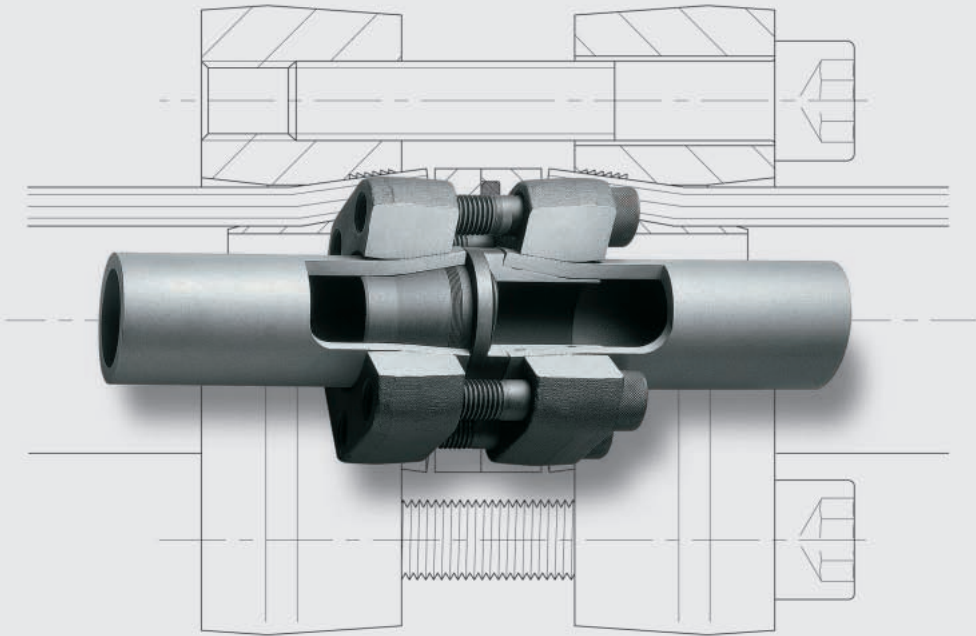




Flange couplings / ZAKO / ZAKO LP

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

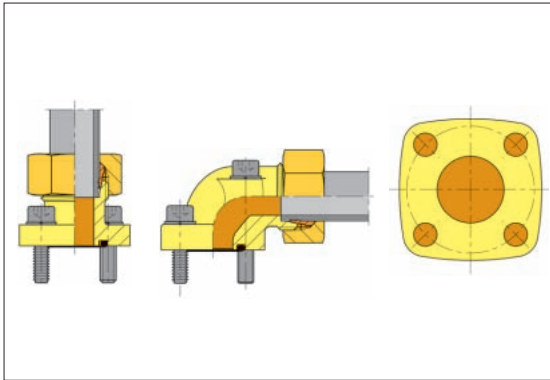


Experience plus ideas

Product Information Flange Couplings

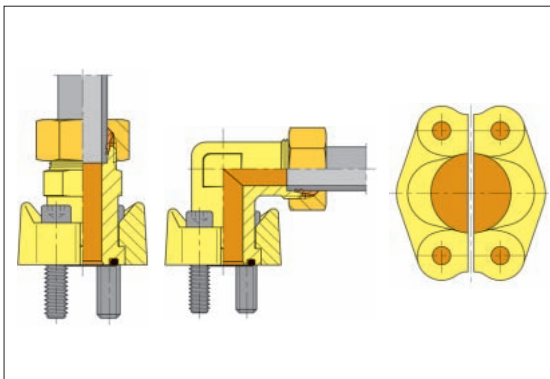
In addition to the tube couplings for the various installation criteria, flanges are frequently used in hydraulic systems, preferably with medium-range and larger dimensions. Different flange versions are available to enable compliance with the different requirements.

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



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.

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.



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!

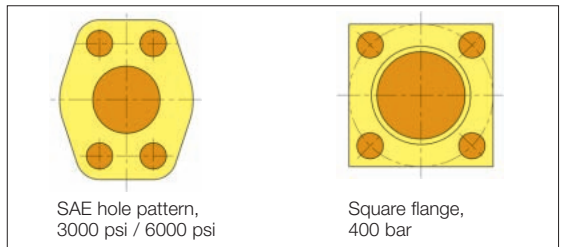


Fig. 1

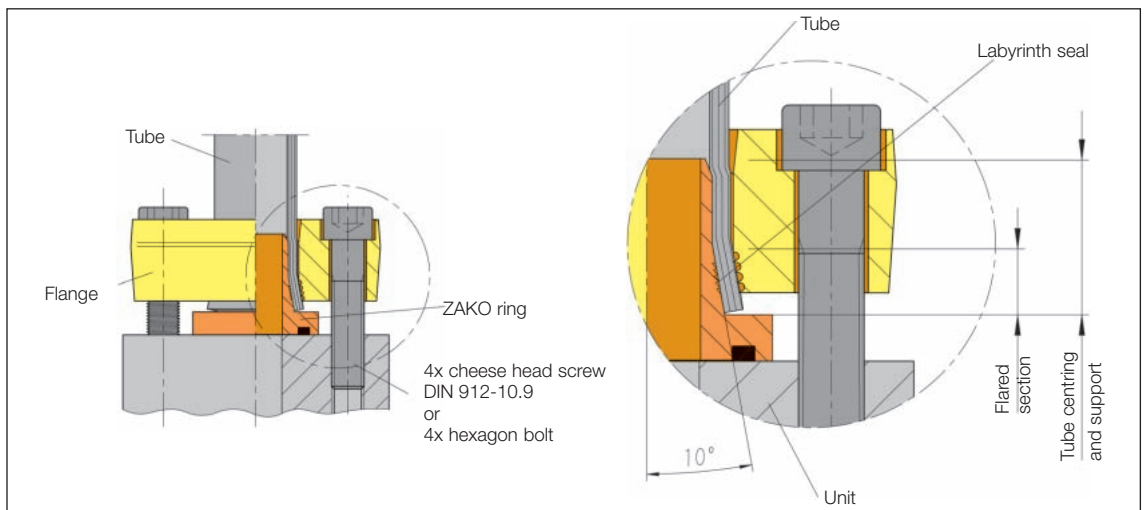


Fig. 2



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.

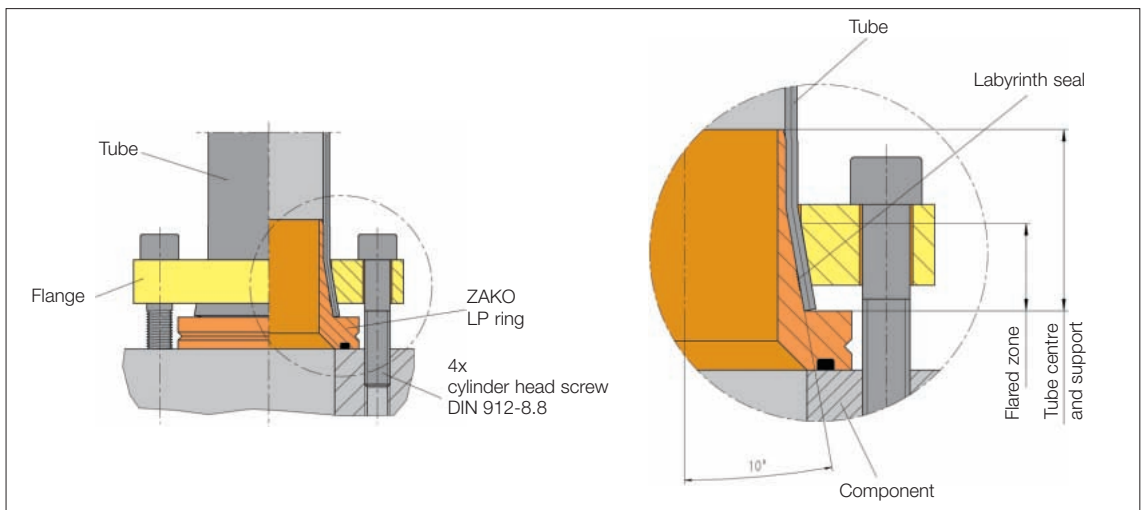
As a standard, all components of the ZAKO Low Pressure series have the chrome VI-free surface protection of VOSS Zink-Nickel.

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:

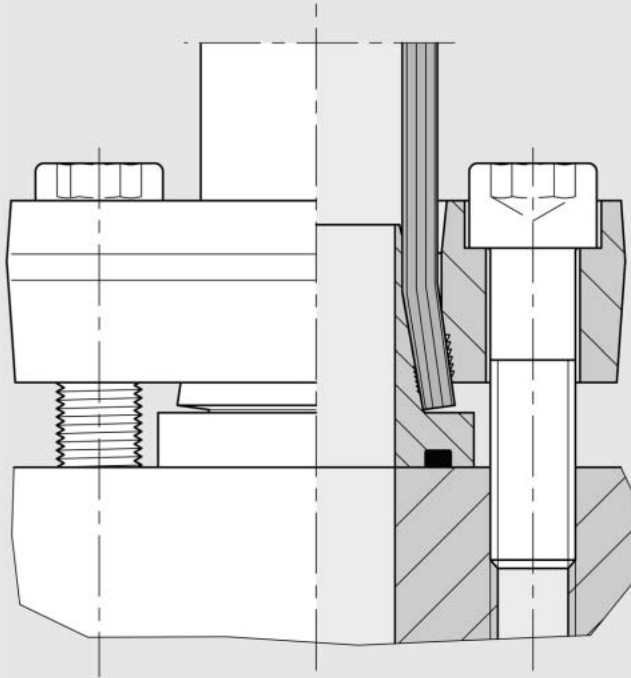
- Notch-free and cut-free tube clamping using the successful 10° flared principle.
- Quick, clean and easy pre-assembly.
- Use of the existing ZAKO pre-assembly equipment.
- The same pre-assembly and assembly processes as with the standard ZAKO high pressure series, however with reduced tightening torque.
- 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.

4





ZAKO flared flanges
complete



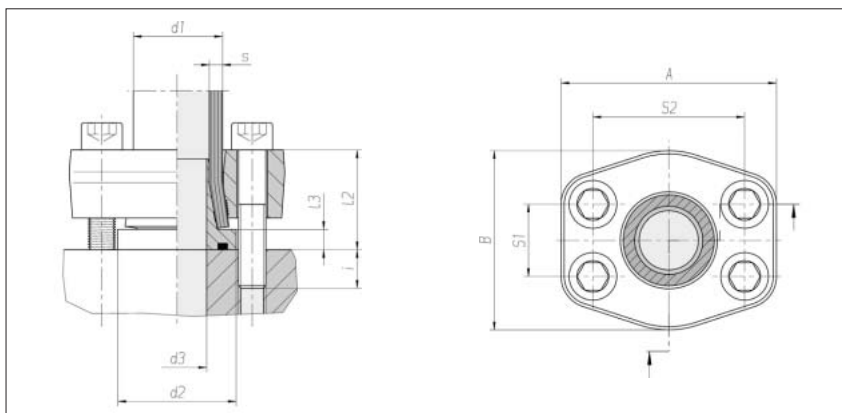
Experience plus ideas



Tube-to-port flange couplings ZAKO system

Hole pattern according to
SAE J 518 C / ISO 6162
Standard series
(3000 psi)

Max. permissible operating
pressure (PB) 250 bar¹⁾



Flange size	Tube d1 x s	d2	d3	l2 approx.	l3	S1	S2	A	B	i	4 x cheese approx. head screw.	Nm*	kg/100 approx.	Order No. complete	Order No. ***
1/2"	16 x 2	30	10.5	32	8	17.5	38.1	55	45	13	M 8 x 45	35	43.9	0 5 13 00 19 00**	0 5 13 00 19 86
1/2"	16 x 2.5	30	10.5	32	8	17.5	38.1	55	45	13	M 8 x 45	35	43.9	0 5 13 01 19 00	0 5 13 01 19 86
1/2"	16 x 3	30	10.5	32	8	17.5	38.1	55	45	13	M 8 x 45	35	43.9	0 5 13 29 19 00	0 5 13 29 19 86
3/4"	20 x 2.5	38	13.5	32	8	22.2	47.6	65	50	13	M 10 x 45	69	54.7	0 5 13 02 19 00	0 5 13 02 19 86
3/4"	20 x 3	38	13.5	32	8	22.2	47.6	65	50	13	M 10 x 45	69	54.8	0 5 13 03 19 00	0 5 13 03 19 86
3/4"	20 x 3.5	38	13.5	32	8	22.2	47.6	65	50	13	M 10 x 45	69	55.0	0 5 13 21 19 00	0 5 13 21 19 86
3/4"	25 x 3	38	17	32.5	8.5	22.2	47.6	65	50	12.5	M 10 x 45	69	66.9	0 5 13 04 19 00	0 5 13 04 19 86
3/4"	25 x 4	38	17	32.5	8.5	22.2	47.6	65	50	12.5	M 10 x 45	69	67.3	0 5 13 22 19 00	0 5 13 22 19 86
1"	30 x 4	46	20	37.5	8.5	26.2	52.4	72	60	12.5	M 10 x 50	69	80.1	0 5 13 05 19 00	0 5 13 05 19 86
1"	30 x 5	46	20	37.5	8.5	26.2	52.4	72	60	12.5	M 10 x 50	69	81.3	0 5 13 25 19 00	0 5 13 25 19 86
1 1/4"	38 x 4	52	28	44	9	30.2	58.7	79	73	16	M 12 x 60	120	106.7	0 5 13 06 19 00	0 5 13 06 19 86
1 1/4"	38 x 5	52	28	44	9	30.2	58.7	79	73	16	M 12 x 60	120	107.2	0 5 13 07 19 00	0 5 13 07 19 86
1 1/4"	38 x 6	52	28	44	9	30.2	58.7	79	73	16	M 12 x 60	120	107.3	0 5 13 28 19 00	0 5 13 28 19 86
1 1/4"	42 x 2	52	34	44	9	30.2	58.7	79	73	16	M 10 x 60	69	80.1	0 5 13 16 19 00	0 5 13 16 19 86
1 1/2"	50 x 2.5	63	42	46	10	35.7	69.9	94	83	14	M 12 x 60	120	136.3	0 5 13 08 19 00	0 5 13 08 19 86
1 1/2"	50 x 5	63	42	46	10	35.7	69.9	94	83	14	M 12 x 60	120	136.9	0 5 13 09 19 00	0 5 13 09 19 86
1 1/2"	50 x 6	63	42	46	10	35.7	69.9	94	83	14	M 12 x 60	120	136.8	0 5 13 10 19 00	0 5 13 10 19 86
1 1/2"	50 x 8	63	42	46	10	35.7	69.9	94	83	14	M 12 x 60	120	140.0	0 5 13 20 19 00	0 5 13 20 19 86
2"	65 x 3	75	46	60	11	42.9	77.8	102	97	15	M 12 x 75	120	189.0	0 5 13 11 19 00	0 5 13 11 19 86
2"	65 x 4	75	46	60	11	42.9	77.8	102	97	15	M 12 x 75	120	183.0	0 5 13 12 19 00	0 5 13 12 19 86
2"	65 x 5	75	46	60	11	42.9	77.8	102	97	15	M 12 x 75	120	186.3	0 5 13 13 19 00	0 5 13 13 19 86
3"	80 x 3	100	71	66	16	61.9	106.4	135	131	24	M 16 x 90	295	405.6	0 5 13 14 19 00	0 5 13 14 19 86

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

¹⁾ According to the ASME Code, a reduced operating pressure applies for the flange sizes 2" and 3"

* Recommended tightening torques (Nm max.) at 10.9

** Sample product code, see: FE-1620-8/3
*** without screws

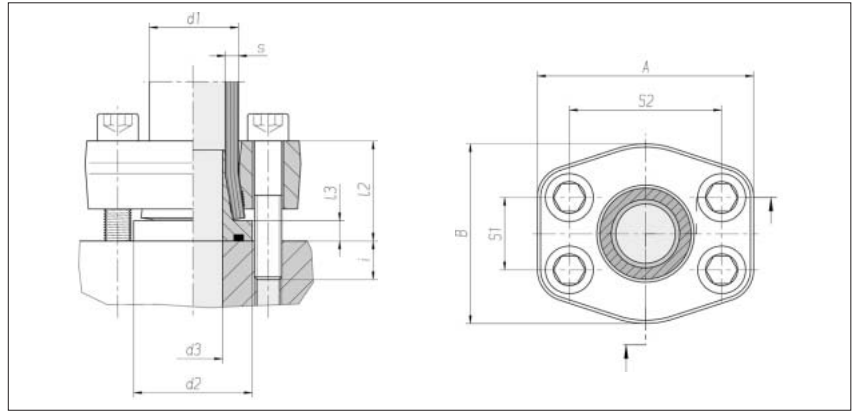


Tube-to-port flange couplings ZAKO system

Hole pattern according to
SAE J 518 C / ISO 6162
Standard series
(3000 psi)

Max. permissible
operating pressure (PB)
250 bar¹⁾

Reducing couplings



Flange size	Tube d1 x s	d2	d3	l2	l3 approx.	S1	S2	A	B	i	4 x cheese approx. head screw	Nm*	kg/100 approx.	Order No. complete	Order No. ***
1"	25 x 3	38	17	38.5	8.5	26.2	52.4	72	60	16.5	M 10 x 55	69	64.0	0 5 13 23 19 00**	0 5 13 23 19 86
1"	25 x 4	38	17	38.5	8.5	26.2	52.4	72	60	16.5	M 10 x 55	69	64.6	0 5 13 24 19 00	0 5 13 24 19 86
1 1/4"	30 x 4	46	20	42	8.5	30.2	58.7	79	73	18	M 12 x 60	120	105.5	0 5 13 26 19 00	0 5 13 26 19 86
1 1/4"	30 x 5	46	20	43.5	8.5	30.2	58.7	79	73	16.5	M 12 x 60	120	105.7	0 5 13 27 19 00	0 5 13 27 19 86
2"	50 x 2.5	63	42	52.5	10	42.9	77.8	102	97	22.5	M 12 x 75	120	193.0	0 5 13 75 19 00	0 5 13 75 19 86
2"	50 x 5	63	42	53	10	42.9	77.8	102	97	22	M 12 x 75	120	193.2	0 5 13 76 19 00	0 5 13 76 19 86
2"	50 x 6	63	42	55	10	42.9	77.8	102	97	20	M 12 x 75	120	193.1	0 5 13 77 19 00	0 5 13 77 19 86
2"	50 x 8	63	42	56	10	42.9	77.8	102	97	19	M 12 x 75	120	197.4	0 5 13 78 19 00	0 5 13 78 19 86

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

¹⁾ According to the ASME Code, a reduced operating pressure applies for the flange sizes 2"

* Recommended tightening torques (Nm max.) at 10.9

** Sample product code, see: FE-2530-16/3
*** without screws

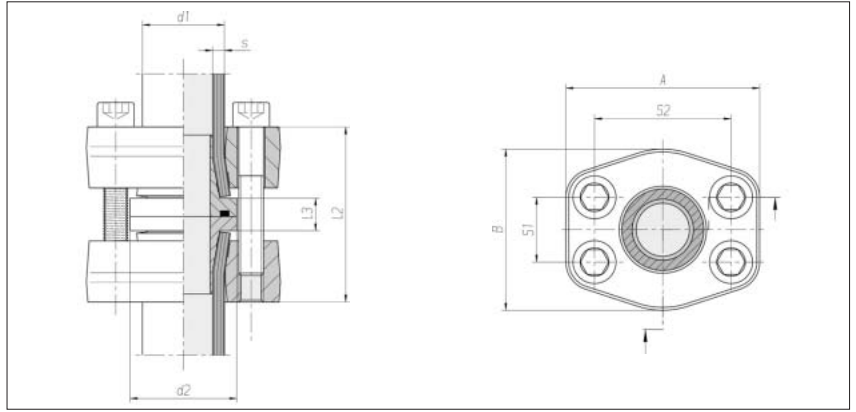


LEHENGOK, S. A.

Tube-to-tube
flange couplings
ZAKO system

Hole pattern according to
SAE J 518 C / ISO 6162
Standard series
(3000 psi)

Max. permissible operating
pressure (PB) 250 bar¹⁾



Flange size	Tube d1 x s	d2	l2 approx.	l3	S1	S2	A	B	4 x cheese head screw	Nm*	kg/100 approx.	Order No. complete	Order No. ***
1/2"	16 x 2	30	61.5	13.5	17.5	38.1	55	45	M 8 x 55	35	77.5	0 5 14 00 19 00**	0 5 14 00 19 86
1/2"	16 x 2.5	30	61.5	13.5	17.5	38.1	55	45	M 8 x 55	35	77.5	0 5 14 01 19 00	0 5 14 01 19 86
1/2"	16 x 3	30	61.5	13.5	17.5	38.1	55	45	M 8 x 55	35	77.5	0 5 14 80 19 00	0 5 14 80 19 86
3/4"	20 x 2.5	38	61.5	13.5	22.2	47.6	65	50	M 10 x 55	69	96.6	0 5 14 02 19 00	0 5 14 02 19 86
3/4"	20 x 3	38	61.5	13.5	22.2	47.6	65	50	M 10 x 55	69	97.0	0 5 14 03 19 00	0 5 14 03 19 86
3/4"	20 x 3.5	38	61.5	13.5	22.2	47.6	65	50	M 10 x 55	69	97.4	0 5 14 81 19 00	0 5 14 81 19 86
3/4"	25 x 3	38	62	14	22.2	47.6	65	50	M 10 x 55	69	106.0	0 5 14 04 19 00	0 5 14 04 19 86
3/4"	25 x 4	38	62	14	22.2	47.6	65	50	M 10 x 55	69	106.4	0 5 14 82 19 00	0 5 14 82 19 86
1"	30 x 4	46	72.5	14.5	26.2	52.4	72	60	M 10 x 60	69	149.0	0 5 14 05 19 00	0 5 14 05 19 86
1"	30 x 5	46	72.5	14.5	26.2	52.4	72	60	M 10 x 60	69	151.2	0 5 14 85 19 00	0 5 14 85 19 86
1 1/4"	38 x 4	52	86	16	30.2	58.7	79	73	M 12 x 75	120	198.6	0 5 14 06 19 00	0 5 14 06 19 86
1 1/4"	38 x 5	52	86	16	30.2	58.7	79	73	M 12 x 75	120	197.1	0 5 14 07 19 00	0 5 14 07 19 86
1 1/4"	38 x 6	52	86	16	30.2	58.7	79	73	M 12 x 75	120	197.0	0 5 14 89 19 00	0 5 14 89 19 86
1 1/2"	50 x 2.5	63	89	17	35.7	69.9	94	83	M 12 x 75	120	255.8	0 5 14 08 19 00	0 5 14 08 19 86
1 1/2"	50 x 5	63	89	17	35.7	69.9	94	83	M 12 x 75	120	256.3	0 5 14 09 19 00	0 5 14 09 19 86
1 1/2"	50 x 6	63	89	17	35.7	69.9	94	83	M 12 x 75	120	255.8	0 5 14 10 19 00	0 5 14 10 19 86
1 1/2"	50 x 8	63	89	17	35.7	69.9	94	83	M 12 x 75	120	256.8	0 5 14 90 19 00	0 5 14 90 19 86
1 1/2"	50 x 9	63	89	17	35.7	69.9	94	83	M 12 x 75	120	257.1	0 5 14 91 19 00	0 5 14 91 19 86
2"	65 x 3	75	117	19	42.9	77.8	102	97	M 12 x 100	120	359.6	0 5 14 11 19 00	0 5 14 11 19 86
2"	65 x 4	75	117	19	42.9	77.8	102	97	M 12 x 100	120	353.2	0 5 14 12 19 00	0 5 14 12 19 86
2"	65 x 5	75	117	19	42.9	77.8	102	97	M 12 x 100	120	357.1	0 5 14 13 19 00	0 5 14 13 19 86
3"	80 x 3	100	129	29	61.9	106.4	135	131	M 16 x 110	295	756.0	0 5 14 14 19 00	0 5 14 14 19 86

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

¹⁾ According to the ASME Code, a reduced operating pressure applies for the flange sizes 2" and 3"

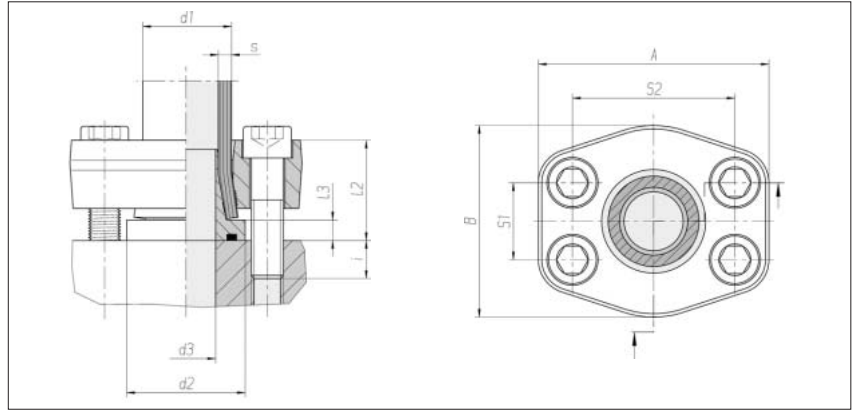
* Recommended tightening torques (Nm max.) at 10.9

** Sample product code, see: FG-1620-8/3
*** without screws

Tube-to-port flange couplings ZAKO system

Hole pattern according to
SAE J 518 C / ISO 6162
High-pressure series
(6000 psi)

Max. permissible operating
pressure (PB) 400 bar



Flange size	Tube d1 x s	d2	d3	l2 approx.	l3 approx.	S1	S2	A	B	i approx.	4 x cheese head screw	Nm*	kg/100 approx.	Order No. complete	Order No. ***
1/2"	16 x 2	30	10.5	32	8	18.3	40.5	56	48	12	M 8 x 40	35	38.6	0 5 13 52 19 00**	0 5 13 52 19 86
1/2"	16 x 2.5	30	10.5	32	8	18.3	40.5	56	48	12	M 8 x 40	35	38.6	0 5 13 30 19 00	0 5 13 30 19 86
1/2"	16 x 3	30	10.5	32	8	18.3	40.5	56	48	12	M 8 x 40	35	38.6	0 5 13 31 19 00	0 5 13 31 19 86
3/4"	20 x 2.5	38	13.5	37	8	23.9	50.8	71	60	13	M 10 x 40	69	69.2	0 5 13 53 19 00	0 5 13 53 19 86
3/4"	20 x 3	38	13.5	37	8	23.9	50.8	71	60	13	M 10 x 40	69	69.3	0 5 13 32 19 00	0 5 13 32 19 86
3/4"	20 x 3.5	38	13.5	37	8	23.9	50.8	71	60	13	M 10 x 40	69	69.6	0 5 13 33 19 00	0 5 13 33 19 86
3/4"	25 x 3	38	17	37.5	8.5	23.9	50.8	71	60	14.5	M 10 x 40	69	65.6	0 5 13 34 19 00	0 5 13 34 19 86
3/4"	25 x 4	38	17	37.5	8.5	23.9	50.8	71	60	14.5	M 10 x 40	69	66.0	0 5 13 35 19 00	0 5 13 35 19 86
1"	30 x 4	46	20	42.5	8.5	27.8	57.2	81	70	14.5	M 12 x 40	120	97.6	0 5 13 36 19 00	0 5 13 36 19 86
1"	30 x 5	46	20	42.5	8.5	27.8	57.2	81	70	14.5	M 12 x 40	120	98.7	0 5 13 37 19 00	0 5 13 37 19 86
1 1/4"	38 x 4	52	28	44	9	31.7	66.7	95	78	17.1	M 14 x 45	190	127.2	0 5 13 55 19 00	0 5 13 55 19 86
1 1/4"	38 x 5	52	28	44	9	31.7	66.7	95	78	17.1	M 14 x 45	190	127.0	0 5 13 38 19 00	0 5 13 38 19 86
1 1/4"	38 x 6	52	28	44	9	31.7	66.7	95	78	17.1	M 14 x 45	190	140.3	0 5 13 39 19 00	0 5 13 39 19 86
1 1/2"	50 x 5	63	36	56.5	10	36.5	79.4	113	95	22	M 16 x 60	295	230.8	0 5 13 56 19 00	0 5 13 56 19 86
1 1/2"	50 x 6	63	36	56.5	10	36.5	79.4	113	95	22	M 16 x 60	295	230.7	0 5 13 40 19 00	0 5 13 40 19 86
1 1/2"	50 x 8	63	36	56.5	10	36.5	79.4	113	95	22	M 16 x 60	295	233.1	0 5 13 41 19 00	0 5 13 41 19 86
2"	65 x 8	75	46	65	11	44.5	96.8	133	114	30	M 20 x 90	580	383.5	0 5 13 42 19 00	0 5 13 42 19 86

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

* Recommended tightening torques (Nm max.) at 10.9

** Sample product code, see: FE-1620-8/6

*** without screws

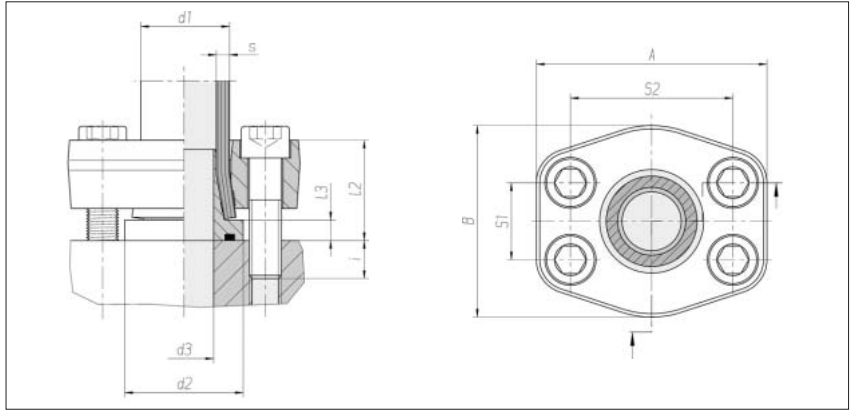


Tube-to-port
flange couplings
ZAKO system

Hole pattern according to
SAEJ 518 C / ISO 6162
High-pressure series
(6000 psi)

Max. permissible operating
pressure (PB) 400 bar

Reducing couplings



Flange size	Tube d1 x s	d2	d3	l2 approx.	l3	S1	S2	A	B	i	4 x cheese approx.head screw	Nm*	kg/100 approx.	Order No. complete	Order No. ***
1"	38 x 5	46	26	43	9	27.8	57.2	81	70	14	M 12 x 40	120	89.9	0 5 13 54 19 00**	0 5 13 54 19 86
2"	50 x 5	63	36	58	10	44.5	96.8	133	114	32	M 20 x 90	580	438.5	0 5 13 57 19 00	0 5 13 57 19 86
2"	50 x 6	63	36	60	10	44.5	96.8	133	114	30	M 20 x 90	580	438.4	0 5 13 58 19 00	0 5 13 58 19 86
2"	50 x 8	63	36	61	10	44.5	96.8	133	114	29	M 20 x 90	580	440.7	0 5 13 43 19 00	0 5 13 43 19 86

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

* Recommended tightening torques (Nm max.) at 10.9

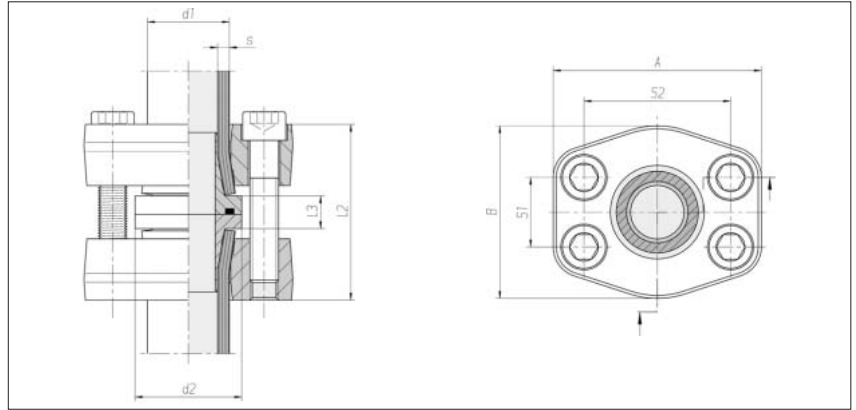
** Sample product code, see: FE-3850-16/6

*** without screws

Tube-to-tube flange couplings ZAKO system

Hole pattern according to
SAE J 518 C / ISO 6162
High-pressure series
(6000 psi)

Max. permissible operating
pressure (PB) 400 bar



Flange size	Tube d1 x s	d2	l2 approx.	l3	S1	S2	A	B	4 x cheese head screw	Nm*	kg/100 approx.	Order No. complete	Order No. ***
1/2"	16 x 2	30	61.5	13.5	18.3	40.5	56	48	M 8 x 50	35	72.0	0 5 14 50 19 00**	0 5 14 50 19 86
1/2"	16 x 2.5	30	61.5	13.5	18.3	40.5	56	48	M 8 x 50	35	72.0	0 5 14 30 19 00	0 5 14 30 19 86
1/2"	16 x 3	30	61.5	13.5	18.3	40.5	56	48	M 8 x 50	35	72.0	0 5 14 31 19 00	0 5 14 31 19 86
3/4"	20 x 2.5	38	71.5	13.5	23.9	50.8	71	60	M 10 x 50	69	132.5	0 5 14 51 19 00	0 5 14 51 19 86
3/4"	20 x 3	38	71.5	13.5	23.9	50.8	71	60	M 10 x 50	69	132.9	0 5 14 32 19 00	0 5 14 32 19 86
3/4"	20 x 3.5	38	71.5	13.5	23.9	50.8	71	60	M 10 x 50	69	133.2	0 5 14 33 19 00	0 5 14 33 19 86
3/4"	25 x 3	38	72	14	23.9	50.8	71	60	M 10 x 50	69	128.2	0 5 14 34 19 00	0 5 14 34 19 86
3/4"	25 x 4	38	72	14	23.9	50.8	71	60	M 10 x 50	69	128.9	0 5 14 35 19 00	0 5 14 35 19 86
1"	30 x 4	46	82.5	14.5	27.8	57.2	81	70	M 12 x 50	120	193.6	0 5 14 36 19 00	0 5 14 36 19 86
1"	30 x 5	46	82.5	14.5	27.8	57.2	81	70	M 12 x 50	120	195.8	0 5 14 37 19 00	0 5 14 37 19 86
1 1/4"	38 x 4	52	86	16	31.7	66.7	95	78	M 14 x 60	190	248.6	0 5 14 53 19 00	0 5 14 53 19 86
1 1/4"	38 x 5	52	86	16	31.7	66.7	95	78	M 14 x 60	190	248.9	0 5 14 38 19 00	0 5 14 38 19 86
1 1/4"	38 x 6	52	86	16	31.7	66.7	95	78	M 14 x 60	190	262.7	0 5 14 39 19 00	0 5 14 39 19 86
1 1/2"	50 x 5	63	110	17	36.5	79.4	113	95	M 16 x 75	295	442.6	0 5 14 54 19 00	0 5 14 54 19 86
1 1/2"	50 x 6	63	110	17	36.5	79.4	113	95	M 16 x 75	295	442.2	0 5 14 40 19 00	0 5 14 40 19 86
1 1/2"	50 x 8	63	110	17	36.5	79.4	113	95	M 16 x 75	295	444.7	0 5 14 41 19 00	0 5 14 41 19 86
1 1/2"	50 x 9	63	110	17	36.5	79.4	113	95	M 16 x 75	295	446.0	0 5 14 55 19 00	0 5 14 55 19 86
2"	65 x 8	75	127	19	44.5	96.8	133	114	M 20 x 110	580	699.0	0 5 14 42 19 00	0 5 14 42 19 86

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

* Recommended tightening torques (Nm max.) at 10.9

** Sample product code, see: FG-1620-8/6

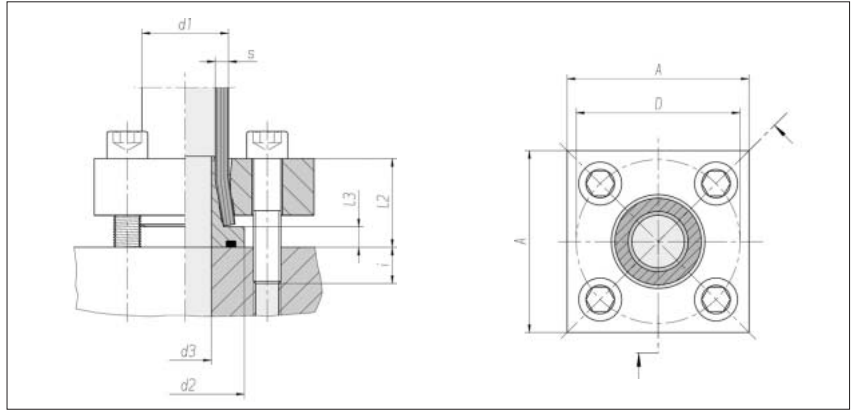
*** without screws



Tube-to-port
flange couplings
ZAKO system

VOSS square
flange hole pattern
High-pressure series

Max. permissible operating
pressure (PB) 400 bar¹⁾



Flange size NW	Tube d1 x s	d2	d3	l2 approx.	l3	D	A	i approx.	4 x cheese head screw	Nm*	kg/100 approx.	Order No. complete	Order No. ***
12	16 x 2	30	10.5	28	8	42	50	12	M 8 x 40	35	42.2	0 5 15 15 19 00**	0 5 15 15 19 86
11	16 x 2.5	30	10.5	28	8	42	50	12	M 8 x 40	35	42.2	0 5 13 60 19 00	0 5 13 60 19 86
10	16 x 3	30	10.5	28	8	42	50	12	M 8 x 40	35	42.2	0 5 13 61 19 00	0 5 13 61 19 86
15	20 x 2.5	38	13.5	32	8	50	55	13	M 10 x 45	69	55.2	0 5 15 16 19 00	0 5 15 16 19 86
14	20 x 3	38	13.5	32	8	50	55	13	M 10 x 45	69	55.3	0 5 13 62 19 00	0 5 13 62 19 86
13	20 x 3.5	38	13.5	32	8	50	55	13	M 10 x 45	69	55.6	0 5 13 63 19 00	0 5 13 63 19 86
19	25 x 3	38	17	32.5	8.5	50	55	12.5	M 10 x 45	69	65.4	0 5 13 64 19 00	0 5 13 64 19 86
17	25 x 4	38	17	32.5	8.5	50	55	12.5	M 10 x 45	69	65.8	0 5 13 65 19 00	0 5 13 65 19 86
22	30 x 4	46	20	37.5	8.5	62	65	17.5	M 12 x 55	120	87.3	0 5 13 66 19 00	0 5 13 66 19 86
20	30 x 5	46	20	37.5	8.5	62	65	17.5	M 12 x 55	120	88.1	0 5 13 67 19 00	0 5 13 67 19 86
30	38 x 4	52	28	39	9	72	80	16	M 12 x 55 ¹⁾	120	124.4	0 5 15 17 19 00	0 5 15 17 19 86
28	38 x 5	52	28	39	9	72	80	16	M 12 x 55 ¹⁾	120	124.9	0 5 13 68 19 00	0 5 13 68 19 86
26	38 x 6	52	28	39	9	72	80	16	M 12 x 55 ¹⁾	120	125.1	0 5 13 69 19 00	0 5 13 69 19 86
45	50 x 2.5	63	42	56	10	85	85	19	M 14 x 75	190	197.4	0 5 15 00 19 00	0 5 15 00 19 86
40	50 x 5	63	42	56	10	85	85	19	M 14 x 75	190	197.9	0 5 15 23 19 00	0 5 15 23 19 86
38	50 x 6	63	42	56	10	85	85	19	M 14 x 75	190	197.9	0 5 15 24 19 00	0 5 15 24 19 86
34	50 x 8	63	42	56	10	85	85	19	M 14 x 75	190	201.1	0 5 15 01 19 00	0 5 15 01 19 86
32	50 x 9	63	42	56	10	85	85	19	M 14 x 75	190	201.1	0 5 15 25 19 00	0 5 15 25 19 86

Continuation on page 241

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

¹⁾ Triple safety

* Recommended tightening torques (Nm max.) at 10.9

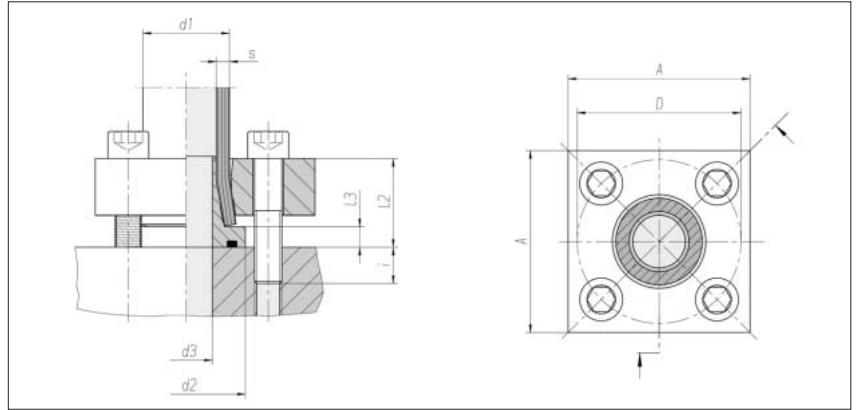
** Sample product code, see: FE-1620

*** without screws

Tube-to-port flange couplings ZAKO system

VOSS square
flange hole pattern
High-pressure series

Max. permissible operating
pressure (PB) 400 bar¹⁾



Flange size NW	Tube d1 x s	d2	d3	l2 approx.	l3	D	A	i	4 x cheese approx. head screw	Nm*	kg/100 approx.	Order No. complete	Order No. ***
45	50 x 2.5	63	42	56	10	98	100	19	M 16 x 75	295	290.1	0 5 15 18 19 00**	0 5 15 18 19 86
40	50 x 5	63	42	56	10	98	100	19	M 16 x 75	295	290.5	0 5 15 19 19 00	0 5 15 19 19 86
38	50 x 6	63	42	56	10	98	100	19	M 16 x 75	295	290.5	0 5 13 70 19 00	0 5 13 70 19 86
34	50 x 8	63	42	56	10	98	100	19	M 16 x 75	295	294.0	0 5 13 71 19 00	0 5 13 71 19 86
32	50 x 9	63	42	56	10	98	100	19	M 16 x 75	295	294.0	0 5 15 20 19 00	0 5 15 20 19 86
54	60 x 3	75	47	64	15	98	100	26	M 16 x 90	295	289.0	0 5 15 02 19 00	0 5 15 02 19 86
50	60 x 5	75	47	64	15	98	100	26	M 16 x 90	295	295.0	0 5 15 21 19 00	0 5 15 21 19 86
40	60 x 10	75	47	64	15	98	100	26	M 16 x 90	295	292.0	0 5 15 03 19 00	0 5 15 03 19 86
49	65 x 8	75	46	60	11	118	120	30	M 20 x 90	580	430.5	0 5 13 72 19 00	0 5 13 72 19 86
50	75 x 12.5	95	45	72	16	118	120	28	M 20 x 100	580	522.0	0 5 13 80 19 00	0 5 13 80 19 86
74	80 x 3	100	71	76	16	145	150	34	M 24 x 110	800	820.0	0 5 15 04 19 00	0 5 15 04 19 86
64	80 x 8	100	60	80	16	145	150	30	M 24 x 110	800	861.0	0 5 15 22 19 00	0 5 15 22 19 86
60	80 x 10	100	60	80	16	145	150	30	M 24 x 110	800	859.0	0 5 13 73 19 00	0 5 13 73 19 86
60	88 x 14	110	54	84	20	145	150	36	M 24 x 120	800	951.0	0 5 13 81 19 00	0 5 13 81 19 86
70	101.6 x 16	114	62	88.5	20	145	150	32	M 24 x 120	800	1132.0	0 5 13 83 19 00	0 5 13 83 19 86
80	114.3 x 17.5	140	74	92	20	175	180	38	M 30 x 130	1500	1400.0	0 5 15 64 19 00	0 5 15 64 19 86
80	120 x 20	140	74	92	20	175	180	38	M 30 x 130	1500	1347.0	0 5 13 82 19 00	0 5 13 82 19 86

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

¹⁾ Triple safety

* Recommended tightening torques (Nm max.) at 10.9

** Sample product code, see: FE-5025

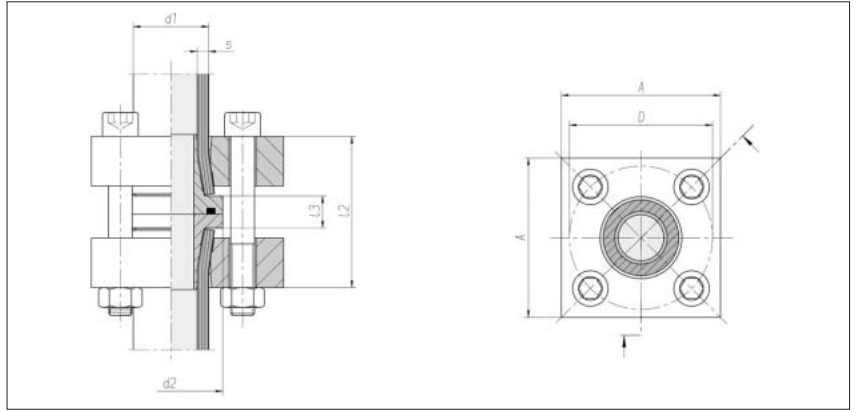
*** without screws



Tube-to-tube
flange couplings
ZAKO system

VOSS square
flange hole pattern
High-pressure series

Max. permissible operating
pressure (PB) 400 bar¹⁾



Flange size NW	Tube d1 x s	d2	l2 approx.	l3	D	A	4 x cheese head screw	Nm*	kg/100 approx.	Order No. complete	Order No. ***
12	16 x 2	30	53.5	13.5	42	50	M 8 x 65	35	81.2	0 5 15 30 19 00**	0 5 15 30 19 86
11	16 x 2.5	30	53.5	13.5	42	50	M 8 x 65	35	81.3	0 5 14 60 19 00	0 5 14 60 19 86
10	16 x 3	30	53.5	13.5	42	50	M 8 x 65	35	81.4	0 5 14 61 19 00	0 5 14 61 19 86
15	20 x 2.5	38	61.5	13.5	50	55	M 10 x 75	69	106.3	0 5 15 31 19 00	0 5 15 31 19 86
14	20 x 3	38	61.5	13.5	50	55	M 10 x 75	69	106.8	0 5 14 62 19 00	0 5 14 62 19 86
13	20 x 3.5	38	61.5	13.5	50	55	M 10 x 75	69	107.1	0 5 14 63 19 00	0 5 14 63 19 86
19	25 x 3	38	62	14	50	55	M 10 x 75	69	126.6	0 5 14 64 19 00	0 5 14 64 19 86
17	25 x 4	38	62	14	50	55	M 10 x 75	69	127.3	0 5 14 65 19 00	0 5 14 65 19 86
22	30 x 4	46	72.5	14.5	62	65	M 12 x 90	120	168.0	0 5 14 66 19 00	0 5 14 66 19 86
20	30 x 5	46	72.5	14.5	62	65	M 12 x 90	120	170.4	0 5 14 67 19 00	0 5 14 67 19 86
30	38 x 4	52	76	16	72	80	M 12 x 90 ¹⁾	120	243.1	0 5 15 32 19 00	0 5 15 32 19 86
28	38 x 5	52	76	16	72	80	M 12 x 90 ¹⁾	120	243.4	0 5 14 68 19 00	0 5 14 68 19 86
26	38 x 6	52	76	16	72	80	M 12 x 90 ¹⁾	120	243.5	0 5 14 69 19 00	0 5 14 69 19 86
45	50 x 2.5	63	109	17	85	85	M 14 x 120	190	379.3	0 5 15 10 19 00	0 5 15 10 19 86
40	50 x 5	63	109	17	85	85	M 14 x 120	190	379.8	0 5 15 38 19 00	0 5 15 38 19 86
38	50 x 6	63	109	17	85	85	M 14 x 120	190	379.3	0 5 15 39 19 00	0 5 15 39 19 86
34	50 x 8	63	109	17	85	85	M 14 x 120	190	385.5	0 5 15 11 19 00	0 5 15 11 19 86
32	50 x 9	63	109	17	85	85	M 14 x 120	190	385.9	0 5 15 40 19 00	0 5 15 40 19 86

Continuation on page 243

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

¹⁾ Triple safety

* Recommended tightening torques (Nm max.) at 10.9

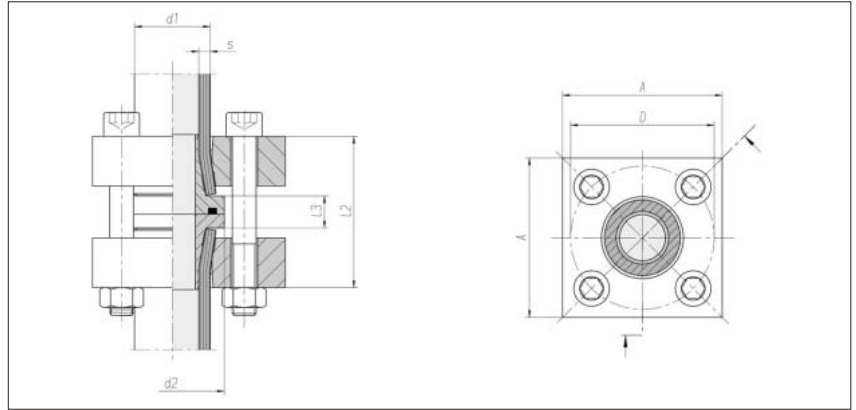
** Sample product code, see: FG-1620

*** without screws

Tube-to-tube flange couplings ZAKO system

VOSS square
flange hole pattern
High-pressure series

Max. permissible operating
pressure (PB) 400 bar¹⁾



Flange size NW	Tube d1 x s	d2	l2 approx.	l3	D	A	4 x cheese head screw	Nm*	kg/100 approx.	Order No. complete	Order No. ***
45	50 x 2.5	63	109	17	98	100	M 16 x 130	295	565.2	0 5 15 33 19 00	0 5 15 33 19 86
40	50 x 5	63	109	17	98	100	M 16 x 130	295	565.7	0 5 15 34 19 00	0 5 15 34 19 86
38	50 x 6	63	109	17	98	100	M 16 x 130	295	565.2	0 5 14 70 19 00	0 5 14 70 19 86
34	50 x 8	63	109	17	98	100	M 16 x 130	295	571.4	0 5 14 71 19 00	0 5 14 71 19 86
32	50 x 9	63	109	17	98	100	M 16 x 130	295	571.8	0 5 15 35 19 00	0 5 15 35 19 86
54	60 x 3	75	115	27	98	100	M 16 x 140	295	551.0	0 5 15 12 19 00	0 5 15 12 19 86
50	60 x 5	75	115	27	98	100	M 16 x 140	295	568.3	0 5 15 36 19 00	0 5 15 36 19 86
40	60 x 10	75	115	27	98	100	M 16 x 140	295	554.8	0 5 15 13 19 00	0 5 15 13 19 86
49	65 x 8	75	117	19	118	120	M 20 x 140	580	820.0	0 5 14 72 19 00	0 5 14 72 19 86
50	75 x 12.5	95	150	28	118	120	M 20 x 180	580	1003.0	0 5 15 41 19 00	0 5 15 41 19 86
74	80 x 3	100	134	29	145	150	M 24 x 180	800	1580.0	0 5 15 19 19 00	0 5 15 19 19 86
64	80 x 8	100	141	36	145	150	M 24 x 180	800	1658.0	0 5 15 37 19 00	0 5 15 37 19 86
60	80 x 10	100	141	36	145	150	M 24 x 180	800	1654.0	0 5 14 73 19 00	0 5 14 73 19 86
60	88 x 14	110	172	36	145	150	M 24 x 200	800	1796.0	0 5 15 42 19 00	0 5 15 42 19 86
70	101.6 x 16	114	173	36	145	150	M 24 x 160	800	2054.0	0 5 14 75 19 00	0 5 14 75 19 86
80	114.3 x 17.5	140	180	36	175	180	M 30 x 170	1500	2565.0	0 5 15 65 19 00	0 5 15 65 19 86
80	120 x 20	140	180	36	175	180	M 30 x 170	1500	2465.0	0 5 14 74 19 00	0 5 14 74 19 86

When selecting the tube dimensions, refer to the pressure specifications of the tube manufacturer.

¹⁾ Triple safety

* Recommended tightening torques (Nm max.) at 10.9

*** without screws

