.0	666	436	1959	0.832
	R18X1.5ST52CF	18	±0.08	1.50	15.0	355	247	953	0.610
	R18X2ST52CF	18		2.00	14.0	473	321	1314	0.789
	R20X2ST52CF	20		2.00	16.0	426	292	1167	0.888
	R20X2.5ST52CF	20	±0.08	2.50	15.0	533	357	1504	1.079
	R20X3ST52CF	20		3.00	14.0	639	420	185	1.258
	R22X1.5ST52CF	22	±0.08	1.50	19.0	290	204	767	0.758
	R22X2ST52CF	22		2.00	18.0	387	267	1049	0.986
	R25X2.5ST52CF	25		2.50	20.0	426	292	1167	1.387
R25X3ST52	**R25X3ST52CF**	25	±0.08	3.00	19.0	511	344	1435	1.628
	R25X4ST52CF	25		4.00	17.0	682	445	2016	2.072
	R28X2ST52CF	28	±0.08	2,00	24.0	304	213	806	1.282
R30X3ST52	**R30X3ST52CF**	30		3.00	24.0	426	292	1167	1.998
	R30X4ST52CF	30	±0.08	4.00	22.0	568	379	1622	2.565
	R30X5ST52CF	30		5.00	20.0	710	461	2120	3.083
	R35X3ST52CF	35	±0.15	3.00	29.0	365	253	983	2.367
	R38X3ST52CF	38		3.00	32.0	336	234	899	2.589
R38X4ST52	**R38X4ST52CF**	38	±0.15	4.00	30.0	448	306	1236	3.354
	R38X5ST52CF	38		5.00	28.0	561	374	1597	4.069
	R38X6ST52CF	38		6.00	26.0	673	440	1984	4.735
	R42X3ST52CF	42		3.00	36.0	304	213	806	2.885
	R42X4ST52CF	42	±0.20	4.00	34.0	406	279	1105	3.748
	R42X5ST52CF	42		5.00	32.0	507	342	1422	4.562

Surface finish:
- Tubes with I.D. 1.5-5 mm: outside and inside oiled.
- Tubes from 6 mm I.D.: outside and inside phosphated and oiled.

- Cr(VI)-free:
These dimensions are externally thick coat passivated (thickness of coat 8-12µm), inside oilded.

Other sizes on request!

Seamless EO stainless steel tubes | Material 316Ti (1.4571)

Acc. to DIN EN 10216-5, DIN EN 10305-1

1. DIN 2413 I: Tubes with a diameter of OD/ID>2 are calculated for static stress in accordance with DIN 2413 III but with K=yield strength.
2. Evaluated in Parker Lab and Test Field. ( ) = Burst pressure (B.P.) acc. to Faupel-von-Mises

Material 316Ti (1.4571) Surface bright annealed Order code	d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure 1 DIN 2413 I static PN bar	Design pressure DIN 2413 III dynamic PN bar	2 Burst pressure bar	Weight kg/m
R04X171	04	±0.08	1.0	2.0	735	539	(2961)	0.075
R06X171	06	±0.08	1.0	4.0	490	383	1850	0.125
R06X1.571	06		1.5	3.0	735	539	2900	0.169
R08X171	08	±0.08	1.0	6.0	368	297	1300	0.175
R08X1.571	08		1.5	5.0	551	424	2050	0.244
R10X171	10	±0.08	1.0	8.0	294	242	950	0.225
R10X1.571	10		1.5	7.0	441	349	1750	0.319
R10X271	10		2.0	6.0	588	447	2400	0.401
R12X171	12	±0.08	1.0	10.0	245	205	850	0.275
R12X1.571	12		1.5	9.0	368	297	1400	0.394
R12X271	12		2.0	8.0	490	383	1900	0.501
R14X1.571	14	±0.08	1.5	11.0	315	258	1200	0.469
R14X271	14		2.0	10.0	420	334	1550	0.601
R14X2.571	14		2.5	9.0	525	406	2100	0.720
R15X171	15	±0.08	1.0	13.0	196	166	675	0.351
R15X1.571	15		1.5	12.0	294	242	1100	0.507
R15X271	15		2.0	11.0	392	314	1400	0.651
R16X1.571	16	±0.08	1.5	13.0	276	228	950	0.545
R16X271	16		2.0	12.0	368	297	1300	0.701
R16X2.571	16		2.5	11.0	459	362	1850	0.845
R16X371	16		3.0	10.0	551	424	2400	0.977
R18X1.571	18	±0.08	1.5	15.0	245	205	800	0.620
R18X271	18		2.0	14.0	327	267	1150	0.801
R20X271	20	±0.08	2.0	16.0	294	242	1050	0.901
R20X2.571	20		2.5	15.0	368	297	1400	1.095
R20X371	20		3.0	14.0	441	349	1800	1.277
R22X1.571	22	±0.08	1.5	19.0	200	170	650	0.770
R22X271	22		2.0	18.0	267	222	900	1.002
R25X271	25	±0.08	2.0	21.0	235	197	763	1.152
R25X2.571	25		2.5	20.0	294	242	1050	1.408
R25X371	25		3.0	19.0	353	286	1275	1.653
R28X1.571	28	±0.08	1.5	25.0	158	135	550	0.995
R28X271	28		2.0	24.0	210	177	700	1.302
R28X2.571	28		2.5	23.0	263	218	(840)	1.596
R30X2.571	30	±0.08	2.5	25.0	245	205	850	1.722
R30X371	30		3.0	24.0	294	242	1150	2.028
R30X471	30		4.0	22.0	392	314	1500	2.605
R35X271	35	±0.15	2.0	31.0	168	143	550	1.653
R35X2.571	35		2.5	30.0	210	177	(659)	2.035
R35X371	35		3.0	29.0	252	210	(803)	2.404
R38X2.571	38	±0.15	2.5	33.0	193	164	628	2.222
R38X471	38		4.0	30.0	309	254	1150	3.405
R42X271	42	±0.20	2.0	38.0	140	121	475	2.003
R42X371	42		3.0	36.0	210	177	750	2.930

Other sizes on request!

Seamless EO stainless steel tubes | Material 316L (1.4404)

Acc. to DIN 10216-5, DIN 10305-1 (-316BA); ASTM A269/A213 (-316)

1. Due to Parker's high quality standards, the pickled tubes (-316) are calculated according to the values of bright annealed tubes (-316BA). Nominal pressure calculation based on these mechanical properties requires certification in accordance with 3.1 - EN 10204, which confirms the mechanical properties
2. DIN 2413 I static pressure (W.P.) capability for straight pipe including manufacturing tolerance.
3. Burst pressure (B.P.) acc. to Faupel-von-Mises

Material 316L (1.4404)		d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure		3 Burst pressure bar	Weight kg/m
Surface						2 DIN 2413 I static PN bar	DIN 2413 III dynamic PN bar		
1 pickled	bright annealed								
Order code									
	R04X1-316BA	04	±0.08	1.0	2.0	735	539	2961	0.075
	R06X1-316BA	06	±0.08	1.0	4.0	490	383	1732	0.125
	R06X1.5-316BA	06		1.5	3.0	735	539	2961	0.169
	R08X1-316BA	08	±0.08	1.0	6.0	368	297	1229	0.175
	R10X1-316BA	10	±0.08	1.0	8.0	294	242	953	0.225
	R10X1.5-316BA	10		1.5	7.0	441	349	1524	0.319
	R10X2-316BA	10		2.0	6.0	588	447	2182	0.401
	R12X1-316BA	12	±0.08	1.0	10.0	245	205	779	0.275
	R12X1.5-316BA	12		1.5	9.0	368	297	1229	0.394
	R12X2-316BA	12		2.0	8.0	490	383	1732	0.501
	R15X1.5-316BA	15	±0.08	1.5	12.0	294	242	953	0.507
R16X2-316		16	±0.08	2.0	12.0	368	297	1229	0.701
R16X2.5-316		16		2.5	11.0	459	362	1601	0.845
R18X1.5-316		18	±0.08	1.5	15.0	245	205	779	0.620
R18X2-316		18		2.0	14.0	327	267	1074	0.801
R20X2-316		20	±0.08	2.0	16.0	294	242	953	0.901
R20X2.5-316		20		2.5	15.0	368	297	1229	1.096
R22X2-316		22	±0.08	2.0	18.0	267	222	857	1.002
R25X2-316		25	±0.08	2.0	21.0	235	197	745	1.152
R25X2.5-316		25		2.5	20.0	294	242	953	1.409
R25X3-316		25		3.0	19.0	353	286	1172	1.653
R28X2-316		28	±0.08	2.0	24.0	210	177	659	1.302
R30X2.5-316		30	±0.08	2.5	25.0	245	205	779	1.722
R30X3-316		30		3.0	24.0	294	242	953	2.028
R35X3-316		35	±0.15	3.0	29.0	252	210	803	2.404
R38X3-316		38	±0.15	3.0	32.0	232	195	734	2.629
R38X4-316		38		4.0	30.0	309	254	1010	3.405
R38X5-316		38		5.0	28.0	387	311	1305	4.132
R38X6-316		38		6.0	26.0	464	365	1621	4.808
R42X3-316		42	±0.20	3.0	36.0	210	177	659	2.930

Other sizes on request!

Seamless EO stainless steel tubes | Material 316L (1.4404/1.4435)

Acc. to DIN EN 10216-5, DIN EN 10305-1

1. DIN 2413 I: Tubes with a diameter of OD/ID>2 are calculated for static stress in accordance with DIN 2413 III but with K=yield strength.
2. Burst pressure (B.P.) calculation acc. to Faupel-von-Mises

Material 316 L (1.4404) Surface bright annealed Order code	d_a Outer-Ø (mm)		s Wallthickness		d Inner-Ø (mm)	Design pressure 1 DIN 2413 I static PN bar	DIN 2413 III dynamic PN bar	2 Burst pressure bar	Weight kg/m
	Inch	mm	Inch	mm					
R1/8X0.028TP316/L	1/8	3.18	0.028	0.71	1.76	659	492	2538	0.044
R3/16X0.035TP316/L	3/16	4.76	0.035	0.89	2.98	549	422	1996	0.086
R1/4X0.035TP316/L	1/4	6.35	0.035	0.89	4.57	412	328	1403	0.122
R1/4X0.049TP316/L			0.049	1.24	3.87	576	440	2126	0.159
R1/4X0.065TP316/L			0.065	1.65	3.05	619	556	3135	0.194
R3/8X0.035TP316/L	3/8	9.53	0.035	0.89	7.75	274	227	883	0.193
R3/8X0.049TP316/L			0.049	1.24	7.05	384	309	1294	0.257
R3/8X0.065TP316/L			0.065	1.65	6.23	510	396	1818	0.326
R1/2X0.035TP316/L	1/2	12.70	0.035	0.89	10.92	206	174	644	0.263
R1/2X0.049TP316/L			0.049	1.24	10.22	288	238	932	0.356
R1/2X0.065TP316/L			0.065	1.65	9.40	382	307	1286	0.457
R1/2X0.083TP316/L			0.083	2.11	8.48	488	381	1724	0.560
R5/8X0.049TP316/L	5/8	15.88	0.049	1.24	13.40	230	193	729	0.455
R5/8X0.065TP316/L			0.065	1.65	12.58	306	251	996	0.588
R3/4X0.049TP316/L	3/4	19.05	0.049	1.24	16.57	192	163	598	0.553
R3/4X0.065TP316/L			0.065	1.65	15.75	255	212	813	0.719
R3/4X0.083TP316/L			0.083	2.11	14.83	325	266	1069	0.895
R3/4X0.095TP316/L			0.095	2.41	14.23	372	300	1248	1.004
R3/4X0.109TP316/L			0.109	2.77	13.51	427	339	1467	1.129
R1X0.065TP316/L	1	25.40	0.065	1.65	22.10	191	162	595	0.981
R1X0.083TP316/L			0.083	2.11	21.18	244	204	775	1.231
R1X0.095TP316/L			0.095	2.41	20.58	279	231	900	1.387
R1X0.126TP316/L			0.126	3.20	19.00	370	299	1240	1.779

Other sizes on request!

Notes

EO-Tubes for flange systems

Marine- and Offshore-Applications
Industrial- and Mobile-Applications

Overview EO flange systems

The Parflange® F37 Programme consists of two flange connection technologies:
The 37° Flare Flange Connection and the Retaining Ring Connection.

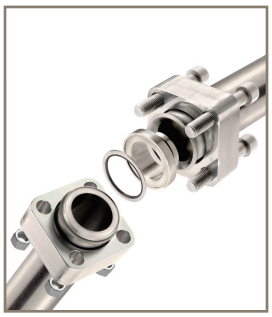
F37 Flaring system

The advantages

- No welding
- No post-weld cleaning
- No welding stress corrosion possible
- No "hot work" permit required
- Workshop prefabrication
- Easy dismantling and reassembling

In this configuration, the deburred tube end is flared orbitally to 37° by Parflange® technology. An insert, soft sealed by an O-ring, is located into each pipe end. In between a F37 Seal (optionally Bonded Seal or O-ring) is placed. By tightening the flanges together, a soft sealed, high pressure tube connection is made. Available as tube-to-tube connection or tube-to-port connection.
The Parflange® F37 flanged connector system is utilising this orbital tube forming technology for tubing assemblies from 16 to 168.3 mm (1/2" to 6" Flanges) outside diameter. It is intended for tube wall thickness up to 9 mm and pressure ratings up to 420 bar. It is available as a high pressure version from 1 1/2" to 10" and as a newly developed SAE 1000 (50-70 bar) version.

F37 Retaining ring system



The advantages

- No welding
- No post-weld cleaning
- No welding stress corrosion possible
- No "hot work" permit required
- Workshop prefabrication
- Easy dismantling and reassembling

The retaining ring used in this connection is a stainless steel segmented ring covered by a stainless steel spring. It is assembled in a machined groove on the tube end or adapter. When tightening this system, the flange is pushed against the retaining ring, thus giving a form tight connection. Retaining ring connections complete the Parflange® F37 range with bulkhead, male, female, weld and tube bend connections.
It is available as a high pressure version from 1 1/2" to 10" and as a newly developed SAE 1000 (50-70 bar) version.

HPF - High Performance flange system

The advantages

- With HPF zinc-plated tubes can be used
- Welding seams must not be descaled and stained
- Tubes assembled with HPF do not require any cleaning
- The flanging process does not cause noxious gases, thus eliminating explosion and fire hazards

Parker's HPF system has been specially designed and developed to meet the requirements of mobile hydraulic and industrial equipment: high perfomance and high pressure. The HPF system is adjusted to standard tube dimensions used in these industries. Diameters from 25 to 150 mm and wall thicknesses up to 17.5 mm. The system is designed for flange patterns according to ISO 6162-1 (SAE J518, code 61), ISO 6162-2 (SAE J518, code 62) and ISO 6164.

The lockring constitutes the core of the HPF connector. It is specially hardened, phosphated and manufactured with a particular contour. This ring supporting the tube on the outside provides additional tear-off safety for the connection. Depending on the size of the tube the safety function of the lockring is substituted for a specially designed and hardened one-piece flange with an adapted internal contour. An insert is placed into the flared end of the tube. On the port side the sealing is guaranteed selectively by a special profile seal or an O-ring seal, on the tube side by an O-ring seal. The application of these soft-sealing elements both on the port side and the tube side guarantees the gas leak tightness of the HPF connector. As the insert does not have a toothed profile, it can be easily assembled repeatedly.

Overview EO steel tubes for flange systems

Material E235+N / St.37.4 (1.0308)		Flange system		
Surface		F37 Flare	F37 Retaining ring	HPF
Phosphated and oiled	Cr(VI)-free			
Order code				
R12X1.5	R12X1.5CF	-	X*	-
R16X2	R16X2CF	X	X*	-
R18X2	R18X2CF	X	X*	-
R20X2	R20X2CF	X	-	-
R20X2.5	R20X2.5CF	X	X*	-
R25X2.5	R25X2.5CF	X	X*	-
R25X3	R25X3CF	X	X*	-
R30X3	R30X3CF	X	X*	-
R30X4	R30X4CF	X	X*	-
	R38X2.5CF	X	-	-
R38X3	R38X3CF	X	-	-
R38X4	R38X4CF	X	X*	-
R38X5	R38X5CF	X	X*	-
R38X7		-	X*	-
R42X2	R42X2CF	X	-	-
R42X3	R42X3CF	X	X*	-
R42X4	R42X4CF	X	X*	-
R50X3	R50X3CF	X	X*	-
R50X6		X	X*	-
R60X3	R60X3CF	X	X*	-
R65X8		-	X*	-
R75X3	R75X3CF	X	X*	-
R90X3.5	R90X3.5CF	X	X*	-
R100X4		X	X*	-
R115X4		X	-	-
R140X4.5		X	X*	-
R165X5		X	X*	-
R220X6		X	X*	-
R273X6		X	X*	-

Material E355+N / St.52.4 (1.0580)		Flange system		
Surface		F37 Flare	F37 Retaining ring	HPF
Phosphated and oiled	Cr(VI)-free			
Order code				
	R12X1.5ST52CF	-	X*	-
R16X2ST52	R16X2ST52CF	X	X*	-
	R18X2ST52CF	X	X*	-
	R20X2ST52CF	X	-	-
R20X2.5ST52	R20X2.5ST52CF	X	X*	-
	R25X2.5ST52CF	X	X*	-
R25X3ST52	R25X3ST52CF	X	X*	X
	R25X4ST52CF	-	-	X
R30X3ST52	R30X3ST52CF	X	X*	-
	R30X4ST52CF	X	X*	X
	R30X5ST52CF	-	-	X
	R38X3ST52CF	X	-	-
R38X4ST52	R38X4ST52CF	X	X*	X
	R38X5ST52CF	X	X*	X
	R38X6ST52CF	-	-	X
	R39X7.5ST52CF	-	X	-
	R42X3ST52CF	X	X*	-
	R42X4ST52CF	X	X*	X
	R42X5ST52CF	-	-	X
	R46X8ST52CF	-	X*	-
	R50X3ST52CF	X	X*	X
R50X5ST52	R50X5ST52CF	X	X*	X
	R50X6ST52CF	X	X*	X
	R50X8ST52CF	-	-	X
R56X8.5ST52	R56X8.5ST52CF	-	X	-
	R60X3ST52CF	X	X*	-
	R60X5ST52CF	X	X*	X
R60X6ST52	R60X6ST52CF	X	X*	X
	R60X8ST52CF	-	X*	X
R60X10St52		-	X*	X
	R65X8ST52CF	-	X*	X
R66X8.5ST52	R66X8.5ST52CF	-	X	X
R73X7ST52	R73X7ST52CF	X	X*	X
R75X5ST52	R75X5ST52CF	X	X*	-
R75X12.5ST52		-	-	X
R80X3ST52		-	-	X
R80X8ST52		-	-	X
R80X10ST52		-	X	X
R88X14ST52		-	-	X
R90X3.5ST52		X	X*	-
R90X5ST52		X	X*	X
R90X9ST52		X	X*	X
R97X12ST52		-	X	X
R101.6X16ST52		-	-	X
R114.3X17.5ST52		-	X	X
R115X15ST52		-	X	X
R120X20ST52		-	-	X
R130X15ST52		-	X	X
R150X15ST52		-	X	X
R190X20ST52		-	X	-
R250X25ST52		-	X	-

X*= Retaining ring weld adapter

Other sizes on request!

Overview EO stainless steel tubes for flange systems

Material 316Ti (1.4571) Surface bright annealed Order code	Flange system F37 Flare	F37 Retaining ring	HPF
R12X1.571	-	X*	-
R16X271	X	X*	-
R18X271	X	X*	-
R20X271	X	-	-
R20X2.571	X	X*	-
R25X2.571	X	X*	-
R25X371	X	X*	-
R30X371	X	X*	-
R30X471	X	X*	-
R38X2.571	X	-	-
R38X471	X	X*	-
R42X371	X	X*	-

Material 316L (1.4404) Surface pickled / bright annealed Order code		Flange system F37 Flare	F37 Retaining ring	HPF
	R12X1.5-316BA	-	X*	-
R16X2-316		X	X*	-
R18X2-316		X	X*	-
R20X2-316		X	-	-
R20X2.5-316		X	X*	-
R25X2.5-316		X	X*	-
R25X3-316		X	X*	-
R30X3-316		X	X*	-
R30X4-316		X	X*	-
R38X2.5-316		X	-	-
R38X3-316		X	-	-
R38X4-316		X	X*	-
R38X5-316		X	X*	-
R42X3-316		X	X*	-
R50X3-316		X	X*	-
R50X5-316		X	X*	-
R50X6-316		X	X*	-
R60X3-316		X	X*	-
R60X5-316		X	X*	-
R60X6-316		X	X*	-
R66X8.5-316		-	X	-
R73X7-316		-	X*	-
R75X3-316		X	X*	-
R75X5-316		X	X*	-
R80X10-316		-	X	-

X*= Retaining ring weld adapter

Material 316L (1.4404) Surface pickled Order code	Flange system F37 Flare	F37 Retaining ring	HPF
R21.34X2.11-316	on request	X*	-
R21.34X2.77-316	on request	X*	-
R21.34X3.73-316	on request	X*	-
R21.34X4.78-316	-	X*	-
R26.67X2.11-316	on request	X*	-
R26.67X2.87-316	on request	X*	-
R26.67X3.91-316	on request	X*	-
R26.67X5.56-316	-	X*	-
R33.40X2.77-316-A999	on request	X*	-
R33.40X3.38-316-A999	on request	X*	-
R33.40X4.55-316-A999	-	X*	-
R33.40X6.35-316-A999	-	X*	-
R42.16X2.77-316-A999	on request	X*	-
R42.16X3.56-316-A999	on request	X*	-
R42.16X4.85-316-A999	on request	X*	-
R42.16X6.35-316-A999	-	X*	-
R48.26X2.77-316-A999	on request	X*	-
R48.26X3.68-316-A999	on request	X*	-
R48.26X5.08-316-A999	on request	X*	-
R48.26X7.14-316-A999	-	X*	-
R60.33X2.77-316-A999	on request	X*	-
R60.33X3.92-316-A999	on request	X*	-
R60.33X5.54-316-A999	on request	X*	-
R60.33X8.74-316-A999	-	X*	-
R73.03X3.05-316-A999	on request	X*	-
R73.03X5.16-316-A999	on request	X*	-
R73.03X7.01-316-A999	on request	X*	-
R73.03X9.52-316-A999	-	X	-
R88.90X3.05-316	X	X*	-
R88.90X5.49-316-A999	on request	X*	-
R88.90X7.62-316-A999	on request	X*	-
R88.90X11.13-316-A999	-	X	-
R114.30X3.05-316-A999	on request	X*	-
R114.30X6.02-316-A999	on request	X*	-
R114.30X8.56-316-A999	-	X*	-
R114.30X13.49-316-A999	-	X	-
R141.30X6.55-316-A999	on request	X*	-
R141.30X9.53-316-A999	-	X*	-
R141.30X15.88-316-A999	-	X	-
R168.26X3.40-316	on request	X*	-
R168.28X7.11-316-A999	-	X*	-
R168.28X18.26-316-A999	-	X	-
R219.08X8.18-316	-	X*	-
R219.08X23.01-316-A999	-	X	-
R273.05X25.40-316-A999	-	X	-

Other sizes on request!

Seamless EO steel tubes | Material E235+N / St.37.4 (1.0308)

Acc. to DIN EN 10305-1

1. DNV Bended pipe including manufacturing and corrosion tolerances.
2. DNV Straight pipe including manufacturing and corrosion tolerances.
3. Burst pressure (B.P.) calculation = Based on Tensile value, wall thickness tolerance not included.

Material E235+N / St.37.4 (1.0308)		d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure		3 Burst pressure bar	Weight kg/m
Surface						1 DNV PN bar	2 DNV PN bar		
Phosphated and oiled	Cr(VI)-free								
Order code									
R12X1.5	**R12X1.5CF**	12	±0.08	1.5	9.0	218	250	1114	0.388
R16X2	**R16X2CF**	16	±0.08	2.0	12.0	235	270	1114	0.691
R18X2	**R18X2CF**	18	±0.08	2.0	14.0	207	237	975	0.789
R20X2	**R20X2CF**	20	±0.08	2.0	16.0	185	212	867	0.888
R20X2.5	**R20X2.5CF**	20		2.5	15.0	246	282	1114	1.079
R25X2.5	**R25X2.5CF**	25	±0.08	2.5	20.0	193	221	867	1.387
R25X3	**R25X3CF**	25		3.0	19.0	242	277	1064	1.628
R30X3	**R30X3CF**	30	±0.08	3.0	24.0	198	227	867	1.998
R30X4	**R30X4CF**	30		4.0	22.0	281	323	1200	2.565
	R38X2.5CF	38	±0.15	2.5	33.0	124	141	549	2.189
R38X3	**R38X3CF**	38		3.0	32.0	154	176	669	2.589
R38X4	**R38X4CF**	38		4.0	30.0	217	248	918	3.354
R38X5	**R38X5CF**	38		5.0	28.0	282	324	1182	4.069
R42X2	**R42X2CF**	42	±0.20	2.0	38.0	85	97	390	1.973
R42X3	**R42X3CF**	42		3.0	36.0	139	158	600	2.885
R42X4	**R42X4CF**	42		4.0	34.0	194	223	821	3.748
R50X3	**R50X3CF**	50	±0.20	3.0	44.0	115	132	498	3.477
R50X6		50		6.0	38.0	258	296	1064	6.511
R60X3	**R60X3CF**	60	±0.25	3.0	54.0	95	109	411	4.217
R65X8		65	±0.30	8.0	49.0	270	310	1095	11.245
R75X3	**R75X3CF**	75	±0.35	3.0	69.0	76	86	325	5.327
R90X3.5	**R90X3.5CF**	90	±0.40	3.5	83.0	75	85	316	7.466
R100X4		100	±0.45	4.0	92.0	78	89	325	9.470
R115X4		115	±0.50	4.0	107.0	68	77	281	10.949
R140X4.5		140	±0.70	4.5	131.0	63	72	259	15.037
R165X5		165	±0.90	5.0	155.0	60	68	244	19.729
R220X6		220	±1.10	6.0	208.0	55	62	219	31.665
R273X6		273	±1.40	6.0	261.0	44	50	175	39.507

Surface finish:
- Tubes with I.D. 1.5-5 mm: outside and inside oiled.
- Tubes from 6 mm I.D.: outside and inside phosphated and oiled.

- Cr(VI)-free:
These dimensions are externally thick coat passivated (thickness of coat 8-12µm), inside oilded.

Other sizes on request!

Seamless EO steel tubes | Material E235+N / St.37.4 (1.0308)

Acc. to DIN EN 10305-1

1. DIN 2413 I static pressure (W.P.) capability for straight pipe including manufacturing tolerance.
2. DIN 2413 III dynamic pressure (W.P.) capability for straight pipe including manufacturing tolerance.
3. Burst pressure (B.P.) calculation acc. to Faupel-von-Mises

Material E235+N / St.37.4 (1.0308)		d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure		3 Burst pressure bar	Weight kg/m
Surface						1 DIN 2413 I static PN bar	2 DIN 2413 III dynamic PN bar		
Phosphated and oiled	Cr(VI)-free								
Order code									
R12X1.5	**R12X1.5CF**	12	±0.08	1.5	9.0	353	303	1022	0.388
R16X2	**R16X2CF**	16	±0.08	2.0	12.0	353	303	1022	0.691
R18X2	**R18X2CF**	18	±0.08	2.0	14.0	313	273	893	0.789
R20X2	**R20X2CF**	20	±0.08	2.0	16.0	282	248	793	0.888
R20X2.5	**R20X2.5CF**	20		2.5	15.0	353	303	1022	1.079
R25X2.5	**R25X2.5CF**	25	±0.08	2.5	20.0	282	248	793	1.387
R25X3	**R25X3CF**	25		3.0	19.0	338	292	975	1.628
R30X3	**R30X3CF**	30	±0.08	3.0	24.0	282	248	793	1.998
R30X4	**R30X4CF**	30		4.0	22.0	376	321	1102	2.565
	R38X2.5CF	38	±0.15	2.5	33.0	186	168	501	2.189
R38X3	**R38X3CF**	38		3.0	32.0	223	199	610	2.589
R38X4	**R38X4CF**	38		4.0	30.0	297	260	840	3.354
R38X5	**R38X5CF**	38		5.0	28.0	371	318	1085	4.069
R42X2	**R42X2CF**	42	±0.20	2.0	38.0	134	123	355	1.973
R42X3	**R42X3CF**	42		3.0	36.0	201	181	547	2.885
R42X4	**R42X4CF**	42		4.0	34.0	269	237	750	3.748
R50X3	**R50X3CF**	50	±0.20	3.0	44.0	169	154	454	3.477
R50X6		50		6.0	38.0	338	292	975	6.511
R60X3	**R60X3CF**	60	±0.25	3.0	54.0	141	129	374	4.217
R65X8		65	±0.30	8.0	49.0	347	299	1004	11.245
R75X3	**R75X3CF**	75	±0.35	3.0	69.0	113	104	296	5.327
R90X3.5	**R90X3.5CF**	90	±0.40	3.5	83.0	110	101	288	7.466
R100X4		100	±0.45	4.0	92.0	113	104	296	9.470
R115X4		115	±0.50	4.0	107.0	98	91	256	10.949
R140X4.5		140	±0.70	4.5	131.0	91	84	236	15.037
R165X5		165	±0.90	5.0	155.0	85	80	222	19.729
R220X6		220	±1.10	6.0	208.0	77	72	199	31.665
R273X6		273	±1.40	6.0	261.0	62	58	160	39.507

Surface finish:
- Tubes with I.D. 1.5-5 mm: outside and inside oiled.
- Tubes from 6 mm I.D.: outside and inside phosphated and oiled.

- Cr(VI)-free:
These dimensions are externally thick coat passivated (thickness of coat 8-12µm), inside oilded.

Other sizes on request!

Seamless EO steel tubes | Material E355+N / St.52.4 (1.0580)

Acc. to DIN EN 10305-1

1. DNV Bended pipe including manufacturing and corrosion tolerances.
2. DNV Straight pipe including manufacturing and corrosion tolerances.
3. Burst pressure (B.P.) calculation = Based on Tensile value, wall thickness tolerance not included.

Material E355+N / St. 52.4 (1.0580)		d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure		3 Burst pressure bar	Weight kg/m
Surface						1 DNV PN bar	2 DNV PN bar		
Phosphated and oiled	Cr(VI)-free								
Order code									
	R12X1.5ST52CF	12	±0.08	1.5	9.0	330	378	1523	0.388
R16X2ST52	**R16X2ST52CF**	16	±0.08	2.0	12.0	355	408	1523	0.691
	R18X2ST52CF	18	±0.08	2.0	14.0	313	358	1333	0.789
R20X2ST52	**R20X2ST52CF**	20	±0.08	2.0	16.0	279	319	1184	0.888
R20X2.5ST52	**R20X2.5ST52CF**	20		2.5	15.0	371	426	1523	1.079
	R25X2.5ST52CF	25		2.5	20.0	291	333	1184	1.387
R25X3ST52	**R25X3ST52CF**	25	±0.08	3.0	19.0	365	418	1454	1.628
	R25X4ST52CF	25		4.0	17.0	519	599	2030	2.072
R30X3ST52	**R30X3ST52CF**	30		3.0	24.0	299	343	1184	1.998
	R30X4ST52CF	30	±0.08	4.0	22.0	424	487	1640	2.565
	R30X5ST52CF	30		5.0	20.0	555	641	2132	3.083
	R38X3ST52CF	38		3.0	32.0	233	266	914	2,589
R38X4ST52	**R38X4ST52CF**	38	±0.15	4.0	30.0	327	375	1254	3.354
	R38X5ST52CF	38		5.0	28.0	426	490	1615	4.069
	R38X6ST52CF	38		6.0	26.0	529	611	1999	4.735
	R39X7.5ST52CF	39	±0.15	7.5	24.0	673	781	2538	5.826
	R42X3ST52CF	42		3.0	36.0	209	239	820	2.885
	R42X4ST52CF	42	±0.20	4.0	34.0	294	336	1122	3.748
	R42X5ST52CF	42		5.0	32.0	381	438	1441	4.562
	R46X8ST52CF	46	±0.20	8.0	30.0	601	695	2244	7.497
	R50X3ST52CF	50		3.0	44.0	174	199	680	3.477
R50X5ST52	**R50X5ST52CF**	50	±0.20	5.0	40.0	315	361	1184	5.549
	R50X6ST52CF	50		6.0	38.0	390	448	1454	6.511
	R50X8ST52CF	50		8.0	34.0	546	631	2030	8.286
R56X8.5ST52	**R56X8.5ST52CF**	56	±0.25	8.5	39.0	516	595	1908	9.957
	R60X3ST52CF	60		3.0	54.0	144	164	561	4.217
	R60X5ST52CF	60		5.0	50.0	259	297	969	6.782
R60X6ST52	**R60X6ST52CF**	60	±0.25	6.0	48.0	319	366	1184	7.990
	R60X8ST52CF	60		8.0	44.0	445	512	1640	10.259
R60X10ST52		60		10.0	40.0	578	668	2132	12.331
	R65X8ST52CF	65	±0.30	8.0	49.0	407	468	1496	11.245
R66X8.5ST52	**R66X8.5ST52CF**	66	±0.30	8.5	49.0	429	494	1576	12.053
R73X7ST52	**R73X7ST52CF**	73	±0.35	7.0	59.0	308	353	1131	11.393
R75X5ST52	**R75X5ST52CF**	75	±0.35	5.0	65.0	205	234	761	8.631
R75X12.5ST52		75		12.5	50.0	583	674	2132	19.266
R80X3ST52		80		3.0	74.0	107	122	415	5.697
R80X8ST52		80	±0.35	8.0	64.0	325	372	1184	14.205
R80X10ST52		80		10.0	60.0	418	481	1523	17.263
R88X14ST52		88	±0.40	14.0	60.0	554	640	2017	25.549
R90X3.5ST52		90		3.5	83.0	113	129	431	7.466
R90X5ST52		90	±0.40	5.0	80.0	169	193	627	10.481
R90X9ST52		90		9.0	72.0	326	374	1184	17.978
R97X12ST52		97	±0.45	12.0	73.0	416	478	1505	25.154
R115X15ST52		115	±0.50	15.0	85.0	444	511	1599	36.992
R120X20ST52		120	±0.50	20.0	80.0	590	682	2132	49.322
R130X15ST52		130	±0.70	15.0	100.0	388	445	1390	42.540
R150X15ST52		150	±0.80	15.0	120.0	332	380	1184	49.939
R190X20ST52		190	±1.00	20.0	150.0	353	405	1254	83.847
R250X25ST52		250	±1.30	25.0	200.0	335	384	1184	138.718

Other sizes on request!

Seamless EO steel tubes | Material E355+N / St.52.4 (1.0580)

Acc. to DIN EN 10305-1

1. DIN 2413 I static pressure (W.P.) capability for straight pipe including manufacturing tolerance.
2. DIN 2413 III dynamic pressure (W.P.) capability for straight pipe including manufacturing tolerance.
3. Burst pressure (B.P.) calculation acc. to Faupel-von-Mises

Material E355+N / St. 52.4 (1.0580)		d_a Outer-Ø (mm)	OuterØ Tolerance (mm)	s Wal-thickness (mm)	d_i Inner-Ø (mm)	Design pressure		3 Burst pressure bar	Weight kg/m
Surface						1 DIN 2413 I static PN bar	2 DIN 2413 III dynamic PN bar		
Phosphated and oiled	Cr(VI)-free								
Order code									
	R12X1.5ST52CF	12	±0.08	1,5	9.0	533	357	1504	0.388
R16X2ST52	**R16X2ST52CF**	16	±0.08	2.0	12.0	533	357	1504	0.691
	R18X2ST52CF	18	±0.08	2.0	14.0	473	321	1314	0.789
R20X2ST52	**R20X2ST52CF**	20	±0.08	2.0	16.0	426	292	1167	0.888
R20X2.5ST52	**R20X2.5ST52CF**	20		2.5	15.0	533	357	1504	1.079
	R25X2.5ST52CF	25		2.5	20.0	426	292	1167	1.387
R25X3ST52	**R25X3ST52CF**	25	±0.08	3.0	19.0	511	344	1435	1.628
	R25X4ST52CF	25		4.0	17.0	682	445	2016	2.072
R30X3ST52	**R30X3ST52CF**	30		3.0	24.0	426	292	1167	1.998
	R30X4ST52CF	30	±0.08	4.0	22.0	568	379	1622	2.565
	R30X5ST52CF	30		5.0	20.0	710	461	2120	3.083
	R38X3ST52CF	38		3.0	32.0	336	234	899	2.589
R38X4ST52	**R38X4ST52CF**	38	±0.15	4.0	30.0	448	306	1236	3.354
	R38X5ST52CF	38		5.0	28.0	561	374	1597	4.069
	R38X6ST52CF	38		6.0	26.0	673	440	1984	4.735
	R39X7.5ST52CF	39	±0.15	7.5	24.0	819	521	2539	5.826
	R42X3ST52CF	42		3.0	36.0	304	213	806	2.885
	R42X4ST52CF	42	±0.20	4.0	34.0	406	279	1105	3.748
	R42X5ST52CF	42		5.0	32.0	507	342	1422	4.562
	R46X8ST52CF	46	±0.20	8.0	30.0	741	478	2235	7.497
	R50X3ST52CF	50		3.0	44.0	256	181	668	3.477
R50X5ST52	**R50X5ST52CF**	50	±0.20	5.0	40.0	426	292	1167	5.549
	R50X6ST52CF	50		6.0	38.0	511	344	1435	6.511
	R50X8ST52CF	50		8.0	34.0	682	445	2016	8.286
R56X8.5ST52	**R56X8.5ST52CF**	56	±0.25	8.5	39.0	647	425	1892	9.957
	R60X3ST52CF	60		3.0	54.0	213	152	551	4.217
	R60X5ST52CF	60		5.0	50.0	355	247	953	6.782
R60X6ST52	**R60X6ST52CF**	60	±0.25	6.0	48.0	426	292	1167	7.990
	R60X8ST52CF	60		8.0	44.0	568	379	1622	10.259
R60X10ST52		60		10.0	40.0	710	461	2120	12.331
	R65X8ST52CF	65	±0.30	8.0	49.0	524	352	1477	11.245
R66X8.5ST52	**R66X8.5ST52CF**	66	±0.30	8.5	49.0	549	367	1557	12.053
R73X7ST52	**R73X7ST52CF**	73	±0.35	7.0	59.0	408	281	1113	11.393
R75X5ST52	**R75X5ST52CF**	75	±0.35	5.0	65.0	284	200	748	8.631
R75X12.5ST52		75		12.5	50.0	710	461	2120	19.266
R80X3ST52		80		3.0	74.0	160	115	408	5.697
R80X8ST52		80	±0.35	8.0	64.0	426	292	1167	14.205
R80X10ST52		80		10.0	60.0	533	357	1504	17.263
R88X14ST52		88	±0.40	14.0	60.0	678	443	2002	25.549
R90X3.5ST52		90		3.5	83.0	166	119	423	7.466
R90X5ST52		90	±0.40	5.0	80.0	237	168	616	10.481
R90X9ST52		90		9.0	72.0	426	292	1167	17.978
R97X12ST52		97	±0.45	12.0	73.0	527	354	1486	25.154
R115X15ST52		115	±0.50	15.0	85.0	556	371	1580	36.992
R120X20ST52		120	±0.50	20.0	80.0	710	461	2120	49.322
R130X15ST52		130	±0.70	15.0	100.0	492	332	1372	42.540
R150X15ST52		150	±0.80	15.0	120.0	426	292	1167	49.939
R190X20ST52		190	±1.00	20.0	150.0	448	306	1236	83.847
R250X25ST52		250	±1.30	25.0	200.0	426	292	1167	138.718

Other sizes on request!

Seamless cold drawn EO stainless steel tube | Material 316Ti (1.4571)

Acc. to DIN 10216-5, DIN EN 10305-1

1. DNV Bended pipe including manufacturing and corrosion tolerances.
2. DNV Straight pipe including manufacturing and corrosion resistance.
3. Burst pressure (B.P.) calculation = Based on Tensile value, wall thickness tolerance not included.

Material 316Ti (1.4571) Surface bright annealed Order code	d_a Outer-Ø (mm)	OuterAußen-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure 1 DNV PN bar	Design pressure 2 DNV PN bar	3 Burst pressure bar	Weight kg/m
R12X1.571	12	±0.08	1.5	9.0	380	437	1514	0.394
R16X271	16	±0.08	2.0	12.0	380	437	1514	0.701
R18X271	18	±0.08	2.0	14.0	334	383	1325	0.801
R20X271	20	±0.08	2.0	16.0	298	341	1178	0.901
R20X2.571	20		2.5	15.0	380	437	1514	1.096
R25X2.571	25	±0.08	2.5	20.0	298	341	1178	1.409
R25X371	25		3.0	19.0	363	418	1445	1.653
R30X371	30	±0.08	3.0	24.0	298	341	1178	2.028
R30X471	30		4.0	22.0	409	470	1631	2.604
R38X2.571	38	±0.15	2.5	33.0	190	217	746	2.222
R38X471	38		4.0	30.0	315	361	1247	3.405
R42X371	42	±0.20	3.0	36.0	207	237	815	2.930

Other sizes on request!

Seamless cold drawn EO stainless steel tube | Material 316Ti (1.4571)

Acc. to DIN 10216-5, DIN EN 10305-1

1. DIN 2413 I static pressure (W.P.) capability for straight pipe including manufacturing tolerance.
2. DIN 2413 III dynamic pressure (W.P.) capability for straight pipe including manufacturing tolerance.
3. Burst pressure (B.P.) calculation acc. to Faupel-von-Mises.

Material 316Ti (1.4571) / Surface bright annealed / Order code	d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure 1 DIN 2413 I static PN bar	Design pressure 2 DIN 2413 III dynamic PN bar	3 Burst pressure bar	Weight kg/m
R12X1.571	12	±0.08	1.5	9.0	368	297	1229	0.394
R16X271	16	±0.08	2.0	12.0	368	297	1229	0.701
R18X271	18	±0.08	2.0	14.0	327	267	1074	0.801
R20X271	20	±0.08	2.0	16.0	294	242	953	0.901
R20X2.571	20		2.5	15.0	368	297	1229	1.096
R25X2.571	25	±0.08	2.5	20.0	294	242	953	1.409
R25X371	25		3.0	19.0	353	286	1172	1.653
R30X371	30	±0.08	3.0	24.0	294	242	958	2.028
R30X471	30		4.0	22.0	392	314	1325	2.604
R38X2.571	38	±0.15	2.5	33.0	193	164	603	2.222
R38X471	38		4.0	30.0	309	254	1010	3.405
R42X371	42	±0.20	3.0	36.0	210	177	659	2.930

Other sizes on request!

Seamless cold drawn EO stainless steel tube | Material 316L (1.4404)

Acc. to DIN 10216-5, DIN 10305-1 (-316BA); ASTM A269/A213 (-316)

1. DNV Bended pipe including manufacturing and corrosion tolerances.
2. DNV Straight pipe including manufacturing and corrosion tolerances.
3. Burst pressure (B.P.) calculation = Based on Tensile value, wall thickness tolerance not included.

Material 316L (1.4404)		d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure		3 Burst pressure bar	Weight kg/m
Surface						1 DNV PN bar	2 DNV PN bar		
pickled	bright annealed								
Order code									
	R12X1.5-316BA	12	±0.08	1.5	9.0	380	437	1514	0.394
R16X2-316		16	±0.08	2.0	12.0	380	437	1514	0.701
R18X2-316		18	±0.08	2.0	14.0	334	383	1325	0.801
R20X2-316		20	±0.08	2.0	16.0	298	341	1178	0.901
R20X2.5-316		20		2.5	15.0	380	437	1514	1.096
R25X2.5-316		25	±0.08	2.5	20.0	298	341	1178	1.409
R25X3-316		25		3.0	19.0	363	418	1445	1.653
R30X3-316		30	±0.08	3.0	24.0	298	341	1178	2.028
R30X4-316		30		4.0	22.0	409	470	1631	2.604
R38X2.5-316		38	±0.15	2.5	33.0	190	217	746	2.222
R38X3-316		38		3.0	32.0	231	264	909	2.629
R38X4-316		38		4.0	30.0	315	361	1247	3.405
R38X5-316		38		5.0	28.0	403	463	1606	4.132
R42X3-316		42	±0.20	3.0	36.0	207	237	815	2.930
R50X3-316		50	±0.20	3.0	44.0	173	197	677	3.531
R50X5-316		50		5.0	40.0	298	341	1178	5.634
R50X6-316		50		6.0	38.0	363	418	1445	6.611
R60X3-316		60	±0.25	3.0	54.0	143	163	558	4.282
R60X5-316		60		5.0	50.0	244	280	964	6.886
R60X6-316		60		6.0	48.0	298	341	1178	8.113
R66X8.5-316		66	±0.30	8.5	49.0	393	452	1567	12.238
R73X7-316		73	±0.35	7.0	59.0	284	326	1124	11.568
R75X3-316		75	±0.35	3.0	69.0	113	129	442	5.409
R75X5-316		75		5.0	65.0	193	220	757	8.764
R80X10-316		80	±0.35	10.0	60.0	380	437	1514	17.528

Other sizes on request!

Seamless cold drawn EO stainless steel tube | Material 316L (1.4404)

Acc. to DIN 10216-5, DIN 10305-1 (-316BA); ASTM A269/A213 (-316)

1. Due to Parker's high quality standards, the pickled tubes (-316) are calculated according to the values of bright annealed tubes (-316BA). Nominal pressure calculation based on these mechanical properties requires certification in accordance with 3.1 - EN 10204, which confirms the mechanical properties
2. DIN 2413 I static pressure (W.P.) capability for straight pipe including manufacturing tolerance.
3. DIN 2413 III dynamic pressure (W.P.) capability for straight pipe including manufacturing tolerance.
4. Burst pressure (B.P.) calculation acc. to Faupel-von-Mises

Material 316L (1.4404)		d_a Outer-Ø (mm)	Outer-Ø Tolerance (mm)	s Wall-thickness (mm)	d_i Inner-Ø (mm)	Design pressure		4 Burst pressure bar	Weight kg/m
Surface						2 DIN 2413 I static PN bar	3 DIN 2413 III dynamic PN bar		
1 pickled	bright annealed								
Order code									
	R12X1.5-316BA	12	±0.08	1.5	9.0	368	297	1229	0.394
R16X2-316		16	±0.08	2.0	12.0	368	297	1229	0.701
R18X2-316		18	±0.08	2.0	14.0	327	267	1074	0.801
R20X2-316		20	±0.08	2.0	16.0	294	242	953	0.901
R20X2.5-316		20		2.5	15.0	368	297	1229	1.096
R25X2.5-316		25	±0.08	2.5	20.0	294	242	953	1.409
R25X3-316		25		3.0	19.0	353	286	1172	1.653
R30X3-316		30	±0.08	3.0	24.0	294	242	953	2.028
R30X4-316		30		4.0	22.0	392	314	1325	2.604
R38X2.5-316		38	±0.15	2.5	33.0	193	164	603	2.222
R38X3-316		38		3.0	32.0	232	195	734	2.629
R38X4-316		38		4.0	30.0	309	254	1010	3.405
R38X5-316		38		5.0	28.0	387	311	1305	4.132
R42X3-316		42	±0.20	3.0	36.0	210	177	659	2.930
R50X3-316		50	±0.20	3.0	44.0	176	150	546	3.531
R50X5-316		50		5.0	40.0	294	242	953	5.634
R50X6-316		50		6.0	38.0	353	286	1172	6.611
R60X3-316		60	±0.25	3.0	54.0	147	126	450	4.282
R60X5-316		60		5.0	50.0	245	205	779	6.886
R60X6-316		60		6.0	48.0	294	242	953	8.113
R66X8.5-316		66	±0.30	8.5	49.0	379	305	1272	12.238
R73X7-316		73	±0.35	7.0	59.0	282	233	910	11.568
R75X3-316		75	±0.35	3.0	69.0	118	102	356	5.409
R75X5-316		75		5.0	65.0	196	166	611	8.764
R80X10-316		80	±0.35	10.0	60.0	368	297	1229	17.528

Other sizes on request!

Seamless stainless steel tubes | Material 316L (1.4404)

Acc. to ASTM A312/A999

1. DNV Bended pipe including manufacturing and corrosion tolerances.
2. DNV Straight pipe including manufacturing and corrosion tolerances.
3. Burst pressure (B.P.) calculation = Based on Tensile value, wall thickness tolerance not included.

Material 316L (1.4404) Surface pickled Order code	d_a Outer-Ø SCH	d_a Outer-Ø mm	s Wallthickness SCH	s Wallthickness mm	d_i Inner-Ø (mm)	Design pressure 1 DNV PN bar	Design pressure 2 DNV PN bar	3 Burst pressure bar	Weight kg/m
R21.34X2.11-316	1/2"	21,.34	SCH 10	2.11	17.12	241	277	1130	1.014
R21.34X2.77-316			SCH 40	2.77	15.80	325	374	1536	1.285
R21.34X3.73-316			SCH 80	3.73	13.88	456	527	2182	1.641
R21.34X4.78-316			SCH 160	4.78	11.78	611	712	2973	1.977
R26.67X2.11-316	3/4"	26.67	SCH 10	2.11	24.56	190	217	885	1.299
R26.67X2.81-316			SCH 40	2.81	21.05	259	297	1213	1.713
R26.67X3.91-316			SCH 80	3.91	18.85	373	430	1769	2.231
R26.67X5.56-316			SCH 160	5.56	15.55	560	651	2713	2.943
R33.40X2.77-316-A999	1"	33.40	SCH 10	2.77	27.86	200	228	931	2.125
R33.40X3.38-316-A999			SCH 40	3.38	30.02	247	284	1160	2.541
R33.40X4.55-316-A999			SCH 80	4.55	24.30	343	395	1624	3.287
R33.40X6.35-316-A999			SCH 160	6.35	20.70	502	583	2418	4.301
R42.16X2.77-316-A999	1 1/4"	42.16	SCH 10	2.77	36.62	156	178	724	2.735
R42.16X3.56-316-A999			SCH 40	3.56	35.04	204	233	950	3.444
R42.16X4.85-316-A999			SCH 80	4.85	32.46	285	327	1339	4.536
R42.16X6.35-316-A999			SCH 160	6.35	29.46	384	443	1826	5.700
R48.26X2.77-316-A999	1 1/2"	48.26	SCH 10	2.77	42.72	135	154	627	3.158
R48.26X3.68-316-A999			SCH 40	3.68	40.90	183	209	850	4.112
R48.26X5.08-316-A999			SCH 80	5.08	38.10	258	296	1212	5.498
R48.26X7.14-316-A999			SCH 160	7.14	33.98	377	434	1788	7.359
R60.33X2.77-316-A999	2"	60.33	SCH 10	2.77	54.76	107	122	496	3.990
R60.33X3.91-316-A999			SCH 40	3.91	52.48	154	176	714	5.521
R60.33X5.54-316-A999			SCH 80	5.54	49.22	223	255	1041	7.596
R60.33X8.74-316-A999			SCH 160	8.74	42.82	368	424	1745	11.284
R73.03X3.05-316-A999	2 1/2"	73.03	SCH 10	3.05	66.90	97	111	449	5.342
R73.03X5.16-316-A999			SCH 40	5.16	62.68	168	192	783	8.765
R73.03X7.01-316-A999			SCH 80	7.01	58.98	234	268	1094	11.583
R73.03X9.53-316-A999			SCH 160	9.53	53.94	327	376	1546	15.146
R88.90X3.05-316	3"	88.90	SCH 10	3.05	82.80	79	90	366	6.557
R88.90X5.49-316-A999			SCH 40	5.49	77.92	146	167	678	11.466
R88.90X7.62-316-A999			SCH 80	7.62	73.56	207	237	966	15.509
R88.90X11.13-316-A999			SCH 160	11.13	66.64	312	359	1474	21.674
R114.30X3.05-316	4"	114.30	SCH 10	3.05	108.20	61	70	282	8.496
R114.30X6.02-316-A999			SCH 40	6.02	102.16	124	141	573	16.322
R114.30X8.56-316-A999			SCH 80	8.56	97.18	179	205	834	22.665
R114.30X13.49-316-A999			SCH 160	13.49	87.32	293	336	1378	34.053
R141.30X6.55-316-A999	5"	141.30	SCH 40	6.55	128.20	108	123	501	22.101
R141.30X9.53-316-A999			SCH 80	9.53	122.24	160	183	745	31.444
R141.30X15.88-316-A999			SCH 160	15.88	109.54	277	318	1304	49.871
R168.28X3.40-316	6"	168.28	SCH 10	3.40	161.48	46	53	212	14.039
R168.28X7.11-316-A999			SCH 40	7.11	154.08	98	112	454	28.697
R168.28X18.26-316-A999			SCH 160	18.26	131.78	267	306	1254	68.603
R219.08X8.18-316	8"	219.08	SCH 40	8.18	202.72	87	99	399	43.202
R219.08X23.01-316-A999			SCH 160	23.01	173.06	258	296	1209	112.981
R273.05X25.40-316-A999	10"	273.05	XXS	25.40	222.25	226	259	1057	157.509

Other sizes on request!

Temperature conversion table

Celsius to Fahrenheit

°C	°F
150	302
145	293
140	284
135	275
130	266
125	257
120	248
115	239
110	230
105	221
100	212
95	203
90	194
85	185
80	176
75	167
70	158
65	149
60	140
55	131
50	122
45	113
40	104
35	95
30	86
25	77
20	68
15	59
10	50
5	41
0	32
-5	23
-10	14
-15	5
-20	-4
-25	-13
-30	-22
-35	-31
-40	-40
-45	-49
-50	-58

Fahrenheit to Celsius

°F	°C
340	171
330	166
320	160
310	154
300	149
290	143
280	138
270	132
260	127
250	121
240	116
230	110
220	104
210	99
200	93
190	88
180	82
170	77
160	71
150	66
140	60
130	54
120	49
110	43
100	38
90	32
80	27
70	21
60	16
50	10
40	4
30	-1
20	-7
10	-12
0	-18
-10	-23
-20	-29
-30	-34
-40	-40
-50	-46
-60	-51

Pressure conversion table

bar to psi

bar	psi
1000	14505
800	11604
600	8703
500	7253
400	5802
250	3626
160	2321
100	1451
60	870
40	580
35	508
25	363
16	232
10	145
6	87
4	58
2.5	36
1.6	23
1	15

psi to bar

psi	bar
10000	689
9000	620
7000	483
6000	414
4000	276
3000	207
2500	172
1000	69
900	62
600	41
500	34
400	28
250	17
150	10.3
100	6.9
90	6.2
60	4.1
40	2.8
25	1.7
10	0.7

Examples

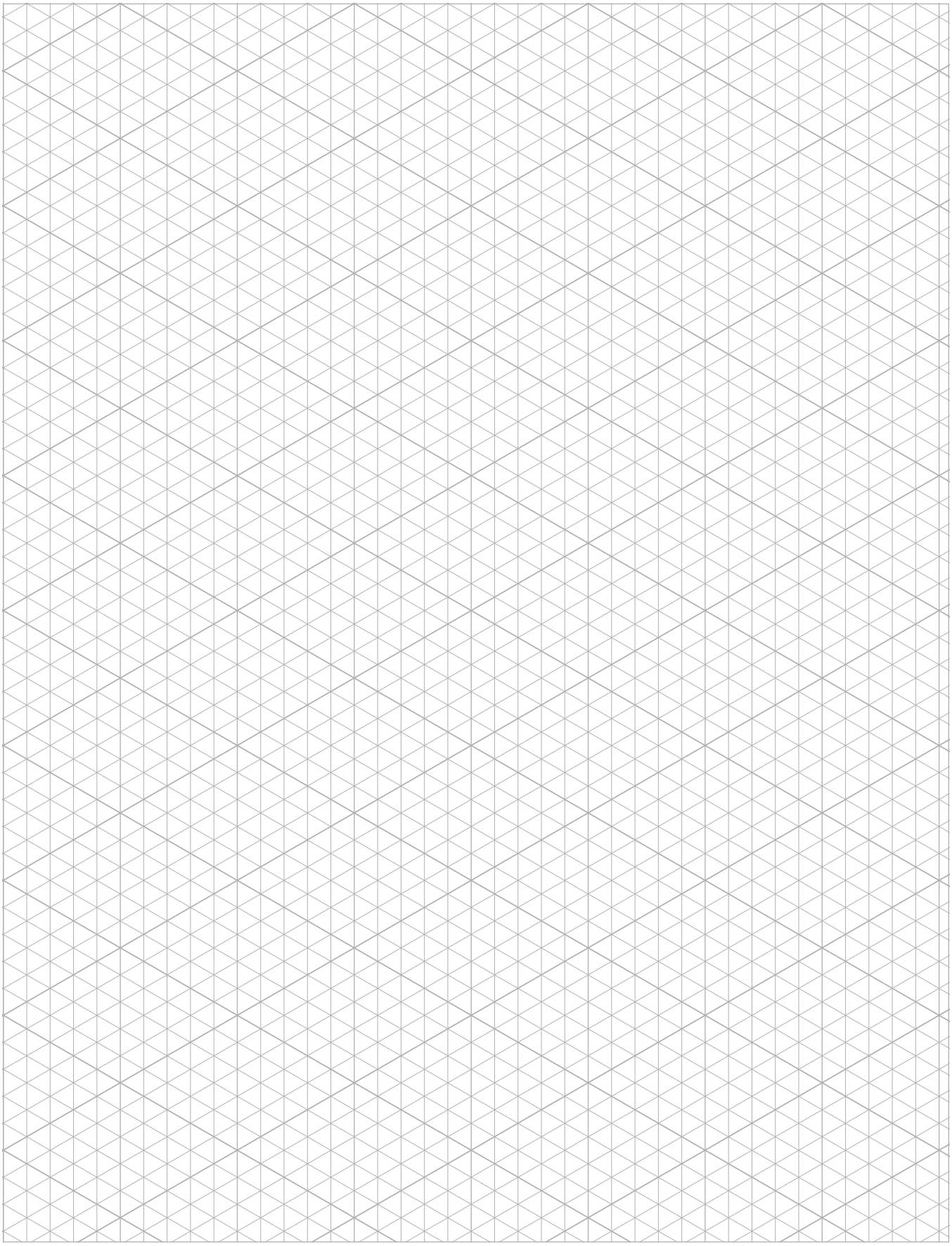
Temperature conversion

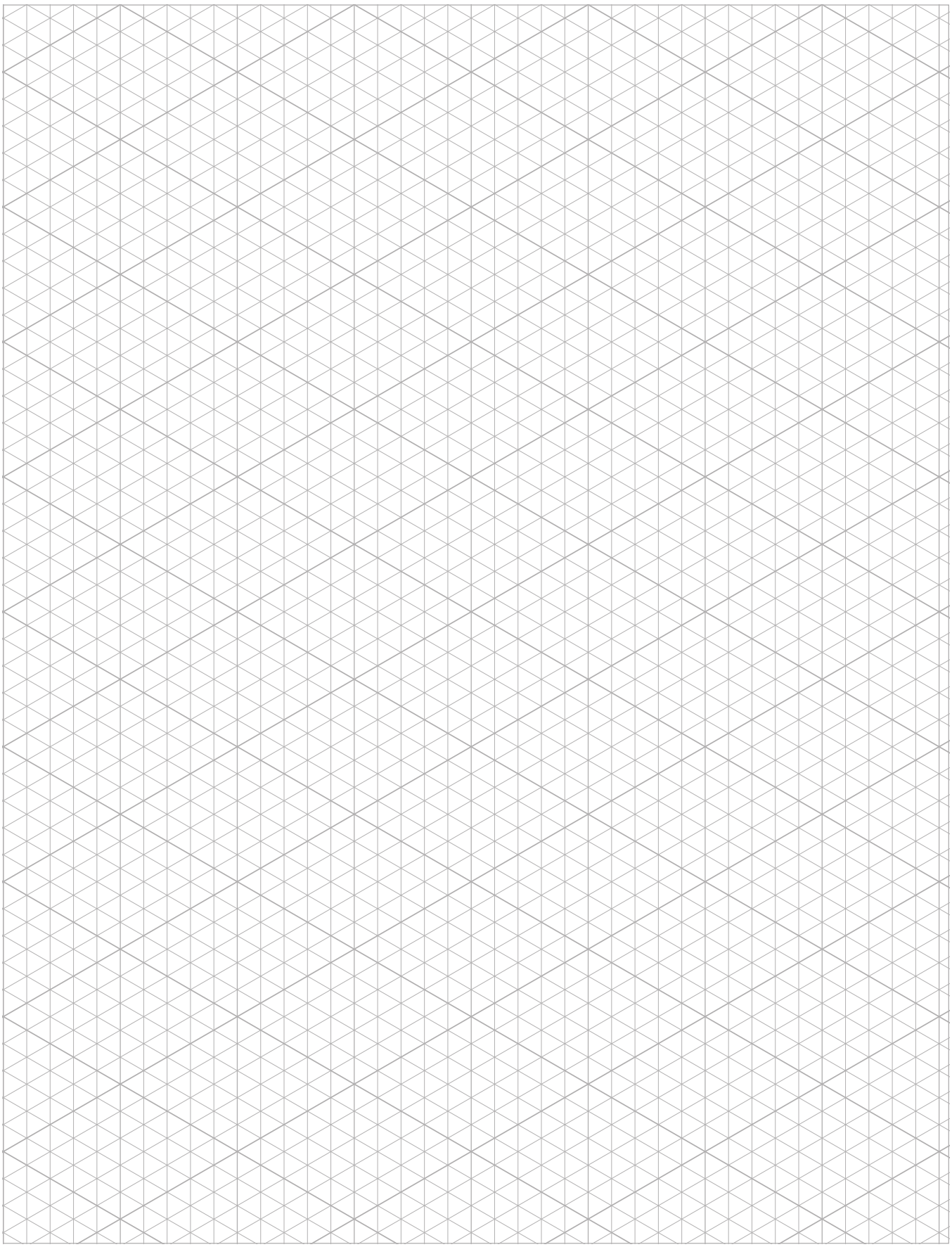
Initial value: 100
°C to °F: 212 °F
°F to °C: 37,78 °C

Pressure converion

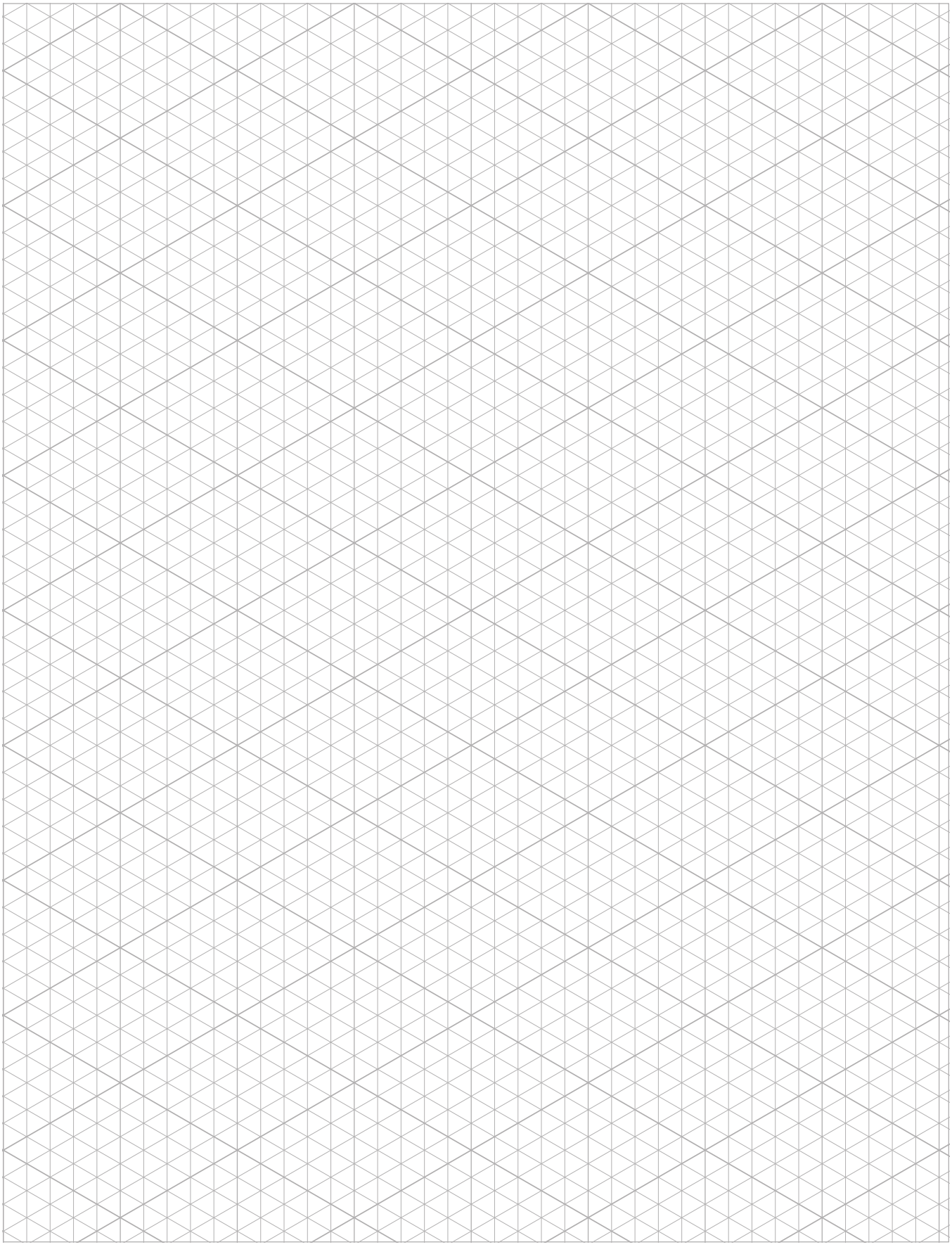
Initial value: 35
bar to psi: 507.675 psi
psi to bar: 2.41296 bar

Notes





Notes



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Aerospace

Key Markets

Aftermarket services
Commercial transports
Engines
General & business aviation
Helicopters
Launch vehicles
Military aircraft
Missiles
Power generation
Regional transports
Unmanned aerial vehicles

Key Products

Control systems & actuation products
Engine systems & components
Fluid conveyance systems & components
Fluid metering, delivery & atomization devices
Fuel systems & components
Fuel tank inerting systems
Hydraulic systems & components
Thermal management
Wheels & brakes

Climate Control

Key Markets

Agriculture
Air conditioning
Construction Machinery
Food & beverage
Industrial machinery
Life sciences
Oil & gas
Precision cooling
Process
Refrigeration
Transportation

Key Products

Accumulators
Advanced actuators
CO_2 controls
Electronic controllers
Filter driers
Hand shut-off valves
Heat exchangers
Hose & fittings
Pressure regulating valves
Refrigerant distributors
Safety relief valves
Smart pumps
Solenoid valves
Thermostatic expansion valves

Electromechanical

Key Markets

Aerospace
Factory automation
Life science & medical
Machine tools
Packaging machinery
Paper machinery
Plastics machinery & converting
Primary metals
Semiconductor & electronics
Textile
Wire & cable

Key Products

AC/DC drives & systems
Electric actuators, gantry robots & slides
Electrohydrostatic actuation systems
Electromechanical actuation systems
Human machine interface
Linear motors
Stepper motors, servo motors, drives & controls
Structural extrusions

Filtration

Key Markets

Aerospace
Food & beverage
Industrial plant & equipment
Life sciences
Marine
Mobile equipment
Oil & gas
Power generation & renewable energy
Process
Transportation
Water Purification

Key Products

Analytical gas generators
Compressed air filters & dryers
Engine air, coolant, fuel & oil filtration systems
Fluid condition monitoring systems
Hydraulic & lubrication filters
Hydrogen, nitrogen & zero air generators
Instrumentation filters
Membrane & fiber filters
Microfiltration
Sterile air filtration
Water desalination & purification filters & systems

Fluid & Gas Handling

Key Markets

Aerial lift
Agriculture
Bulk chemical handling
Construction machinery
Food & beverage
Fuel & gas delivery
Industrial machinery
Life sciences
Marine
Mining
Mobile
Oil & gas
Renewable energy
Transportation

Key Products

Check valves
Connectors for low pressure fluid conveyance
Deep sea umbilicals
Diagnostic equipment
Hose couplings
Industrial hose
Mooring systems & power cables
PTFE hose & tubing
Quick couplings
Rubber & thermoplastic hose
Tube fittings & adapters
Tubing & plastic fittings

Hydraulics

Key Markets

Aerial lift
Agriculture
Alternative energy
Construction machinery
Forestry
Industrial machinery
Machine tools
Marine
Material handling
Mining
Oil & gas
Power generation
Refuse vehicles
Renewable energy
Truck hydraulics
Turf equipment

Key Products

Accumulators
Cartridge valves
Electrohydraulic actuators
Human machine interfaces
Hybrid drives
Hydraulic cylinders
Hydraulic motors & pumps
Hydraulic systems
Hydraulic valves & controls
Hydrostatic steering
Integrated hydraulic circuits
Power take-offs
Power units
Rotary actuators
Sensors

Pneumatics

Key Markets

Aerospace
Conveyor & material handling
Factory automation
Life science & medical
Machine tools
Packaging machinery
Transportation & automotive

Key Products

Air preparation
Brass fittings & valves
Manifolds
Pneumatic accessories
Pneumatic actuators & grippers
Pneumatic valves & controls
Quick disconnects
Rotary actuators
Rubber & thermoplastic hose & couplings
Structural extrusions
Thermoplastic tubing & fittings
Vacuum generators, cups & sensors

Process Control

Key Markets

Alternative fuels
Biopharmaceuticals
Chemical & refining
Food & beverage
Marine & shipbuilding
Medical & dental
Microelectronics
Nuclear Power
Offshore oil exploration
Oil & gas
Pharmaceuticals
Power generation
Pulp & paper
Steel
Water/wastewater

Key Products

Analytical Instruments
Analytical sample conditioning products & systems
Chemical injection fittings & valves
Fluoropolymer chemical delivery fittings, valves & pumps
High purity gas delivery fittings, valves, regulators & digital flow controllers
Industrial mass flow meters/ controllers
Permanent no-weld tube fittings
Precision industrial regulators & flow controllers
Process control double block & bleeds
Process control fittings, valves, regulators & manifold valves

Sealing & Shielding

Key Markets

Aerospace
Chemical processing
Consumer
Fluid power
General industrial
Information technology
Life sciences
Microelectronics
Military
Oil & gas
Power generation
Renewable energy
Telecommunications
Transportation

Key Products

Dynamic seals
Elastomeric o-rings
Electro-medical instrument design & assembly
EMI shielding
Extruded & precision-cut, fabricated elastomeric seals
High temperature metal seals
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