



HANSA FLEX

TECHNICAL INFORMATION **FLANGES**

Technical information Flanges

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1. General information

This technical information relates to flange connections in the context of SAE high- and low-pressure flanges, Cetop flanges, pump flanges, individual parts and accessories.

The instructions and guidance are to be observed or implemented and describe precautionary measures the non-adoption of which can lead to severe injury or risk to life for users or third parties or to material damage to plant and equipment, or may adversely impact the environment.

All work must be performed by suitably qualified and knowledgeable personnel. National accident prevention regulations or local safety rules imposed by the operator must also be observed.

This technical information gives instruction and guidance on the use of flange connections and makes no claim of completeness. HANSA-FLEX AG in cooperation with its partner, the International Hydraulics Academy (IHA), offers training courses for a deeper knowledge of the subject.

2. Safety instructions

Careless or incorrect handling or the wrong choice of hydraulic components or accessories may result in damage to property or personal injury! Caution: Risk to life!

Incorrect handling of hydraulic components and/or the non-use of personal protective equipment can have the following consequences, (examples):

- Injuries caused by components set in motion or lowering as a result of failure of the hydraulic circuit
- Injuries caused by the escape of fluids under high pressure
- Injuries from hose line whiplash
- Injuries caused by the explosion or ignition of flammable media
- Injuries caused by contact with the fluid (very hot, very cold, toxic, corrosive, ...)
- Injuries caused by touching components carrying very hot or very cold fluids
- Functional impairment of plant, equipment or tools connected to the system

The following information on the selection and handling of hydraulic components represents additional safety instructions that must also be taken into account when using our products.

Safety precautions: Systems, plant and equipment must be designed such that risk to personnel is excluded in the event of the failure of the hydraulic components. The same approach should be taken in order to avoid property and environmental damage.

Responsibility of the employer (operator): The employer is, for example, responsible for all measures that affect the choice of suitable products and observance of safety precautions.

The plant operator (employer) must, in particular, ensure that:

- The hydraulic components are used only for their intended purpose
- The hydraulic components may be operated only if they are in a technically flawless and serviceable condition
- The operating personnel must be adequately familiarised with how the hydraulic components work and their safety instructions
- No safety equipment may be removed and/or disabled during operation of the hydraulic components

- The hydraulic components must not be in a pressurised state during installation or removal.

Design / selection criteria for flange connections

- The following points must be taken into account, (not exhaustive):
- Resistance to media – e.g. of the seals
- Working pressures
- Operating temperatures
- Size / flow
- Special operating or ambient conditions
- Certifications (are there particular requirements?)
- Vacuum operation
- External forces (tension and shear forces, vibrations etc.)

3. Technical information

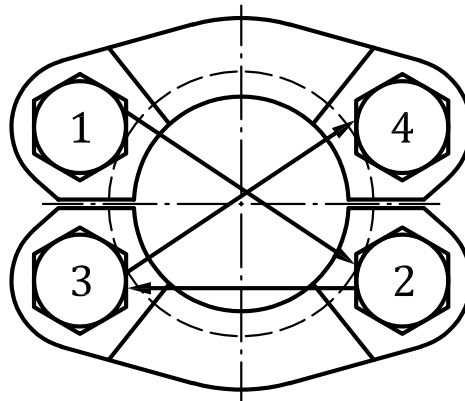
Selection criteria for flange connections

- Consider the recommended fields of use in the light of the manufacturer's information and your own experience
- Are the required safety factors maintained? E.g. 1:4 (max. working pressure / burst pressure)
- Equivalence of system pressure and max. working pressure of the component
- Temperature ranges for the proposed use
- Connection types for connecting into the pipeline network
- Materials required for the flange connections, including seals
- Size of the flange connections, taking into account the volumetric flow and pressure loss requirements

3.1 Installation instructions

Installation

1. Check the sealing face and sealing ring groove of the flange to be mounted for damage and remove any burrs and foreign particles.
2. Apply system fluid to the surface of the sealing ring and then place the sealing ring into the sealing ring groove.
3. Position the flange on the counter piece and pre-mount the screws, tightening them until they are hand tight.
4. Important: In order to avoid any breaks, slightly tighten all screws before applying the tightening torque.
5. Tighten the screws with the recommended tightening torque in the order 1,2,3,4 (see illustration below).



For flanges that are connected to a hydraulic pipe by a welded connection, do not place the sealing ring into the groove provided for that purpose until the component has been cleaned and allowed to cool.

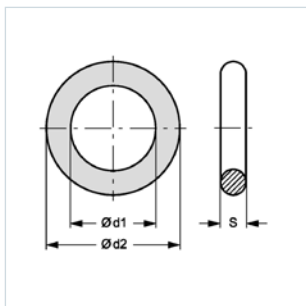
The connecting screws for square flanges are tightened in the same way as shown above.

In addition to choosing the correct means of flange attachment and proper installation, the choice of suitable elastomeric seals is also important. This will avoid leaks and ensure the flange connection performs reliably.

The choice of SAE flange halves and SAE full flanges must take into account the construction.

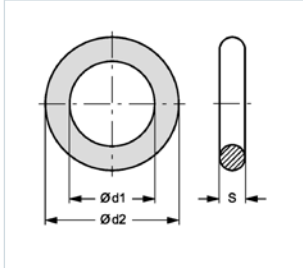
Seals

Hydraulic seals made from various materials are suitable for sealing the flange connections. The information below applies to their use as flange seals. The HANSA-FLEX range includes:



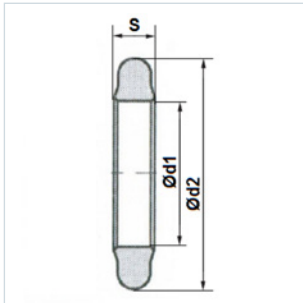
SAE O – ring

Example:	SAE O-RING 1/2
Working pressure:	Max. 420 bar
Usage temperature:	-40 °C to 120 °C
Media:	Mineral oils, hydraulic oils
Material:	NBR 90 Shore
Can be used for e.g.:	Standard hydraulic applications



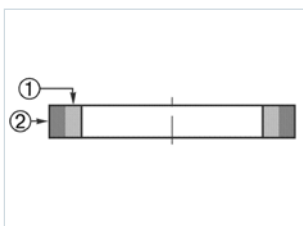
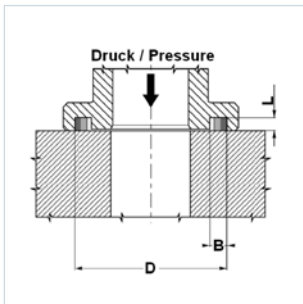
SAE O – ring V

Example:	SAE O-RING 1/2 V
Working pressure:	Max. 420 bar
Usage temperature:	-15 °C to 200 °C
Media:	Mineral oils, hydraulic oils
Material:	FKM 90 Shore (Viton)
Can be used for e.g.:	Higher temperature ranges, various media



FS

Example:	FS-08
Working pressure:	Max. 500 bar
Usage temperature:	-40 °C to 120 °C
Media:	Mineral oils, hydraulic oils
Material:	Polyurethane 93 Shore A
Can be used for e.g.:	Higher pressure ranges, increased requirements



SFS

Example:	SFS-08
Working pressure:	Max. 420 bar
Usage temperature:	-35 °C to 110 °C
Media:	Mineral oils, hydraulic oils
Material:	Polyurethane: (1) 57 Shore A / (2) 95 Shore A
Can be used for e.g.:	Higher loads, rough surfaces

Screws

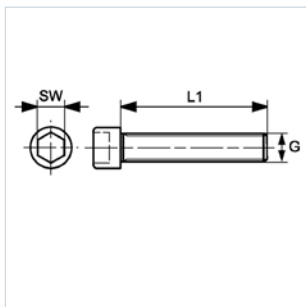
In accordance with ISO 6162-1 and ISO 6162-2, metric screws of property class 10.9 or inch screws grade 8 are to be used. Inch screws are not to be used for new assemblies.

HANSA-FLEX uses metric screws of property class 10.9 and inch screws grade 8.

The table below summarises the screws, associated working pressures and tightening torques to be used.

The listed tightening torques are recommended values and relate to oiled screws with a friction coefficient of 0.17 and the material pair steel / steel. If factors deviate from this situation, the value must be re-determined.

Hexagon socket screw



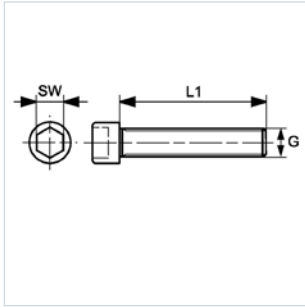
Schraube M

Example:	SCHRAUBE M 08-25
Standard:	DIN 912 (ISO 4762)
Design:	Hexagon socket screw
Material:	Steel 10.9
Surface:	Phosphate treated

The suffix VZ (SCHRAUBE M VZ) indicates that the product is also available with a galvanic zinc surface finish.

In addition, **SCHRAUBE M SK** screws **10.9** with **hexagon head** are available.

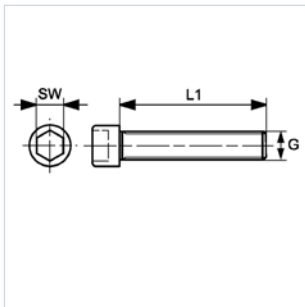
Metric screw set



AFS SCHR M

Example:	AFS 80 SCHR M
Standard:	DIN 912 (ISO 4762)
Design:	Screw set
Material:	Steel 10.9
Surface:	Black oiled

UNC screw set



AFS SCHR U

Example:	AFS 80 SCHR U
Standard:	ASA B 18.3 – Grade 8
Design:	Screw set
Material:	Steel
Surface:	Black oiled

Additional information lock washers:

There is no technical reason why lock washers should be used. Lock washers perform no safety function either with respect to the holes or the loosening of screws. For this reason, the relevant standards (e.g.: DIN 127) have also been withdrawn.

Recommendation: Do not use lock washers (if necessary, hardened plain washers can be used).

Screw tightening torques and maximum working pressures for flange connections in accordance with ISO 6162

Screws 10.9					Screws UNC Grade 8*		
Nominal size		HF designation for metric hexagon socket screw (1 No.)	Tightening torque	Maximum working pressure	HF designation for inch hexagon socket screw set (4 No.)	Tightening torque	Maximum working pressure
ISO (DN)	SAE (inch)		Nm (+10%)	bar		Nm (+10%)	bar
For flanges in accordance with ISO 6162-1 (3000 psi) and SAE J518-1 (Code 61) / 35–350 bar							
13	1/2"	SCHRAUBE M 8-25	32	350	AFS 80 SCHR U (5/16-18"x32mm)	32	350
19	3/4"	SCHRAUBE M 10-30	70	350	Screw: 3/8-16"x32mm (1)	60	350
25	1"	SCHRAUBE M 10-30	70	320	Screw: 3/8-16"x32mm (1)	60	320
32	1 1/4"	SCHRAUBE M 10-30	70	280	AFS 104 SCHR U (7/16-14"x38mm)	92	280
38	1 1/2"	SCHRAUBE M 12-35	130	210	Screw: 1/2-13"x38mm (1)	150	210
51	2"	SCHRAUBE M 12-35	130	210	Screw: 1/2-13"x38mm (1)	150	210
64	2 1/2"	SCHRAUBE M 12-40	130	175	AFS 106 SCHR U (1/2-13"x44mm)	150	175
76	3"	SCHRAUBE M 16-50	295	160	Screw: 5/8-11"x44mm (1)	295	160
89	3 1/2"	SCHRAUBE M 16-50	295	35	Screw: 5/8-11"x51mm (1)	295	35
102	4"	SCHRAUBE M 16-50	295	35	Screw: 5/8-11"x51mm (1)	295	35
127	5"	SCHRAUBE M 16-55	295	35	Screw: 5/8-11"x57mm (1)	295	35
For flanges in accordance with ISO 6162-2 (6000 psi) and SAE J518-2 (Code 62) / 420 bar							
13	1/2"	SCHRAUBE M 8-30	32	420	AFS 80 SCHR U (5/16-18"x32mm)	32	420
19	3/4"	SCHRAUBE M 10-35	70	420	AFS 100 SCHR U (3/8-16"x38mm)	60	420
25	1"	SCHRAUBE M 12-45	130	420	AFS 403 SCHR U (7/16-14"x44mm)	92	420
32	1 1/4"	SCHRAUBE M 12-45	130	420	AFS 106 SCHR U (1/2-13"x44mm)	150	420
32	1 1/4"	M14 x 45**	180	420	/		
38	1 1/2"	SCHRAUBE M 16-55	295	420	Screw: 5/8-11"x57mm (1)	295	420
51	2"	SCHRAUBE M 20-70	550	420	Screw: 3/4-10"x70mm (1)	450	420
64	2 1/2"	M24 x 80 (1)	550	420	/		
76	3"	M30 x 90 (1)	650	420	/		

* In accordance with ISO 6162 and SAE J518 not to be used for new assemblies. Metric screws must be used for new assemblies.

** In accordance with ISO 6162 and SAE J518 not to be used for new assemblies. M12 screws and corresponding flanges must be used for new assemblies (e.g.: FH6044).

(1) Not a catalogue item. Can be obtained on request.

3.2 Technical parameters

Materials

Material descriptions for flanges can usually be found in the HANSA-FLEX catalogue data. HANSA-FLEX reserves the right to use alternative materials of the same quality, provided that the product standards allow it.

Screws of at least property class 10.9 (metric) or grade 8 (inch) are to be used for flanges in accordance with ISO 6162-1 and ISO 6162-2. Screws of property class 8.8 (metric) and grade 5 (inch) may no longer be used.

Screws of at least property class 10.9 are to be used for flanges in accordance with ISO 6164.

Pressure data

Pressure data usually refer to individual components. Where different individual parts are joined together, the weakest component determines the maximum working pressure of the combined assembly.

Relevant product standards

ISO 6162-1: Hydraulic fluid power – Flange connectors with split or one-piece flange clamps and metric or inch screws - Part 1: Flange connectors for use at pressures of 3.5 MPa (35 bar) to 35 MPa (350 bar), DN 13 to DN 127.

ISO 6162-2: Hydraulic fluid power – Flange connectors with split or one-piece flange clamps and metric or inch screws - Part 2: Flange connectors, ports and mounting surfaces for use at a pressure of 42 MPa (420 bar), DN 13 to DN 76.

ISO 6164: Hydraulic fluid power - Four-screw, one-piece square flange connections for use at pressures of 42 MPa, DN 25 to 80.

SAE J 518-1 (compatible with ISO 6162-1)

SAE J 518-2 (compatible with ISO 6162-2)

4. Maintenance

Components must be regularly inspected and kept in a safe condition. Instructions arising from risk assessments must be implemented.

5. Disposal information

Observe the local waste disposal regulations.