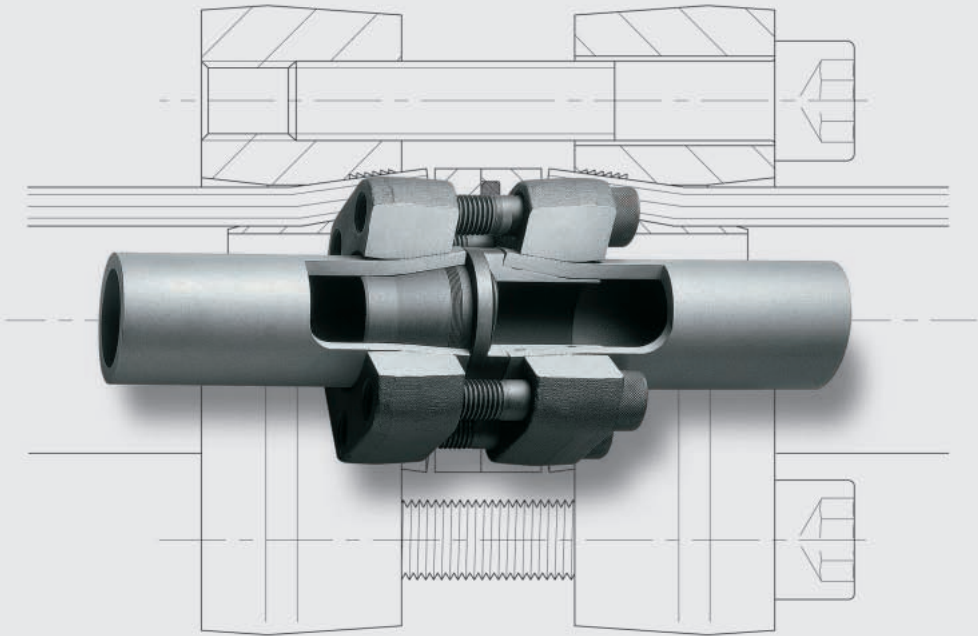




Flange couplings / ZAKO / ZAKO LP

- Flange couplings with cutting-ring connection
- ZAKO flared flanges
- ZAKO LP flared flanges



Experience plus ideas

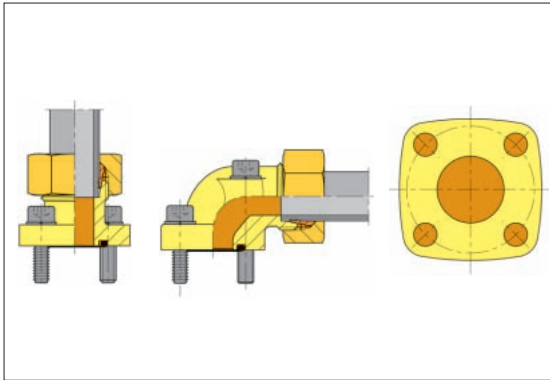
Product Information Flange Couplings

In addition to the tube couplings for the various installation criteria, flanges are frequently used in hydraulic systems, preferably with medium-range and larger dimensions. Different flange versions are available to enable compliance with the different requirements.

The SAE flange couplings are supplied in standard and high-pressure designs with hole patterns in accordance with SAE J 518 or ISO 6162.

The device-side connection is carried out with 2 flange halves secured with 4 cheese head screws. In contrast to the male threads, the screws can be mounted on the couplings with smaller tools and reduced force. The tube-side connection can be produced with cutting rings or BV-10 flared couplings.

Flange couplings with square flange and cutting-ring connection



The flange couplings with a square flange connection are characterized by particularly compact outside dimensions. They are supplied in straight and elbow designs. The product range consists of the outside tube diameters from 10 mm to 35 mm. Flange sealing is carried out with an elastic round sealing ring (O-ring), and the mounting connection with cheese head screws. The flange connections are designed for the connection hole patterns of leading pump manufacturers.

SAE flange couplings with cutting-ring connection – elbow design

A particular advantage of the SAE flange couplings with an elbow design is their directional adjustability. However, the accessibility of the mounting screws must be ensured when installing the tube.

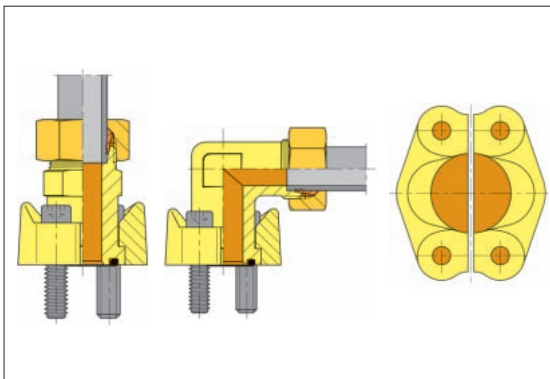
SAE flange couplings with welded connection on request

The VOSS ZAKO system with the 10° flare principle is available for especially high loads, such as vibrations and pressure jolts or high pressures with larger tube dimensions.

General Note

In order for the flange couplings listed in this catalogue to fulfill their function, it is extremely important that the respective installation instructions and the note in the technical remarks are followed exactly.

SAE flange couplings with cutting-ring connection





ZAKO flange couplings

The ZAKO programme of flange couplings caters to tubing systems with outside diameters of between 16 and 120 mm. Both the connecting and the tube-to-port flange couplings are available for standard (250 bar) or high pressure (400 bar) and are classified accordingly in the standard and high-pressure series. VOSS offers the SAE and square flanges listed in this catalogue (Fig. 1 and 2).

To pre-assemble the ZAKO flange couplings, press the ZAKO ring into the tube end (similar to the flared cone of BV-10 tube couplings in conjunction with 10° flared cones). The tube fixture for both systems is therefore identical (see Fig. 3). The difference lies in the fact that the flared cone is sealed by means of a DKO head. On the tube side, sealing is achieved with high surface pressure at the flared section and the labyrinth seal effect of the small teeth on the cone surface. The flange presses a large area of the tube end against the ZAKO ring, ensuring especially high holding forces. As a result, the system remains leak-tight even when exposed to vibrations or reverse bending stress.

Hydraulic engineers appreciate the following characteristics of ZAKO flanges:

- Particularly suitable for extreme loading.
- Notching and incision-free tube holding with the 10° flared cone principle.
- Use of standard coupling bores.
- Easy assembly, even with thick-walled tubes.
- Minimisation of assembly errors, as the ZAKO ring must be pre-assembled in an assembly aid.

- Suitable for stainless-steel tubes with tolerances according to DIN 2391-C.
- Complete range of flanges in the standard and high-pressure lines with hole patterns according to SAE and square flange.

Note on safety:

A wide range of different operating conditions often cause loads on tube connections with unforeseeable parameters. To ensure safe operation, please observe the following:

- In addition to the outer diameter of the tube, also take the wall thickness into account.
- VOSS 10° flared couplings may only be pre-assembled with the specially designed VOSS pre-assembly devices.
- Always observe the assembly instructions of the device used!

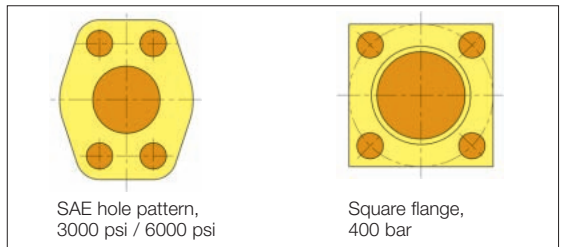


Fig. 1

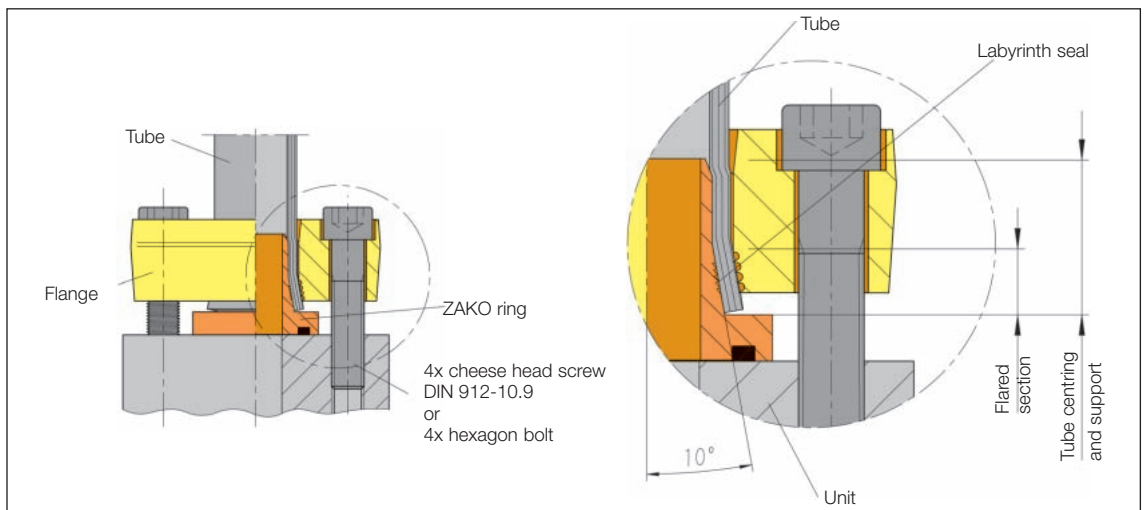


Fig. 2



Product information about ZAKO Low Pressure Flange Couplings

The ZAKO Low Pressure flange program has been specially designed for applications in the low pressure area, for example return lines or lubrication lines. The quick and easy pre-assembly and final assembly make this tube coupling system an economical alternative to welding.

Due to the many years of experience with our 10° flared system, we guarantee a quadruple safety factor at an operating pressure of 60 bar, also with ZAKO Low pressure flange coupling.

The quick and clean pre-assembly of thin-walled tubing, having a tube outside diameter of 48.3 to 114.3 mm, is normally carried out on our 10° flared machine. Only a tool change is required.

With the pre-assembly the ZAKO Low Pressure ring is pressed with hydraulic force into the tube. The tube which is now pre-assembled has such a high pressing force on the front side of the coupling due to the 10° flare that alternating bending stresses, oscillations, pressure impulses and deviations in temperature are tolerated.

In addition to the technical advantages, which this coupling offers as opposed to welding, the economical benefit should be mentioned. The normal working stages for welding, such as crimping, adjustment, seal welding and cleaning and the transportation connected with it as well as the maintenance work and expenditure incurred for training of staff are completely dispensed with when using the ZAKO Low Pressure.

90° tube bends and T-pieces are obtainable in addition to the ZAKO Low Pressure flange program with coupling flanges and flange connections.

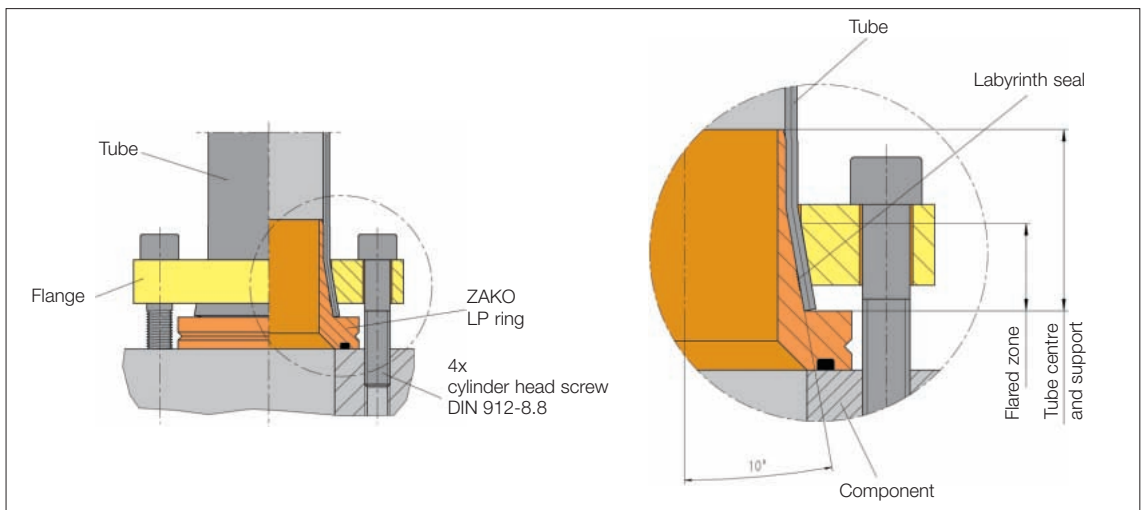
Due to this, further cost saving can be achieved because the tube bending processes and the resulting assembly times do not apply.

As a standard, all components of the ZAKO Low Pressure series have the chrome VI-free surface protection of VOSS Zink-Nickel.

Owing to the fact that the ZAKO Low Pressure series was designed for low pressure, the dimensions of the individual components are reduced in addition to the tightening torque. This additionally simplifies assembly, especially with regard to positions difficult to access.

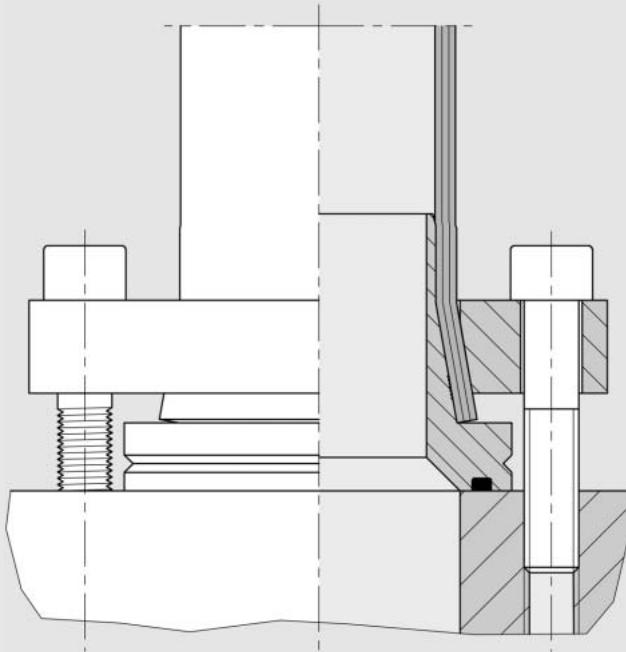
An overview of the features of the ZAKO Low Pressure tube coupling system are:

- Notch-free and cut-free tube clamping using the successful 10° flared principle.
- Quick, clean and easy pre-assembly.
- Use of the existing ZAKO pre-assembly equipment.
- The same pre-assembly and assembly processes as with the standard ZAKO high pressure series, however with reduced tightening torque.
- Reduction of the assembly times due to the saving of welding and cleaning processes.
- Quadruple reliability of the system against bursting.
- Flange program available with hole patterns according to SAE including 90° tube bend and T-piece.
- Chrome VI-free corrosion protection as a standard VOSS Zink-Nickel.





ZAKO Low Pressure



Experience plus ideas

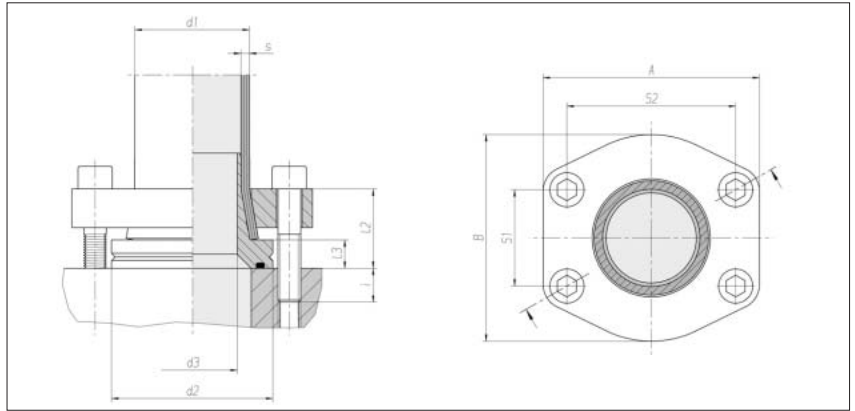


LEHENGOK, S. A.

Tube-to-port
flange couplings
ZAKO system
Low Pressure

Hole pattern according to
SAE J 518 C / ISO 6162-1

Max. permissible operating
pressure (PB) 60 bar



Flange size NW	Tube d1 x s	d2	d3	l2	l3	S1	S2	A	B	i	4 x cheese head screw*	Nm**	kg/100 approx.	Order No.
1 1/2"	48.3 x 3.2	63	39	35	10	35.7	69.9	94	83	15.5	M 12 x 50	85	82.6	0 5 18 60 20 00
1 1/2"	48.3 x 4	63	36.5	35	10	35.7	69.9	94	83	15.5	M 12 x 50	85	85.1	0 5 18 62 20 00
2"	60.3 x 3.6	72	49	42	15	42.9	77.8	102	97	18	M 12 x 60	85	109.8	0 5 18 80 20 00
2 1/2"	60.3 x 3.6	85	49	42	15	50.8	88.9	114	109	18	M 12 x 60	85	161.8	0 5 18 64 20 00
2 1/2"	60.3 x 4.5	85	47.5	42	15	50.8	88.9	114	109	18	M 12 x 60	85	149.5	0 5 18 66 20 00
3"	76.1 x 3.6	100	65.5	50	16	61.9	106.4	135	131	20	M 16 x 70	210	262.2	0 5 18 68 20 00
3"	76.1 x 4.5	100	63.5	50	16	61.9	106.4	135	131	20	M 16 x 70	210	216.8	0 5 18 70 20 00
3 1/2"	88.9 x 3.6	114	78	56	20	69.9	120.7	152	140	19	M 16 x 75	210	341.0	0 5 18 72 20 00
3 1/2"	88.9 x 5	114	74.5	56	20	69.9	120.7	152	140	19	M 16 x 75	210	347.2	0 5 18 74 20 00
5"	114.3 x 3.6	150	103	57	20	92.1	152.4	184	181	18.5	M 16 x 75	210	525.1	0 5 18 76 20 00
5"	114.3 x 6.3	150	96	57	20	92.1	152.4	184	181	18.5	M 16 x 75	210	548.7	0 5 18 78 20 00

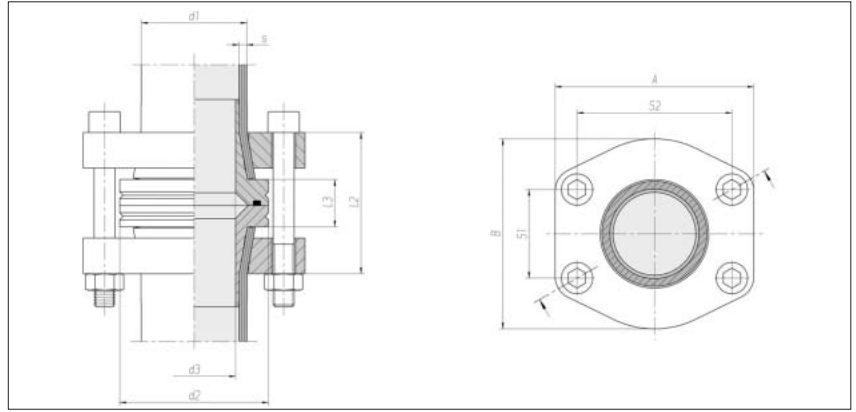
* Screws according to DIN 912,
property class 8.8

** Recommended tightening torque
(Nm max.) at friction coefficient
 μ total: 0,14

Tube-to-tube flange couplings ZAKO system Low Pressure

Hole pattern according to
SAE J 518 C / ISO 6162-1

Max. permissible operating
pressure (PB) 60 bar



Flange size NW	Tube d1 x s	d2	d3	l2 approx.	l3	S1	S2	A	B	4 x cheese head screw*	Nm**	kg/100 approx.	Order No.
1 1/2"	48.3 x 3.2	63	39	66	17	35.7	69.9	94	83	M 12 x 80	85	168.0	0 5 18 61 20 00
1 1/2"	48.3 x 4	63	36.5	66	17	35.7	69.9	94	83	M 12 x 80	85	173.0	0 5 18 63 20 00
2"	60.3 x 3.6	72	49	81	27	42.9	77.8	102	97	M 12 x 100	85	222.0	0 5 18 81 20 00
2 1/2"	60.3 x 3.6	85	49	81	27	50.8	88.9	114	109	M 12 x 100	85	323.0	0 5 18 65 20 00
2 1/2"	60.3 x 4.5	85	47.5	81	27	50.8	88.9	114	109	M 12 x 100	85	302.0	0 5 18 67 20 00
3"	76.1 x 3.6	100	65.5	96	28	61.9	106.4	135	131	M 16 x 110	210	530.0	0 5 18 69 20 00
3"	76.1 x 4.5	100	63.5	96	28	61.9	106.4	135	131	M 16 x 110	210	446.0	0 5 18 71 20 00
3 1/2"	88.9 x 3.6	114	78	108	36	69.9	120.7	152	140	M 16 x 130	210	682.0	0 5 18 73 20 00
3 1/2"	88.9 x 5	114	74.5	108	36	69.9	120.7	152	140	M 16 x 130	210	693.0	0 5 18 75 20 00
5"	114.3 x 3.6	150	103	108	36	92.1	152.4	184	181	M 16 x 130	210	1044.0	0 5 18 77 20 00
5"	114.3 x 6.3	150	96	108	36	92.1	152.4	184	181	M 16 x 130	210	1087.0	0 5 18 79 20 00

* Screws according to DIN 912,
property class 8.8

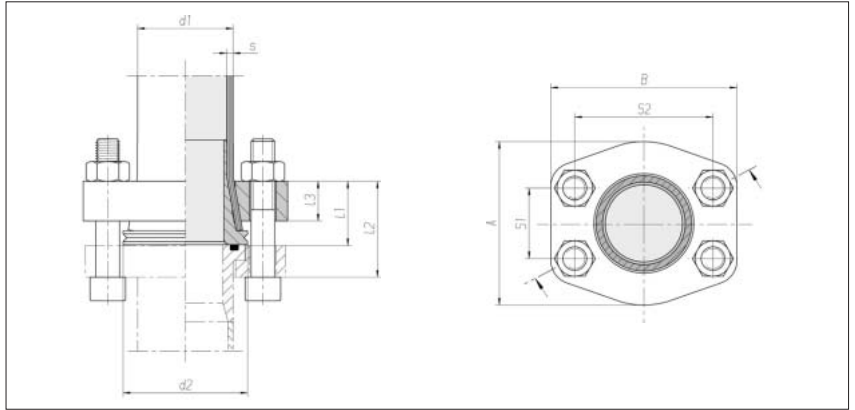
** Recommended tightening torque
(Nm max.) at friction coefficient
 μ total: 0,14



Tube-to-tube flange couplings ZAKO system Low Pressure

Hole pattern according to
SAE J 518 C / ISO 6162-1

Max. permissible operating
pressure (PB) 60 bar



Flange size NW	Tube d1 x s	d2	l1 approx.	l2 approx.	l3	S1	S2	A	B	4 x cheese head screw*	Nm**	kg/100 approx.	Order No.
1 1/2"	48.3 x 3.2	63	31.5	47.5	20	35.7	69.9	83	94	M12 x 70	85	86.0	0 5 18 82 20 00
1 1/2"	48.3 x 4	63	31.5	47.5	20	35.7	69.9	83	94	M12 x 70	85	88.0	0 5 18 83 20 00
2"	60.3 x 3.6	72	39	55	20.5	42.9	77.8	97	102	M12 x 80	85	113.0	0 5 18 84 20 00
2 1/2"	60.3 x 3.6	85	39	58	20.5	50.8	88.9	109	114	M12 x 80	85	161.0	0 5 18 85 20 00
2 1/2"	60.3 x 4.5	85	39	58	20.5	50.8	88.9	109	114	M12 x 80	85	152.0	0 5 18 86 20 00
3"	76.1 x 3.6	100	46	68	27	61.9	106.4	131	135	M16 x 90	210	268.0	0 5 18 87 20 00
3"	76.1 x 4.5	100	46	68	27	61.9	106.4	131	135	M16 x 90	210	229.0	0 5 18 88 20 00
3 1/2"	88.9 x 3.6	114	52	74	27.5	69.9	120.7	140	152	M16 x 110	210	341.0	0 5 18 89 20 00
3 1/2"	88.9 x 5	114	52	74	27.5	69.9	120.7	140	152	M16 x 110	210	347.0	0 5 18 90 20 00
5"	114.3 x 3.6	150	52.5	80.5	27.5	92.1	152.4	181	184	M16 x 110	210	519.0	0 5 18 91 20 00
5"	114.3 x 6.3	150	52.5	80.5	27.5	92.1	152.4	181	184	M16 x 110	210	539.0	0 5 18 92 20 00

* Screws according to DIN 912,
property class 8.8

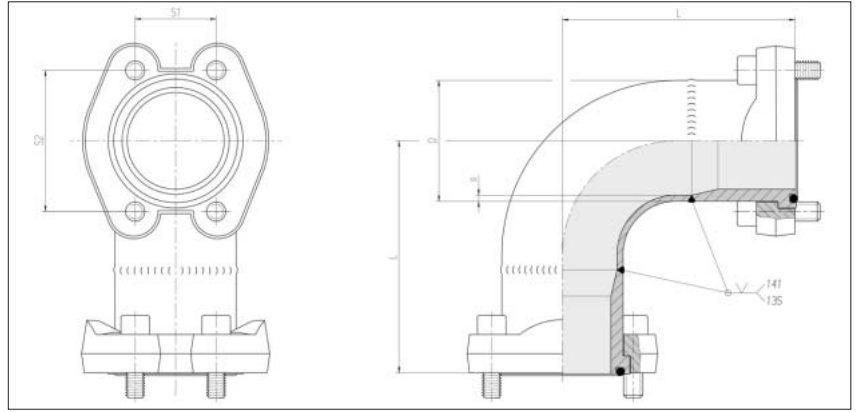
** Recommended tightening torque
(Nm max.) at friction coefficient
 μ total: 0,14

Tube-to-tube flange couplings ZAKO system Low Pressure

Hole pattern according to
SAE J 518 C / ISO 6162-1

90° bend

Max. permissible operating
pressure (PB) 60 bar



Flange size NW	L	S1	S2	4 x cheese head screw*	O-ring	Nm**	Order No.
1 1/2"	102	35.7	69.9	M 12 x 35	47.22 x 3.53	85	0 5 00 58 20 00
2"	111	42.9	77.8	M 12 x 35	56.74 x 3.53	85	0 5 00 60 20 00
2 1/2"	127	50.8	88.9	M 12 x 40	69.44 x 3.53	85	0 5 00 62 20 00
3"	130	61.9	106.4	M 16 x 45	85.32 x 3.53	210	0 5 00 64 20 00
3 1/2"	152	69.9	120.7	M 16 x 45	98.02 x 3.53	210	0 5 00 66 20 00
5"	175	92.1	152.4	M 16 x 50	136.12 x 3.53	210	0 5 00 68 20 00

* Screws according to DIN 912,
property class 8.8

** Recommended tightening torque
(Nm max.) at friction coefficient
 μ total: 0,14

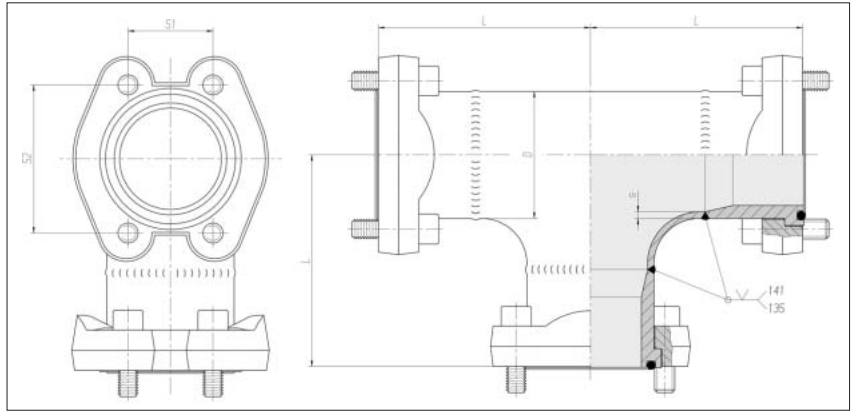


Tube-to-tube
flange couplings
ZAKO system
Low Pressure

Hole pattern according to
SAE J 518 C / ISO 6162-1

T- piece

Max. permissible operating
pressure (PB) 60 bar



Flange size NW	L	S1	S2	4 x cheese Zyl.-Schr.*	O-ring	Nm**	Order No.
1 1/2"	102	35.7	69.9	M 12 x 35	47.22 x 3.53	85	0 5 00 59 20 00
2"	111	42.9	77.8	M 12 x 35	56.74 x 3.53	85	0 5 00 61 20 00
2 1/2"	127	50.8	88.9	M 12 x 40	69.44 x 3.53	85	0 5 00 63 20 00
3"	130	61.9	106.4	M 16 x 45	85.32 x 3.53	210	0 5 00 65 20 00
3 1/2"	152	69.9	120.7	M 16 x 45	98.02 x 3.53	210	0 5 00 67 20 00
5"	175	92.1	152.4	M 16 x 50	136.12 x 3.53	210	0 5 00 69 20 00

* Screws according to DIN 912,
property class 8.8

** Recommended tightening torque
(Nm max.) at friction coefficient
 μ total: 0,14