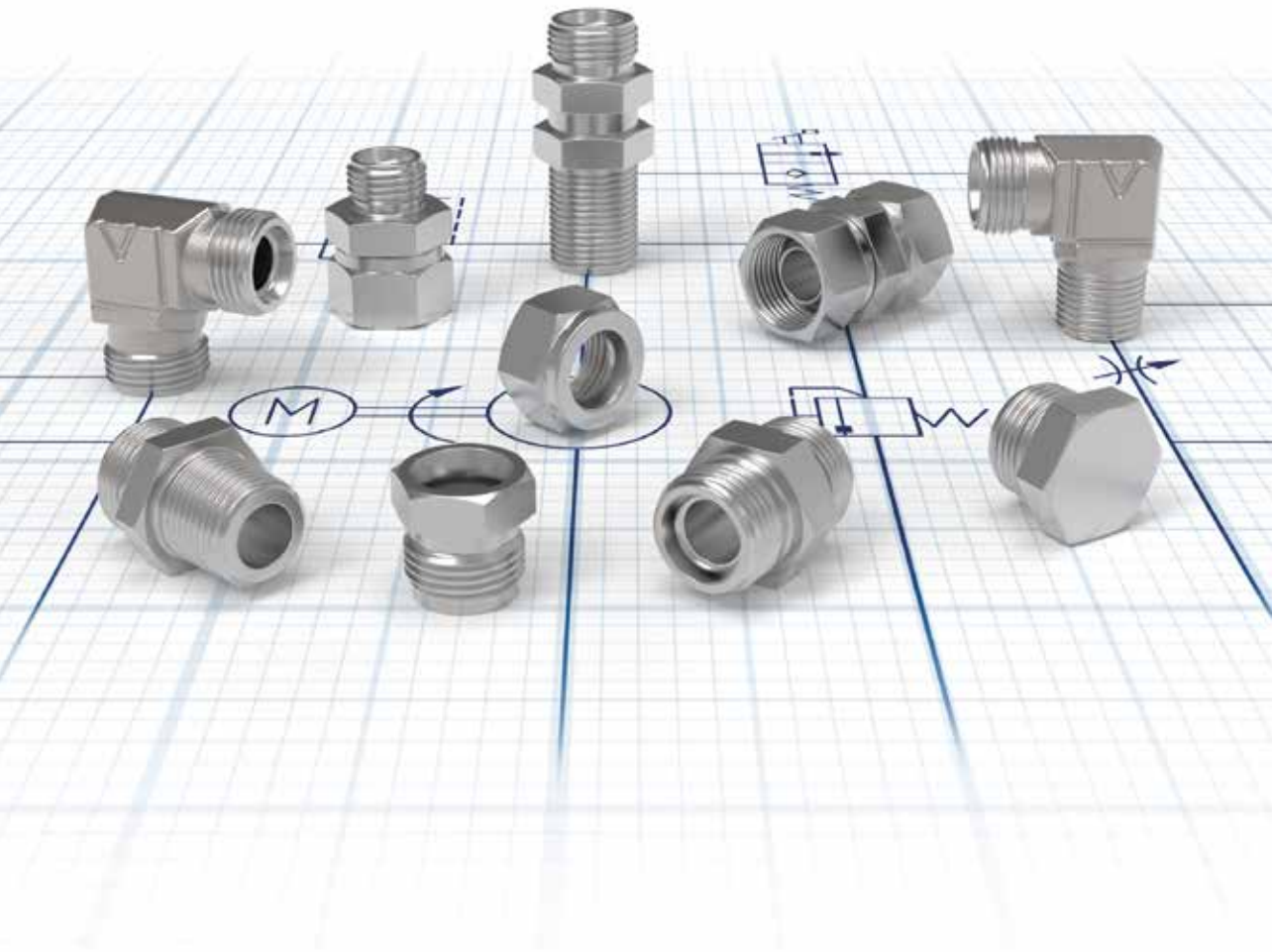
VOSS

VOSS *Lok* 40



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Dealers world-wide

Please request the latest list of dealers from our Wipperfürth sales office.

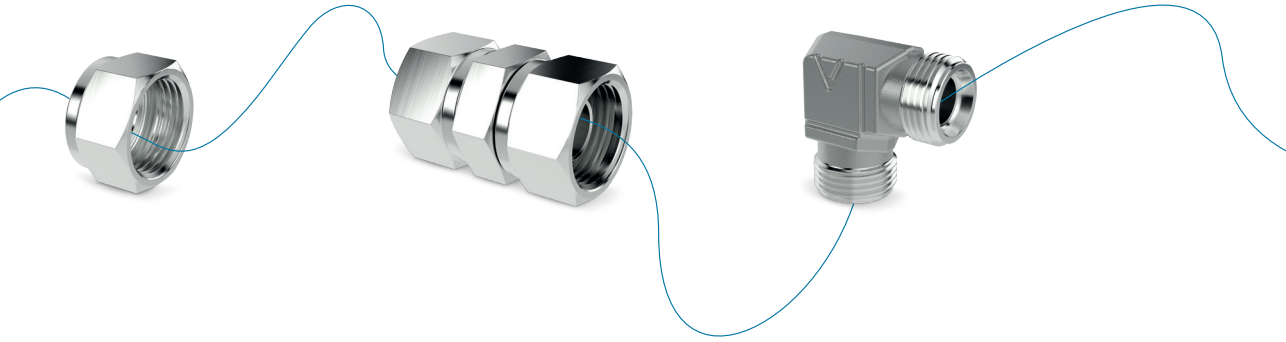
To ensure operation-safe functionality of the VOSS products, compliance with the respective operating and assembly instructions as well as current standards and regulations of general mechanical engineering are basic requirements. Please always use the respective current version of these.

Printing errors, mistakes and technical changes reserved.
This issue of the catalog replaces all previously published documents, catalogs and assembly instructions, etc.

All previous documents loose their validity immediately!

VOSS

Content Chapter



General information

Connections with passion.

The company

VOSS is partner to vehicle manufacturing and mechanical engineering companies, providing tubing and connection technology for fluid systems.

Thanks to its strong customer focus, its innovations and outstanding quality, the company – founded in 1931 – has developed into an international corporate group. VOSS Holding is the parent organization under which VOSS Automotive GmbH, VOSS Fluid GmbH and 11 foreign subsidiaries are grouped.

With production facilities in Austria and abroad and sales companies in Europe and overseas, VOSS is one of the top suppliers of fluid system components – "VOSS Automotive" serving the vehicle engineering and "VOSS Fluid" for the mechanical engineering sectors.

VOSS's product range includes connecting elements, ready-to-install tubing, valves and other components for use in pneumatic, hydraulic, fuel and air-conditioning systems.

VOSS, as a development partner and system provider offering a comprehensive product range, is committed to active participation in ongoing decision-making processes in the fluid engineering industry.

Company headquarters: Factory and administration in Wipperfürth

Machine components for connection technology

A full offer and quality: this is the principle that VOSS follows to produce one of the most product ranges of tube connection systems. The whole spectrum can be supplied as a catalog range.

Cutting ring couplings, soft-sealing and flanged screw couplings, tube forming systems, flange couplings and complementary accessories are all part of the offer. One area of focus in particular is the development of customer-oriented system solutions. For these, VOSS Fluid takes on a full package of tasks from project planning to engineering, production, assembly, and special logistics services.

VOSS Fluid also offers convincing and economical added services and suggestions for improvement which take purchasing costs, assembly effort, sustainability of the couping seal and long-term corrosion protection into account.

The strict quality policy and quality aims defined accordingly - documented in all required certification and approvals of the valid associations and specialist professional bodies - have secured VOSS a leading position in its traditional markets.

Thanks to worldwide depots with a wide range of systems and a global network of authorized specialist dealers, VOSS Fluid stands for the highest availability of products and offers particularly economical supply systems. These ranges from KANBAN Full Service to full optimization of the customer's supply chain.

With regular training and provision of application information, VOSS Fluid offers a wide range of special services. The internal and cross-department logistics of the whole VOSS company group results in significant cost benefits which make timely and capacity-optimized customer production possible without the customer needing to build up its own stocks.

VOSS corporate environmental policy

1. The management of the VOSS corporate group considers environmental protection to be an important part of business management and the basis of long-lasting company success.

2. VOSS employees are integrated at all levels into the group's efforts to protect and reduce the burden on the environment on a permanent basis, and their awareness for the environment is encouraged by training and other activities.

3. VOSS evaluates the impact of all new developments (both products and processes) on the environment with the aim of keeping this impact to a minimum.

4. The impact of activities on the local environment are regularly monitored and evaluated.

5. Where it is impossible to avoid negative impact on the environment, one of the company's explicit objectives is to continuously reduce this impact.

6. In order to put this policy into practice, defined procedures and specifications regulating the relevant technical and organizational procedures are in place within the company.

7. Working in close cooperation with authorities and customers, VOSS constantly determines and evaluates existing environmental protection requirements. This forms the basis for all our activities to constantly reduce existing environmental burdens and comply with statutory regulations.

8. The public, as well as any other interested persons and organizations can obtain information on our environment-related activities at any time.

9. VOSS encourages its contractual partners to apply the same standards as VOSS itself does.

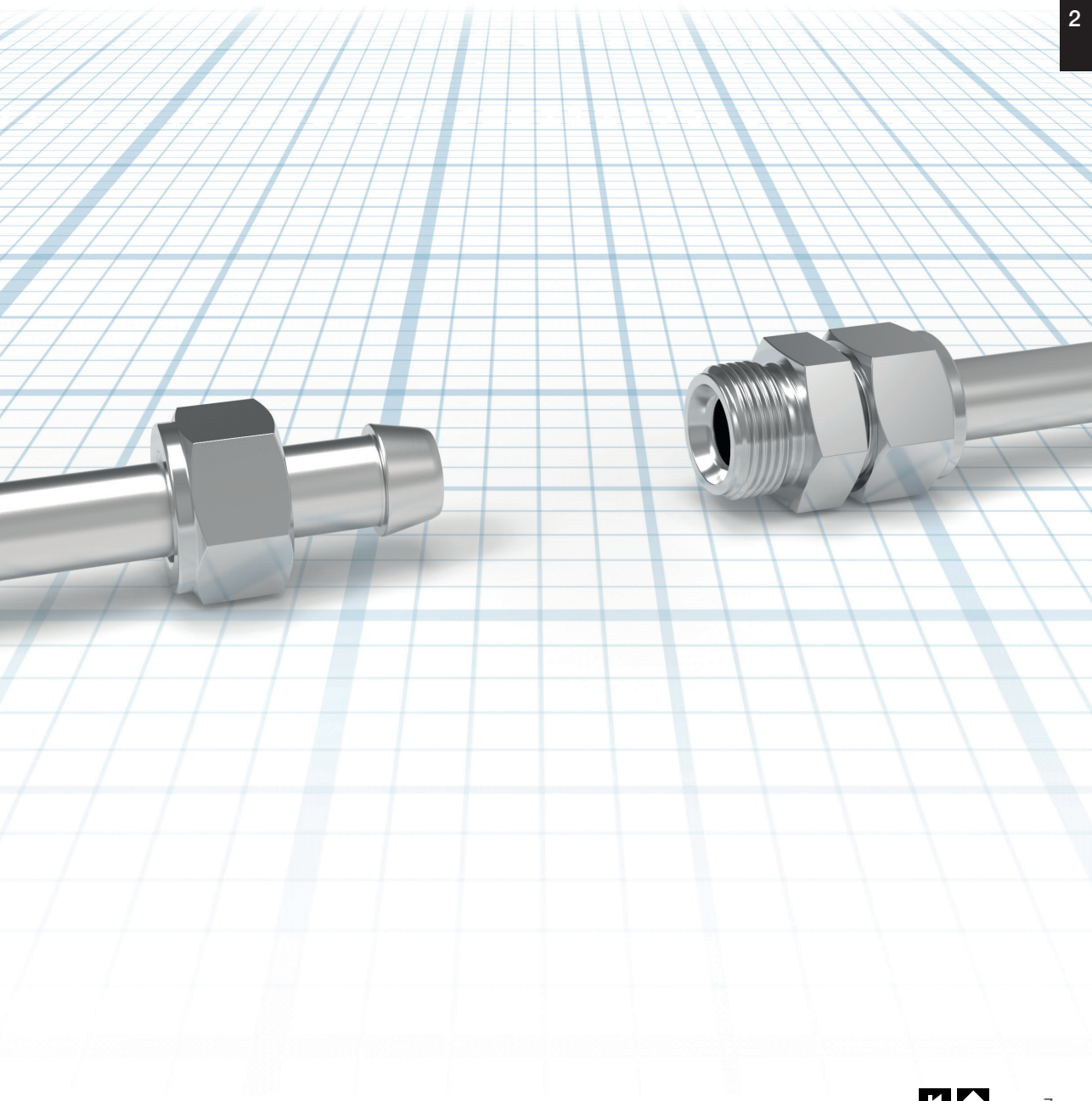
10. Energy efficiency is a major consideration when acquiring plant, equipment and services.

11. We are constantly improving our energy balance by implementing dedicated measures.

VOSS

Overview of 40° tube connection system

The innovative and economical tube forming solution



Content	Type/Page
The complete range of VOSS *Lok 40* couplings	P.10
VOSS *Lok 40* tube connections product informations	P.13

The complete range of VOSS *Lok 40* couplings

Tube connecting parts

Union nuts	Retaining screws
	
P. 32 40-N-...-	P. 34 40-SU-...-

Male stud connectors

imperial, parallel, sealing ring	imperial, parallel, sealing edge	imperial, parallel, PEFLEX	UN/UNF, O-Ring	NPT, conical	Angle, NPT, conical
					
P. 36 40-SDS-...	P. 37 40-SDS-...	P. 38 40-SDS-...	P. 39 40-SDS-...	P. 40 40-SDS-...	P. 41 40-SDE-...

Unions

Straight	Elbow	T
		
P. 44 40-S-...	P. 45 40-E-...	P. 46 40-T-...

Bulkhead unions

Straight

P. 48
40-BHSLN-…

40° taper couplings

Straight

P. 50
40-SW2S-…

Elbow

P. 51
40-SWE-…

Reducers

P. 52
40-SWS-…

Female connectors

Straight female stud connectors, imperial

P. 54
40-S-…

Component parts and accessories for couplings

Blanking plugs

P. 56
40-PLC-…

Tube blanking screws

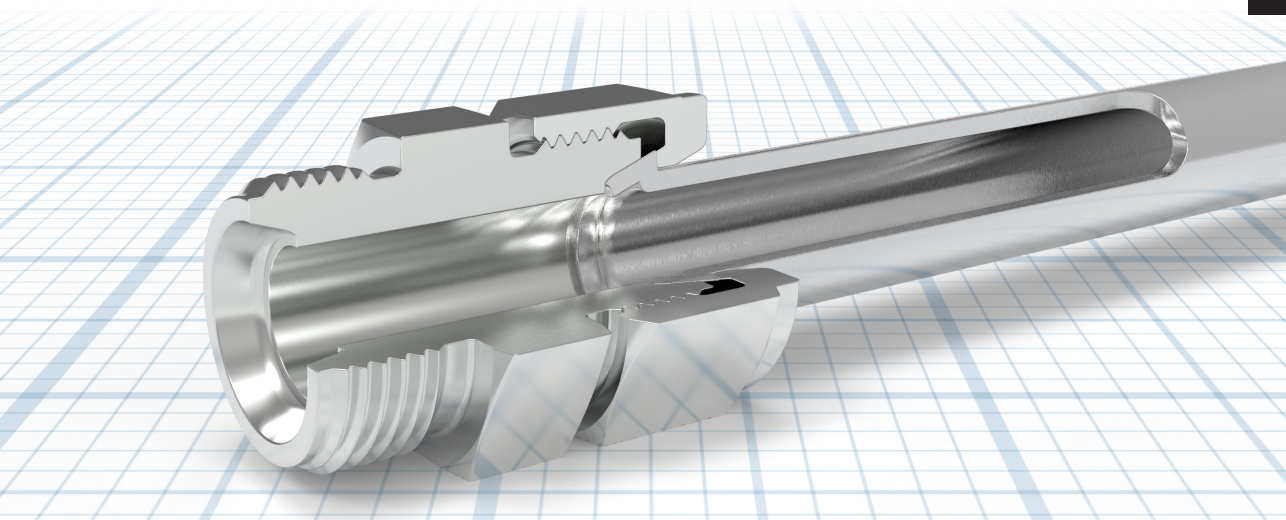
P. 58
40-TBS-…

Sealing rings

P. 60
GP-SR-…

VOSS

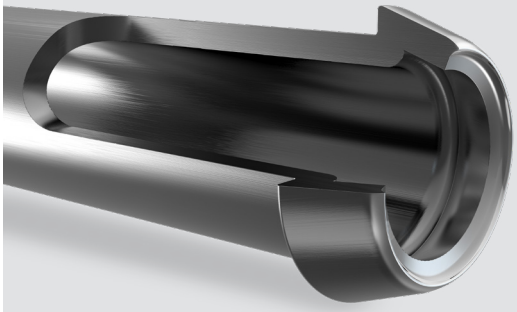
VOSS *Lok* 40 tube connections
product informations



VOSS *Lok* 40 - the innovative and economical tube connection

We are famous worldwide for our expertise as a manufacturer of tube connections in the field of high pressure hydraulics. And also because we are always working to improve our solutions even more. Our development engineers have been moving away from cutting ring systems and toward forming systems in hydraulics for years. The advantages can also be transferred to applications with clamping ring systems. The result: VOSS *Lok* 40 - our innovative and cost-effective tube forming solution.

With the VOSS *Lok* 40 forming machine, a sealing and holding contour is formed at the end of the tube so that clamping rings are no longer required.



Design-dependent process reliability

- The mechanical forming process eliminates errors and enables simple pre-assembly.
- VOSS *Lok* 40 protects against assembly errors with a noticeable increase in force at the end of assembly.
- VOSS *Lok* 40 enables simple and secure torque assembly.

High tightness

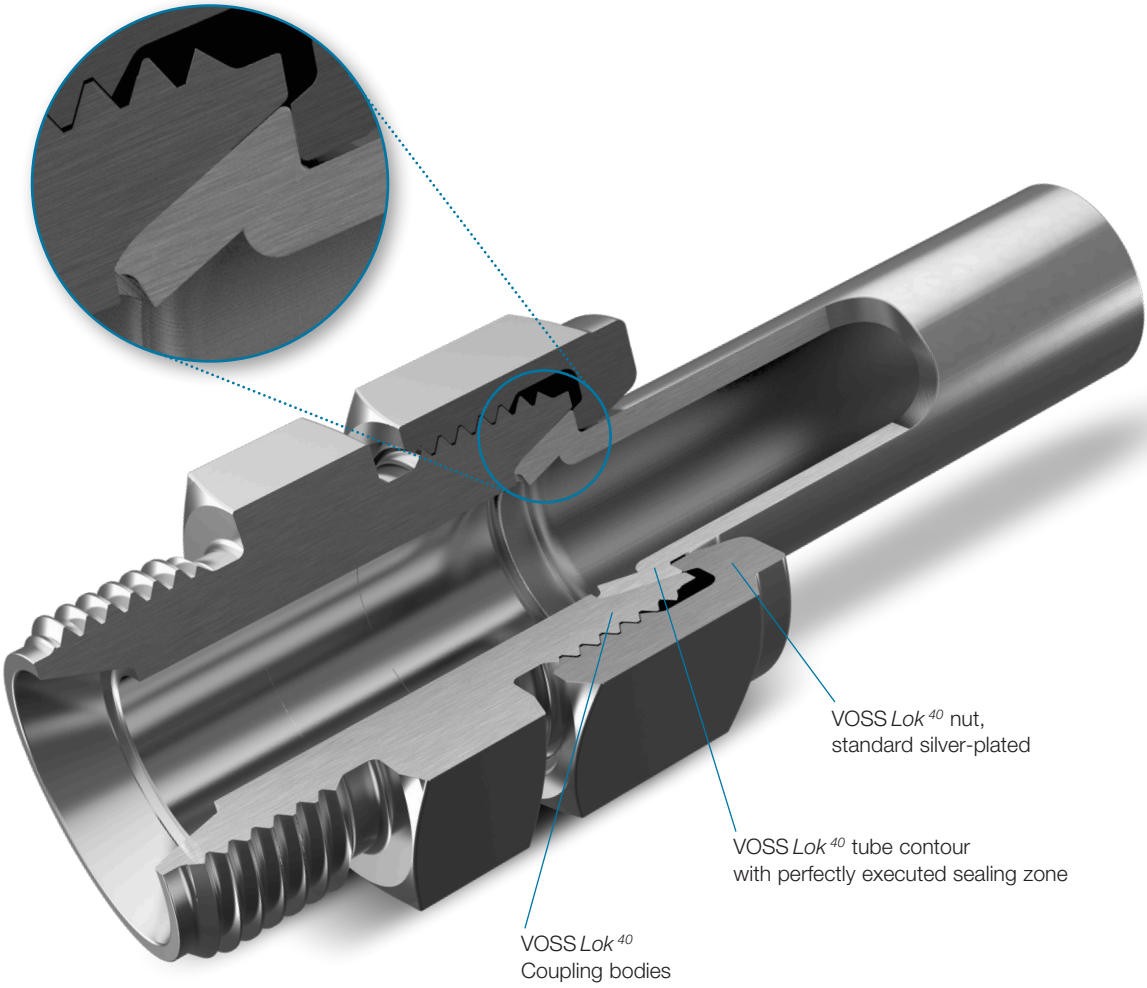
- VOSS *Lok* 40 ensures a high level of impermeability at nominal pressures of up to 70 MPa (700 bar).
- VOSS *Lok* 40 is also best suited for use in gas applications.
- The high surface quality of the forming reduces the possibilities of leakage paths.

Highly cost-effective

- Prevention of leaks and claims
- Reduction of material and warehousing costs by saving on components
- Fast and more process-reliable forming process

Chemistry & petrochemistry

The VOSS *Lok* 40 principle



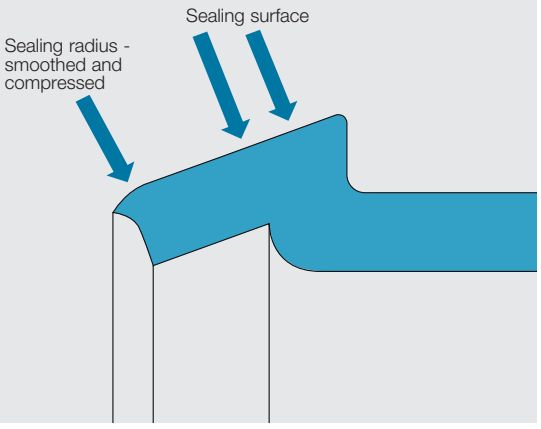
Energy

VOSS *Lok* 40 - the perfect contour for an optimal seal

The VOSS *Lok* 40 tube contour

The 40° tube contour is formed at the end of the tube with the VOSS *Lok* 40 forming machine. The material on the tube surface is compressed and smoothed on the sealing radius by the mechanical forming process. This eliminates surface defects on the tube and achieves maximum impermeability.

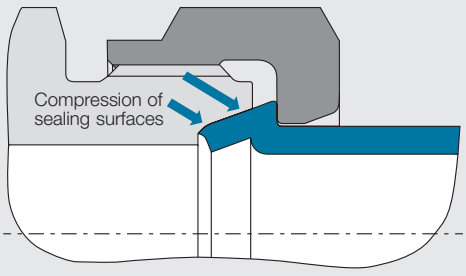
Tube forming



The VOSS *Lok* 40 connecting system

Connecting studs and tube contours are aligned with each other in such a way as to achieve highest pressing of sealing surfaces and thereby an optimum seal of the only possible leak path.

VOSS *Lok* 40 tube connection



Water Supply

VOSS *Lok* [40] - an abundance of process reliability

Assembly made easy

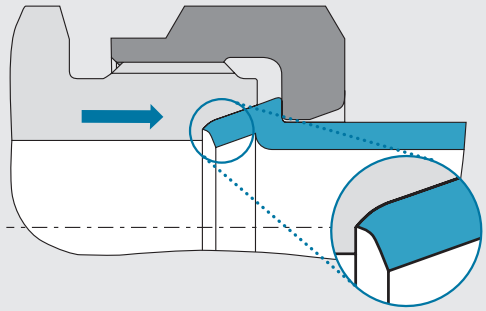
- Assembly is performed in just a few steps.
- A controlled increase in force occurs at the end of the assembly process.
- The option to re-tighten the connection is retained.

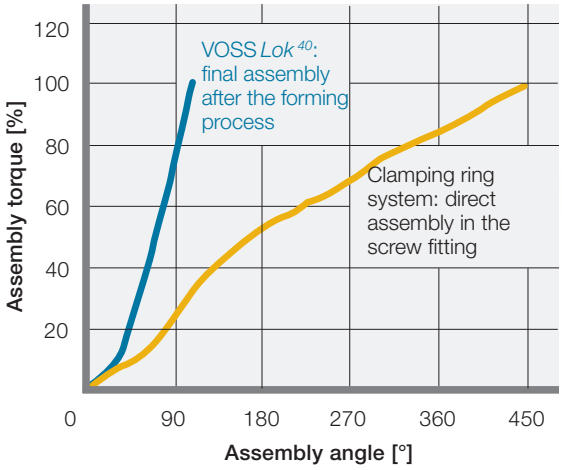
Assembly advantages compared to clamp ring systems

- The assembly travel path is significantly reduced (tightening 120° instead of 450°).
- VOSS *Lok* [40] also enables torque assembly.
- The noticeable increase in force at the end of assembly protects against over-tightening.

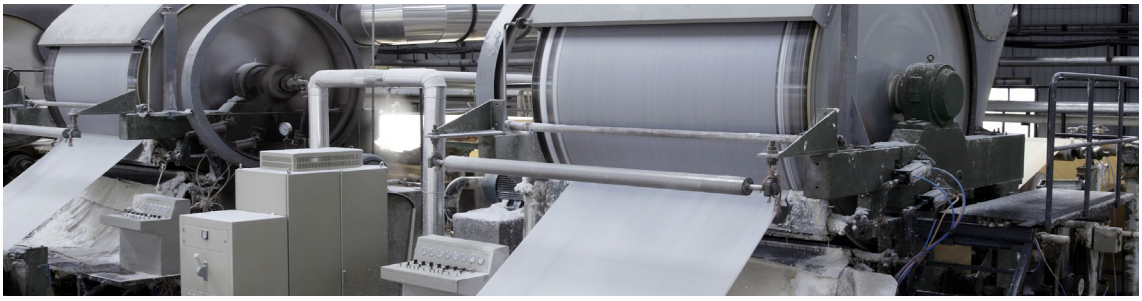
In combination with the stop surface on the connecting stud, the nose formed on the sealing radius results in a “soft” block stop.

VOSS *Lok* [40] over-tightening protection





Cellulose & paper



VOSS *Lok* 40 - simple, fast and precise forming

The VOSS *Lok* 40 forming machine enables fast and precise forming. Its simple operating concept guarantees flawless pre-assemblies, and its compact design expands the possible applications.

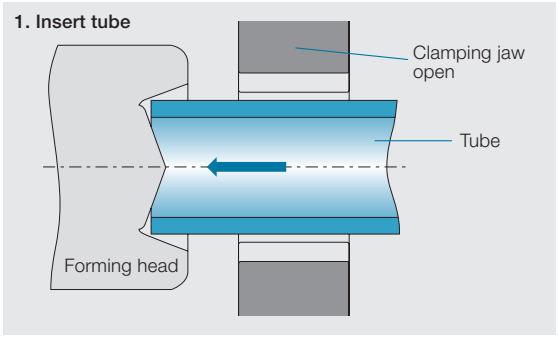
The VOSS *Lok* 40 forming machine

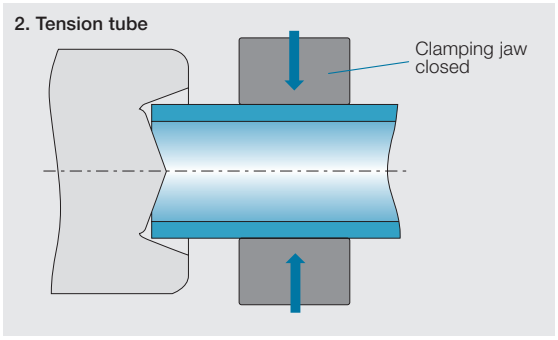
- Specially designed for tight tube bends and short tube lengths
- Flawless pre-assembly process through mechanical forming
- Short cycle times of 3 to 5 seconds!
- Compact design
- Automatic machine setting of the forming parameters
- Automatic tool recognition
- For tubes with an outside diameter of 6 to 22 mm
- For tubes made of steel, stainless steel or special materials
- For metric and imperial tube dimensions

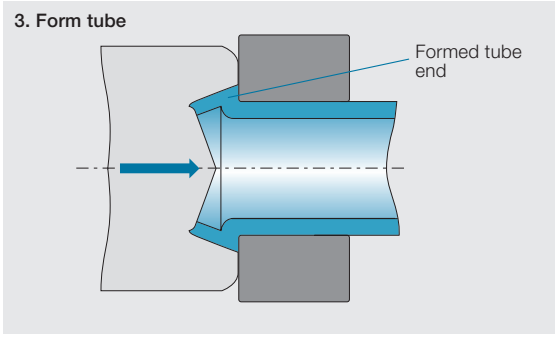
Oil & Gas

The forming process

Thanks to the newly developed tool unit with double function, the forming process can be carried out quickly and securely in just three steps.







One tool unit for steel and stainless steel tubes

Forming tool and clamping elements are integrated in one unit, reducing pre-assembly errors and allowing for faster and simpler tool change without risk of confusion.

Industry

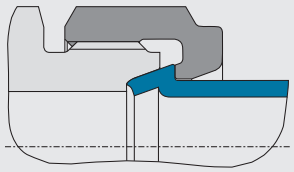
VOSS *Lok* 40 - the versatile and flexible system

VOSS *Lok* 40 is compatible with clamping ring coupling bodies

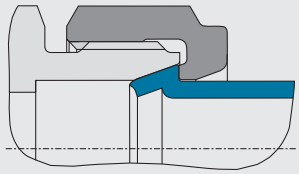
The VOSS *Lok* 40 system can also be used in combination with conventional clamping ring connector.

The cost advantage as well as the reduction of leak paths remain, except the assembly advantage of the “soft” block stop cannot be used in this combination.

Tube connection parts in the VOSS *Lok* 40 stud



Tube connection parts in the clamping ring stud

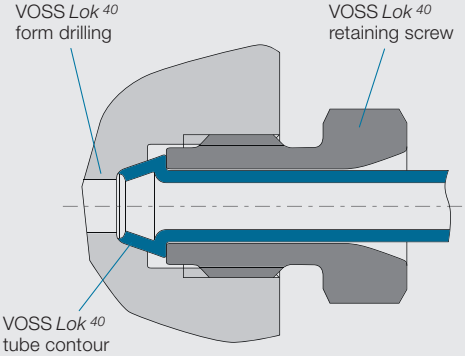


The VOSS *Lok* 40 male nut for vehicle manufacturing - maximum cost and space savings

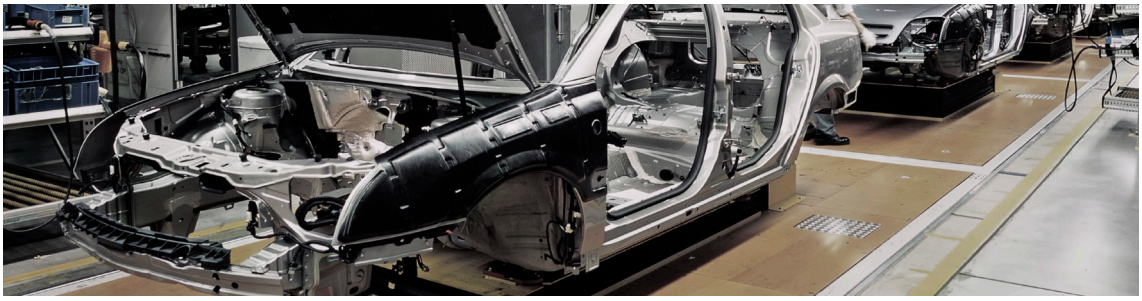
In addition to the extensive variety of coupling bodies and screw-in bosses, we have also designed the VOSS *Lok* 40 male nut. In connection with a form drilling, this represents a cost and space-saving solution for crash-proof block integration.

Advantages of block integration

- Male stud connector is not needed
- Reduction of leak path
- Increased safety in the event of a crash
- Space-saving installation area



Automotive



VOSS *Lok* 40 - cost-effective added value

The cost-effectiveness of a connector system in high pressure applications is influenced by many factors. With VOSS *Lok* 40 successfully avoid leaks and thereby reduces associated expensive claims. The simple assembly increases your product quality, while omitting the clamping and wedge ring eliminates costs for materials planning and warehousing space.

Especially cost-efficient in serial production

- Increased leak protection
- Elimination of clamping and wedge ring
- Reliable and simple assembly process

VOSS *Lok* 40 - the product range

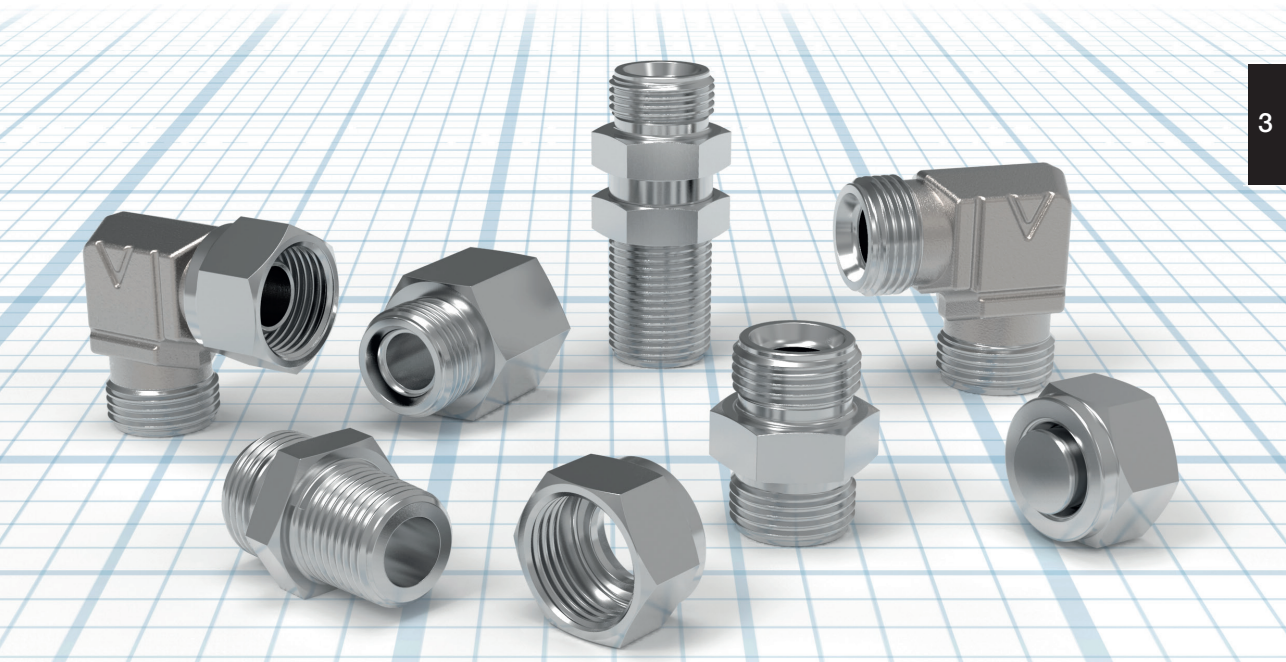
The extensive VOSS *Lok* 40 system comprises a wide variety of structural shapes, such as angle, T or L-couplings. The system components are available in stainless steel as standard, or alternatively in steel or various special materials with differing outside diameters.

- The VOSS *Lok* 40 forming machine processes tubes with an outside diameter from 6 to 22 mm, as well as imperial dimensions.
- Stainless steel 1.4571 and steel E235/E355 are suitable as tube materials, as well as special materials.
- Coupling components made of stainless steel 1.4404 or special materials available upon request.

Pharmaceutical

Tube coupling parts, 40° connecting pieces and single parts / accessories

Extensive variety in types of coupling bodies



VOSS

Content	Type/Page	
Female connectors	S	
		
	P.54	
Caps	PLC	
		
	P.56	
Plugs	TBS	
		
	P.58	
Sealing rings	SR	PEFLEX / OR
	P.60	P.61

The new product designations of VOSS products

This catalog contains alphanumeric product designation which is heavily influenced by ISO 8434. This means that the designation is self-explanatory and the product is easy to identify. It is easy to understand internationally due to the English structure. The new product designation of customer-specific solutions can also be independently generated from variations of the existing VOSS product program.

Example: 40-SDS-18-U11/16-12F-SST

40 - SD S -

System

40° VOSS *Lok* [40] program

The “System” characteristics describes the product line.

Function/Components

Stud couplings

“Function/Components” describes the product type.

Form

Straight

Indication of the component form.

Completion

This feature indicates completion of the product type with potential components (for example hexagonal nuts, O-ring, etc.). Deviating connector systems are listed in the “Suffix” characteristic.

Series/thread

Specification of the series.

Straight male stud connectors for tubes with an 18 mm outside diameter, 1 1/16-12 UN thread, O-ring seal, made from stainless steel.

Tube OD/ Nominal size	Thread	Nominal size	Sealing type/ threaded port	Suffix

You can find order examples, further explanations and variation options in the respective chapters or on the pages following the individual product groups.

18 - U 11/16-12 F - SST

Suffix

Stainless steel

Deviations from the standard (such as for example sealing material, wrench size, special dimensions, etc.)

Sealing type/threaded port

O-ring seal

Sealing type on the male thread.

Nominal size

1 1/16-12 UN

Indication of the nominal thread diameter (for metric and imperial threads without information on the pitch).

Thread

UN/UNF

Thread type information.

Tube OD/Nominal size

18 mm tube OD

Indication of the outside tube diameter.

	System
40	40° VOSS *Lok* [40] program
GP	General program (components and accessories, applicable in different connecting systems)

	Function
	Plugs
PL	Plugs
	Screws
TBS	Tube blanking screws
	Swivel couplings
SW	Swivel couplings
SW2	2-sided swivels
	Sealings
OR	O-rings
PEFLEX	PEFLEX sealing rings
	Other
BH	Bulk head
N	Union nuts
SU	Union screws
SD	Stud couplings

	Form
E	Elbow
K	Cross
L	L
S	Straight
T	Tee

	Completion
C	Complete connection (eg. with union nut)

	Series/Thread
	Thread
M	Metric
G	BSPP
R	BSPT
U	UNF
N	NPT
IM	Internal thread, metric
IG	Internal thread, BSPP

IU	Internal thread, UNF
IN	Internal thread, NPT

	Tube OD/Diameter
6	6 mm
8	8 mm
10	10 mm
12	12 mm
14	14 mm
15	15 mm
16	16 mm
18	18 mm
20	20 mm
22	22 mm
3/16	3/16 inch
1/4	1/4 inch
5/16	5/16 inch
3/8	3/8 inch
1/2	1/2 inch
5/8	5/8 inch
3/4	3/4 inch
7/8	7/8 inch
1	1 inch

	Sealing type
A	Metal-to-metal flat face sealing
B	Metal-to-metal sealing edge
E	Elastomeric sealing
F	O-ring sealing
T	Tapered

	Suffix overview
Suffix 4	Sealing material
Suffix 6	Differing dimension
Suffix 7	Material/Strength
Suffix 8	Coating

Unnamed suffixes are irrelevant for this chapter.
Note: Products with several relevant suffices are listed according to the sales name of the numbering.

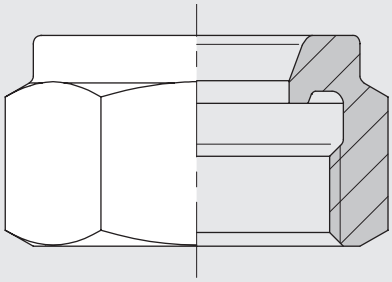
Suffix 4	Sealing material
EPDM85	EPDM 85
FKM80	FKM 80
FKM90	FKM 90
NBR80	NBR 70-80
NBR85	NBR 85
NBR90	NBR 90

Suffix 6	Differing dimension
	Height
H2.5	Height 2.5 mm
…	…
	Length
LG17	Length 17 mm
…	…
	Wrench size
WS19	Wrench size 19 mm
…	…

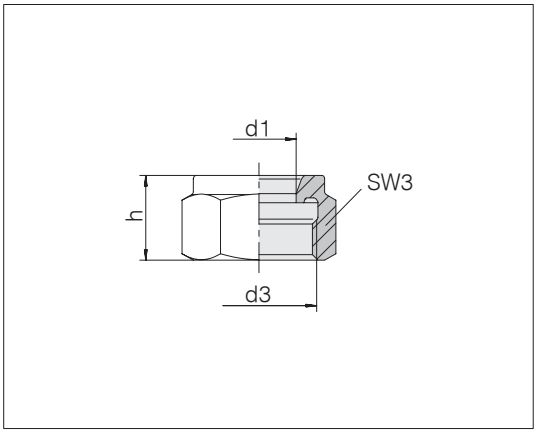
Suffix 7	Material/Strength
ST	Steel
SST	Stainless Steel
BS	Brass

Suffix 8	Coating
C00	Steel, blank, washed and oiled, production stage
C21	Zinc-nickel, transparent passivated, sealed and lubricated

Union nuts



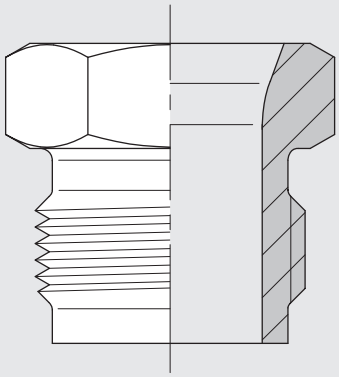
Union nuts



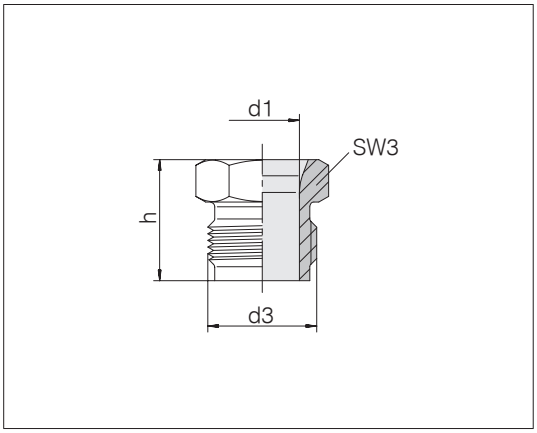
Tube OD d1	d3 UN/UNF	SW3	h	kg/100 ca.	Order-No.	Designation
6	7/16 - 20 UNF	14	12.5	0.9	7000380700	40-N-6-SST
8	1/2 - 20 UNF	16	13	1.2	7000381100	40-N-8-SST
10	5/8 - 20 UN	19	14	1.6	7000381500	40-N-10-SST
12	3/4 - 20 UNEF	22	15	2.0	7000381900	40-N-12-SST
14	7/8 - 20 UNEF	25	15	2.4	7000382300	40-N-14-SST
15	7/8 - 20 UNEF	25	15	2.4	7000382700	40-N-15-SST
16	7/8 - 20 UNEF	25	15	2.3	7000383100	40-N-16-SST
18	1 - 20 UNEF	30	15.5	4.0	7000383400	40-N-18-SST
20	1 1/8 - 20 UN	32	15.5	3.9	7000383800	40-N-20-SST
22	1 1/8 - 20 UN	32	15.5	3.7	7000384200	40-N-22-SST

The union nuts are silver plated to reduce the assembly forces inside.

Retaining screws



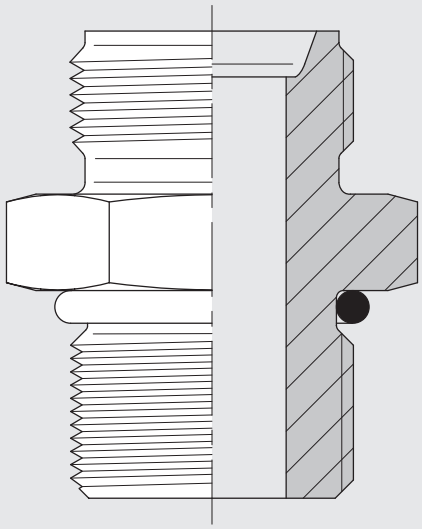
Retaining screws



Tube OD d1	d3 metric	SW3	h	kg/100 ca.	Order-No.	Designation
6	M 12 x 1.5	14	18	1.1	7001416800	40-SU-6-SST
8	M 14 x 1.5	16	19	1.5	7001417100	40-SU-8-SST
10	M 16 x 1.5	17	19	1.6	7001417200	40-SU-10-SST
12	M 18 x 1.5	19	20	2.0	7001417300	40-SU-12-SST
14	M 20 x 1.5	22	20	2.5	7001417400	40-SU-14-SST
15	M 21 x 1.5	22	20	2.4	7001417500	40-SU-15-SST
16	M 22 x 1.5	24	21	3.0	7001417600	40-SU-16-SST
18	M 24 x 1.5	27	22	3.9	7001417700	40-SU-18-SST
20	M 26 x 1.5	27	22	3.6	7001417800	40-SU-20-SST
22	M 28 x 1.5	30	22	4.3	7001417900	40-SU-22-SST

The union screws are silver plated to reduce the mounting force outside.

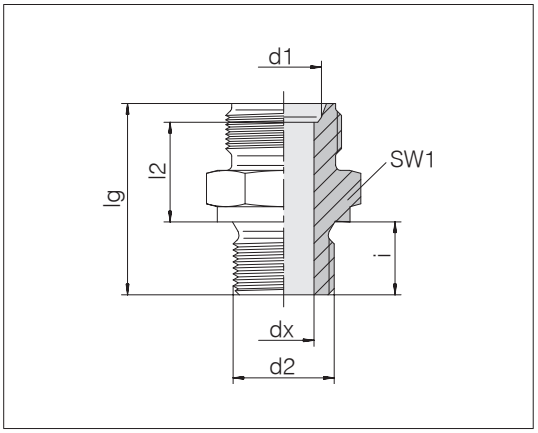
Male stud connectors



Male stud connectors

Male thread: BSPP thread, cylindrical
Threaded stud: DIN 3852-2 Form A
Sealing type: Sealing ring
Sealing material: e.g. copper sealing ring

Tube coupling: VOSS *Lok* [40]

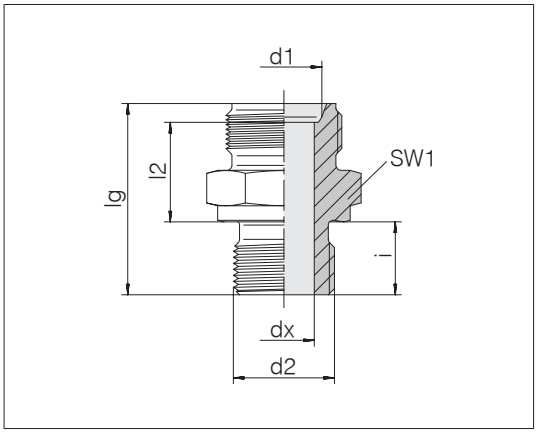


Tube OD d1	d2 BSPP	dx	lg	l2	SW1	i	kg/100 ca.	Order-No.	Designation
6	G 1/8 A	4	24	13.4	14	8	1.5	7004700200	40-SDS-6-G1/8A-SST
8	G 1/4 A	5	29.5	14.8	19	12	3.2	7004700300	40-SDS-8-G1/4A-SST
10	G 1/4 A	6	29.5	14.5	19	12	3.3	7004700400	40-SDS-10-G1/4A-SST
12	G 3/8 A	9	31.5	16.4	22	12	5.1	7004700500	40-SDS-12-G3/8A-SST
14	G 1/2 A	11.5	34	16.8	27	14	7.9	7004700600	40-SDS-14-G1/2A-SST
15	G 1/2 A	12	34	16.7	27	14	7.6	7004700700	40-SDS-15-G1/2A-SST
16	G 1/2 A	13	34	16.5	27	14	7.0	7004700800	40-SDS-16-G1/2A-SST
18	G 1/2 A	14	35.5	17.9	27	14	7.8	7004700900	40-SDS-18-G1/2A-SST
20	G 3/4 A	16	37.5	17.8	32	16	10.7	7004701000	40-SDS-20-G3/4A-SST
22	G 3/4 A	18	37.5	17.5	32	16	10.7	7004701100	40-SDS-22-G3/4A-SST

Male stud connectors

Male thread: BSPP thread, cylindrical
Threaded stud: DIN ISO 1179-4 Form B
Sealing type: Sealing edge

Tube coupling: VOSS *Lok* 40

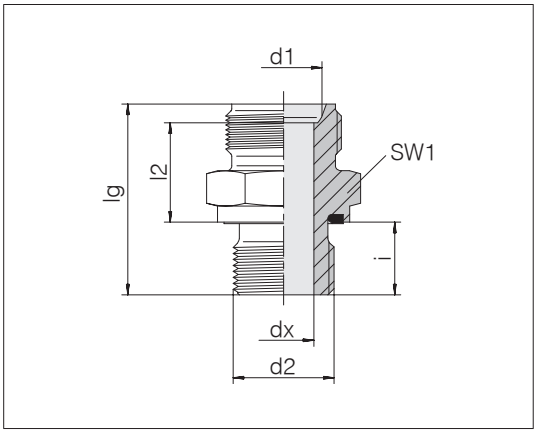


Tube OD d1	d2 BSPP	dx	lg	l2	SW1	i	kg/100 ca.	Order-No.	Designation
6	G 1/8 A	4	24	13.4	14	8	1.5	7004830300	40-SDS-6-G1/8B-SST
8	G 1/4 A	5	29.5	14.8	19	12	3.1	7004830400	40-SDS-8-G1/4B-SST
10	G 1/4 A	6	29.5	14.5	19	12	3.2	7004830500	40-SDS-10-G1/4B-SST
12	G 3/8 A	9	31.5	16.4	22	12	5.1	7004830600	40-SDS-12-G3/8B-SST
14	G 1/2 A	11.5	34	16.8	27	14	7.7	7004830700	40-SDS-14-G1/2B-SST
15	G 1/2 A	12	34	16.7	27	14	7.4	7004830800	40-SDS-15-G1/2B-SST
16	G 1/2 A	13	34	16.5	27	14	6.9	7004830900	40-SDS-16-G1/2B-SST
18	G 1/2 A	14	35.5	17.9	27	14	7.7	7004831000	40-SDS-18-G1/2B-SST
20	G 3/4 A	16	37.5	17.8	32	16	11.3	7004831100	40-SDS-20-G3/4B-SST
22	G 3/4 A	18	37.5	17.5	32	16	10.5	7004831200	40-SDS-22-G3/4B-SST

Male stud connectors

Male thread: BSPP thread, cylindrical
Threaded stud: ISO 1179-2 Form E
Sealing type: Profile sealing ring PEFLEX
Sealing material: Standard FKM

Tube coupling: VOSS *Lok* [40]

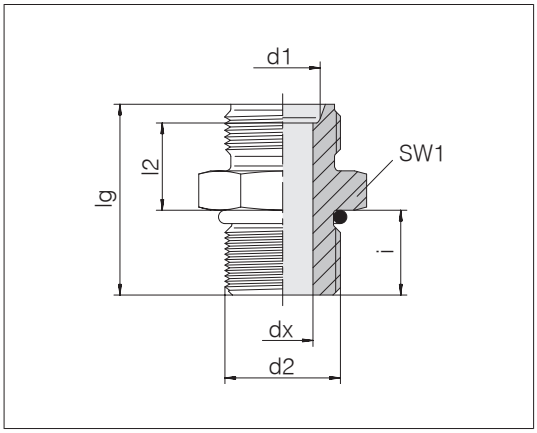


Tube OD d1	d2 BSPP	dx	lg	l2	SW1	i	kg/100 ca.	Order-No.	Designation
6	G 1/8 A	4	24	13.4	14	8	1.5	7001200000	40-SDS-6-G1/8E-SST
8	G 1/4 A	5	29.5	14.8	19	12	3.1	7001200300	40-SDS-8-G1/4E-SST
10	G 1/4 A	6	29.5	14.5	19	12	3.2	7001200600	40-SDS-10-G1/4E-SST
12	G 3/8 A	9	31.5	16.4	22	12	5.0	7001200900	40-SDS-12-G3/8E-SST
14	G 1/2 A	11.5	34	16.8	27	14	7.7	7001201200	40-SDS-14-G1/2E-SST
15	G 1/2 A	12	34	16.7	27	14	7.4	7001201500	40-SDS-15-G1/2E-SST
16	G 1/2 A	13	34	16.5	27	14	6.8	7001201800	40-SDS-16-G1/2E-SST
18	G 1/2 A	14	35.5	17.9	27	14	7.6	7001202100	40-SDS-18-G1/2E-SST
20	G 3/4 A	16	37.5	17.8	32	16	11.0	7001202400	40-SDS-20-G3/4E-SST
22	G 3/4 A	18	37.5	17.5	32	16	10.3	7001202700	40-SDS-22-G3/4E-SST

Male stud connectors

Male thread: UN/UNF, cylindrical
Threaded stud: ISO 11926-2/3 (SAE J1926-2/3)
Sealing type: O-ring (Form F)
Sealing material: Standard FKM

Tube coupling: VOSS *Lok* [40]

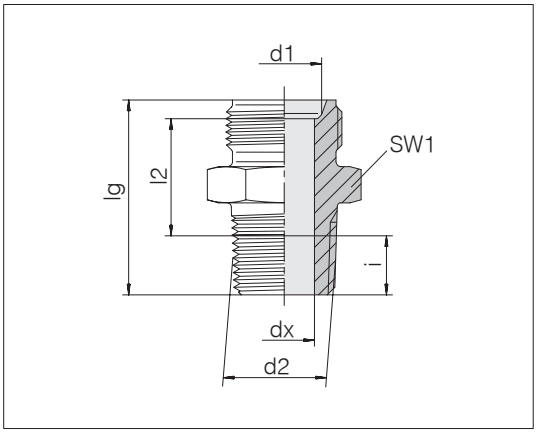


Tube OD d1	d2 UN/UNF	dx	lg	l2	SW1	i	kg/100 ca.	Order-No.	Designation
6	7/16-20 UNF-2A	4.5	27	13.4	14	11	1.8	7001267700	40-SDS-6-U7/16-20F-SST
8	1/2-20 UNF-2A	6	28.5	14.8	17	11	2.6	7001268000	40-SDS-8-U1/2-20F-SST
10	9/16-18 UNF-2A	7.5	29.5	14.5	19	12	3.4	7001268300	40-SDS-10-U9/16-18F-SST
12	3/4-16 UNF-2A	10	33.5	16.4	24	14	6.3	7001268600	40-SDS-12-U3/4-16F-SST
14	7/8-14 UNF-2A	11.5	36	16.8	27	16	9.0	7001268900	40-SDS-14-U7/8-14F-SST
15	7/8-14 UNF-2A	12	36	16.7	27	16	8.7	7001269200	40-SDS-15-U7/8-14F-SST
16	7/8-14 UNF-2A	12.5	36	16.5	27	16	8.4	7001269500	40-SDS-16-U7/8-14F-SST
18	7/8-14 UNF-2A	12.5	37.5	17.9	27	16	9.2	7001269800	40-SDS-18-U7/8-14F-SST
20	1 1/16-12 UN-2A	15.5	40	17.8	32	18.5	13.8	7001270100	40-SDS-20-U11/16-12F-SST
22	1 1/16-12 UN-2A	15.5	40	17.5	32	18.5	12.9	7001270400	40-SDS-22-U11/16-12F-SST

Male stud connectors

Male thread: NPT thread, tapered
Threaded stud: ASME B1.20.1
Sealing type: Tapered thread
Sealing material: e.g. PTFE sealing tape

Tube coupling: VOSS *Lok* [40]



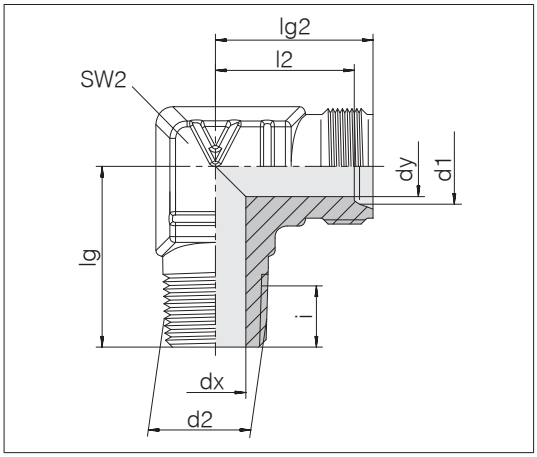
Tube OD d1	d2 NPT	dx	lg	l2 ca.	SW1	i ca.	kg/100 ca.	Order-No.	Designation
6	1/8 NPT	4.5	24.4	14.9	12	6.9	1.4	7001264700	40-SDS-6-N1/8T-SST
8	1/4 NPT	6.5	30.6	17.9	17	10	2.8	7001265000	40-SDS-8-N1/4T-SST
10	1/4 NPT	6.5	30.6	17.6	17	10	3.2	7001265300	40-SDS-10-N1/4T-SST
12	3/8 NPT	9.5	32.2	18.8	22	10.3	5.0	7001265600	40-SDS-12-N3/8T-SST
14	1/2 NPT	11.5	36.8	20	24	13.6	5.0	7001265900	40-SDS-14-N1/2T-SST
15	1/2 NPT	12	36.8	19.9	24	13.6	7.4	7001266200	40-SDS-15-N1/2T-SST
16	1/2 NPT	12	36.8	19.7	24	13.6	7.3	7001266500	40-SDS-16-N1/2T-SST
18	1/2 NPT	12	37.3	20.1	27	13.6	8.9	7001266800	40-SDS-18-N1/2T-SST
20	3/4 NPT	16	38.6	20.8	30	14.1	11.8	7001267100	40-SDS-20-N3/4T-SST
22	3/4 NPT	16	38.6	20.5	30	14.1	11.6	7001267400	40-SDS-22-N3/4T-SST

The screw depth i is subject to tolerance-related deviations.

Male stud elbows

Male thread: NPT thread, tapered
Threaded stud: ASME B1.20.1
Sealing type: Tapered thread
Sealing material: e.g. PTFE sealing tape

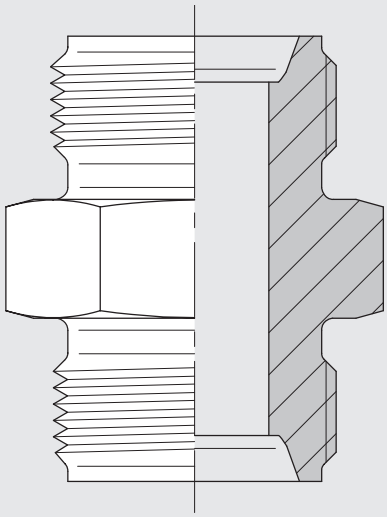
Tube coupling: VOSS *Lok* [40]



Tube OD d1	d2 NPT	dx	dy	lg	lg2	l2 ca.	SW2	i ca.	kg/100 ca.	Order-No.	Designation
6	1/8 NPT	4.5	4.5	20.2	20.8	18.2	12	6.9	2.8	7005078800	40-SDE-6-N1/8T-SST
8	1/4 NPT	6.5	6.5	26.4	21.8	19.1	14	10	4.3	7005078900	40-SDE-8-N1/4T-SST
10	1/4 NPT	6.5	8	28.4	23.8	20.8	17	10	6.6	7005079000	40-SDE-10-N1/4T-SST
12	3/8 NPT	9.5	9.5	31.5	27.3	24.2	19	10.3	9.5	7005079100	40-SDE-12-N3/8T-SST
14	1/2 NPT	11.5	11.5	39.1	30.3	27.1	22	13.6	15.5	7005079200	40-SDE-14-N1/2T-SST
15	1/2 NPT	12	12	39.1	30.3	27	22	13.6	14.9	7005079300	40-SDE-15-N1/2T-SST
16	1/2 NPT	12	13	39.1	30.3	26.8	22	13.6	14.4	7005079400	40-SDE-16-N1/2T-SST
18	1/2 NPT	12	15	40.9	32.6	29	27	13.6	22.2	7005079500	40-SDE-18-N1/2T-SST
20	3/4 NPT	16	16	42.6	34	30.3	30	14.1	26.2	7005079600	40-SDE-20-N3/4T-SST
22	3/4 NPT	16	18	42.6	34	30	30	14.1	28.1	7005079700	40-SDE-22-N3/4T-SST

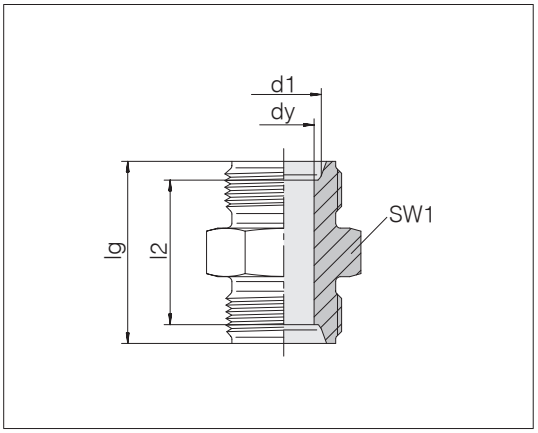
The screw depth i is subject to tolerance-related deviations.

Unions



Unions

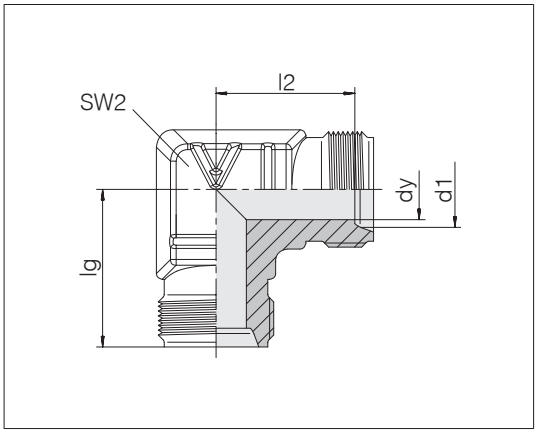
Tube coupling: VOSS *Lok* [40]



Tube OD d1	dy	lg	l2	SW1	kg/100 ca.	Order-No.	Designation
6	4.5	25	19.8	12	1.4	7000935900	40-S-6-SST
8	6.5	26	20.6	14	1.7	7000936000	40-S-8-SST
10	8	26	20	17	2.7	7000936100	40-S-10-SST
12	10	28	21.8	22	4.5	7000936200	40-S-12-SST
14	11.5	28	21.6	24	6.0	7000936300	40-S-14-SST
15	12	28	21.4	24	5.7	7000936400	40-S-15-SST
16	13	28	21	24	5.1	7000936500	40-S-16-SST
18	15	30	22.8	27	7.3	7000936600	40-S-18-SST
20	16	30	22.6	30	9.6	7000936700	40-S-20-SST
22	18	30	22	30	8.2	7000936800	40-S-22-SST

Union elbows

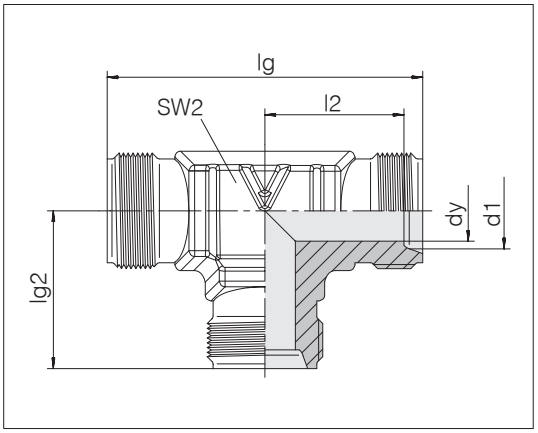
Tube coupling: VOSS *Lok* 40



Tube OD d1	dy	lg	l2	SW2	kg/100 ca.	Order-No.	Designation
6	4.5	20	17.4	12	2.4	7000960700	40-E-6-SST
8	6.5	21.5	18.8	14	3.3	7000960800	40-E-8-SST
10	8	23.5	20.5	17	5.7	7000960900	40-E-10-SST
12	9.5	27	23.9	19	8.9	7000961000	40-E-12-SST
14	11.5	30	26.8	22	13.3	7000961100	40-E-14-SST
15	12	30	26.7	22	12.8	7000961200	40-E-15-SST
16	13	30	26.5	22	11.8	7000961300	40-E-16-SST
18	15	32.3	28.7	27	19.2	7000961400	40-E-18-SST
20	16	33.7	30	30	26.2	7000961500	40-E-20-SST
22	18	33.7	29.7	30	23.2	7000961600	40-E-22-SST

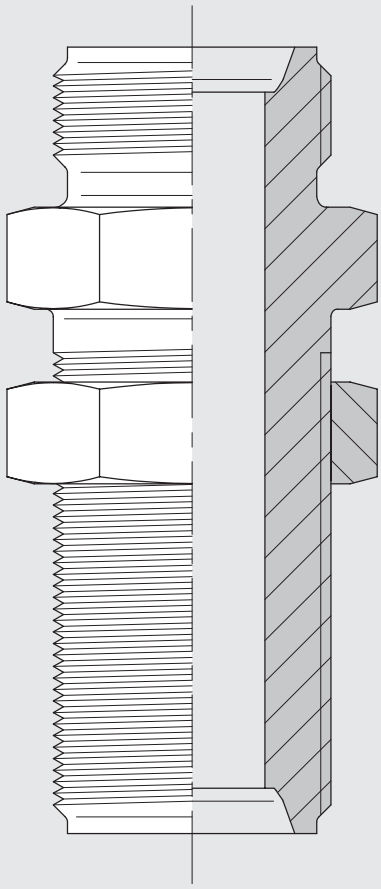
Union tees

Tube coupling: VOSS *Lok* [40]



Tube OD d1	dy	lg	lg2	l2	SW2	kg/100 ca.	Order-No.	Designation
6	4.5	41.6	20.8	18.2	12	3.6	7000909800	40-T-6-SST
8	6.5	43.6	21.8	19.1	14	4.5	7000910700	40-T-8-SST
10	8	47.6	23.8	20.8	17	7.6	7000910900	40-T-10-SST
12	10	54.6	27.3	24.2	19	11.3	7000911100	40-T-12-SST
14	11.5	60.6	30.3	27.1	22	17.4	7000911300	40-T-14-SST
15	12	60.6	30.3	27	22	16.7	7000911500	40-T-15-SST
16	13	60.6	30.3	26.8	22	15.3	7000911700	40-T-16-SST
18	15	65.2	32.6	29	27	24.5	7000911900	40-T-18-SST
20	16	68	34	30.3	30	32.9	7000912100	40-T-20-SST
22	18	68	34	30	30	28.8	7000912300	40-T-22-SST

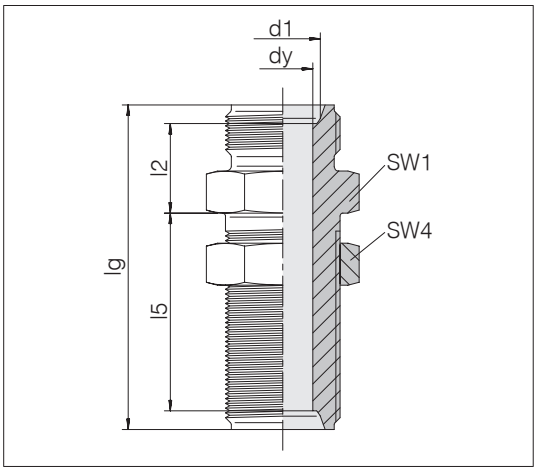
Bulkhead unions



Bulkhead unions

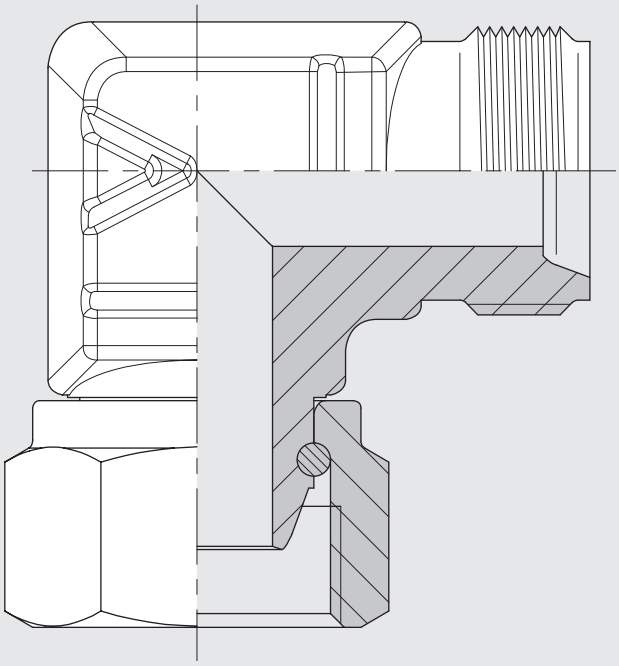
For insertion of the tubes into a partition wall

Tube coupling: VOSS *Lok* [40]



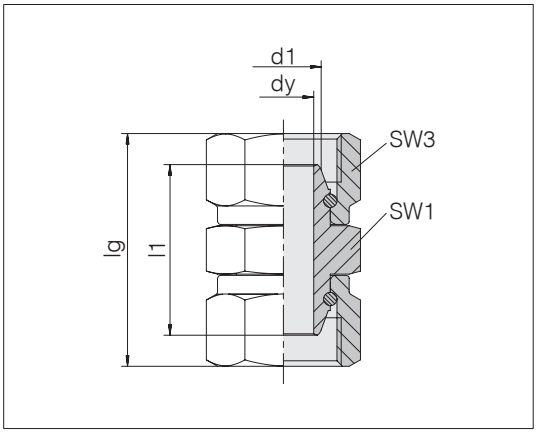
Tube OD d1	dy	lg	l2	l5	SW1	SW4	kg/100 ca.	Order-No.	Designation
6	4.5	48.5	13.9	29.4	16	16	3.5	7005822000	40-BHSLN-6-SST
8	6.5	48.4	13.8	29.2	17	17	3.8	7005822100	40-BHSLN-8-SST
10	8	49	13.5	29.5	22	22	6.6	7005822200	40-BHSLN-10-SST
12	10	49.9	13.9	29.8	24	24	8.6	7005822300	40-BHSLN-12-SST
14	11.5	51.9	14.8	30.7	27	27	12.3	7005822400	40-BHSLN-14-SST
15	12	51.9	14.7	30.6	27	27	11.9	7005822500	40-BHSLN-15-SST
16	13	51.9	14.5	30.4	27	27	11.0	7005822600	40-BHSLN-16-SST
18	15	54.9	15.9	31.8	30	30	14.9	7005822700	40-BHSLN-18-SST
20	16	54.9	15.8	31.7	36	36	21.9	7005822800	40-BHSLN-20-SST
22	18	54.9	15.5	31.4	36	36	19.3	7005822900	40-BHSLN-22-SST

40° taper couplings



Swivel unions

Directionally adjustable taper coupling on both sides

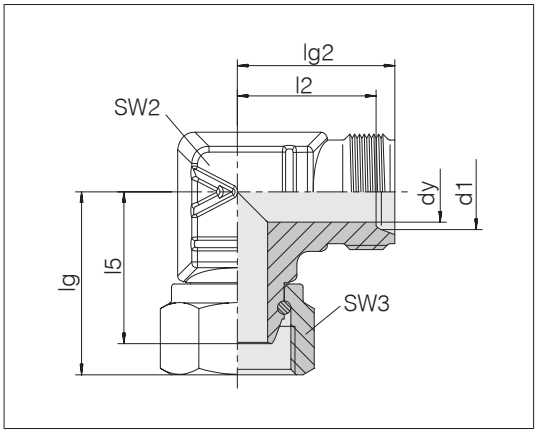


Tube OD d1	dy	lg	l1	SW1	SW3	kg/100 ca.	Order-No.	Designation
6	4.5	36	25.6	12	14	2.9	7000919500	40-SW2S-6-SST
8	6.5	35.8	25.6	14	16	3.8	7000919600	40-SW2S-8-SST
10	8	37.6	27	17	19	5.2	7000919700	40-SW2S-10-SST
12	10	41.2	29.8	19	22	7.1	7000919800	40-SW2S-12-SST
14	11.5	41	29.8	22	25	8.9	7000919900	40-SW2S-14-SST
15	12	41	30	22	25	9.0	7000920000	40-SW2S-15-SST
16	13	40.6	30	22	25	8.7	7000920100	40-SW2S-16-SST
18	15	43.8	32.4	24	30	13.6	7000920200	40-SW2S-18-SST
20	16	44.6	33.4	27	32	15.0	7000920300	40-SW2S-20-SST
22	18	44	33.4	27	32	14.2	7000920400	40-SW2S-22-SST

Swivel elbows

Directionally adjustable taper coupling

Tube coupling: VOSS *Lok* 40

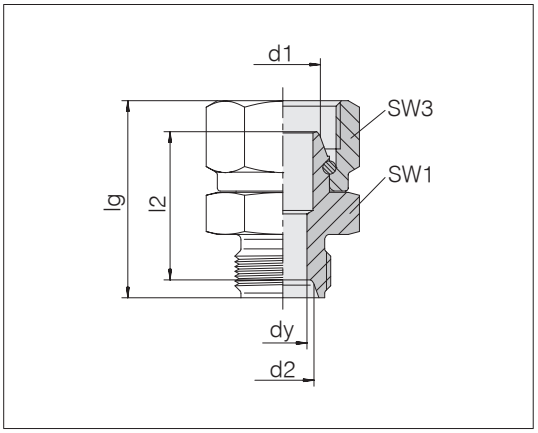


Tube OD d1	dy	lg	lg2	l2	l5	SW2	SW3	kg/100 ca.	Order-No.	Designation
6	4.5	25.8	20.8	18.2	20.6	12	14	3.8	7005172700	40-SWE-6-SST
8	6.5	26.7	21.8	19.1	21.6	14	16	5.6	7005172800	40-SWE-8-SST
10	8	29.1	23.8	20.8	23.8	17	19	7.2	7005172900	40-SWE-10-SST
12	9.5	33.4	27.3	24.2	27.7	19	22	10.6	7005173000	40-SWE-12-SST
14	11.5	36.3	30.3	27.1	30.7	22	25	17.7	7005173100	40-SWE-14-SST
15	12	36.3	30.3	27	30.8	22	25	14.8	7005173200	40-SWE-15-SST
16	13	36.1	30.3	26.8	30.8	22	25	13.9	7005173300	40-SWE-16-SST
18	15	39	32.6	29	33.3	27	30	26.4	7005173400	40-SWE-18-SST
20	16	40.3	34	30.3	34.7	30	32	30.0	7005173500	40-SWE-20-SST
22	18	40	34	30	34.7	30	32	27.4	7005173600	40-SWE-22-SST

Tube end reducers

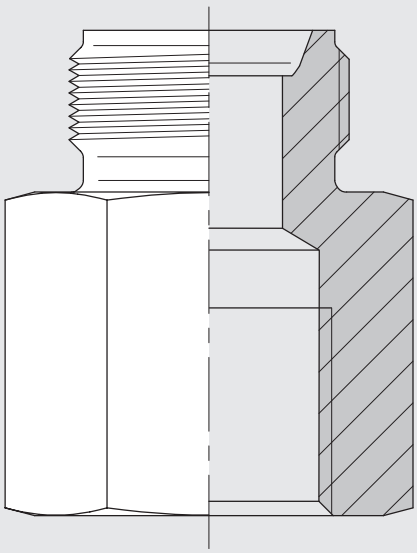
Directionally adjustable taper coupling

Tube coupling: VOSS *Lok* [40]



Tube OD d1	Tube OD d2	dy	lg	l2	SW1	SW3	kg/100 ca.	Order-No.	Designation
8	6	4.5	30.9	23.2	14	16	2.8	7005710900	40-SWS-8-6-SST
10	8	6.5	32.3	24.3	17	19	3.9	7005711000	40-SWS-10-8-SST
12	10	8	34.6	25.9	19	22	5.8	7005711100	40-SWS-12-10-SST
14	12	10	35	26.3	22	25	7.2	7005711200	40-SWS-14-12-SST
15	14	11.5	35	26.3	24	25	7.9	7005711300	40-SWS-15-14-SST
16	15	12	34.8	26.2	24	25	7.7	7005711400	40-SWS-16-15-SST
18	16	13	36.9	27.7	24	30	9.4	7005711500	40-SWS-18-16-SST
20	18	15	38.3	29.1	27	32	11.9	7005711600	40-SWS-20-18-SST
22	20	16	46.2	29	30	32	13.6	7005711700	40-SWS-22-20-SST

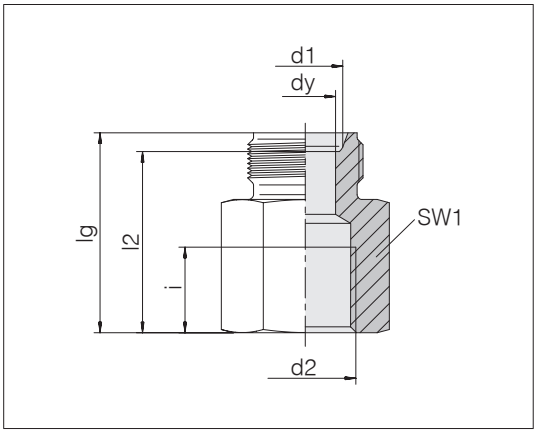
Female connectors



Female connectors

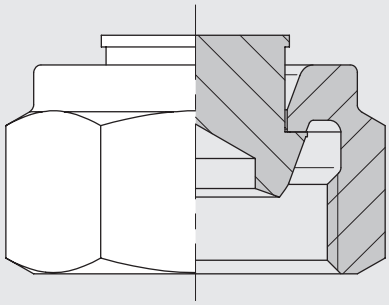
Female thread: BSPP thread, cylindrical

Tube coupling: VOSS *Lok* [40]



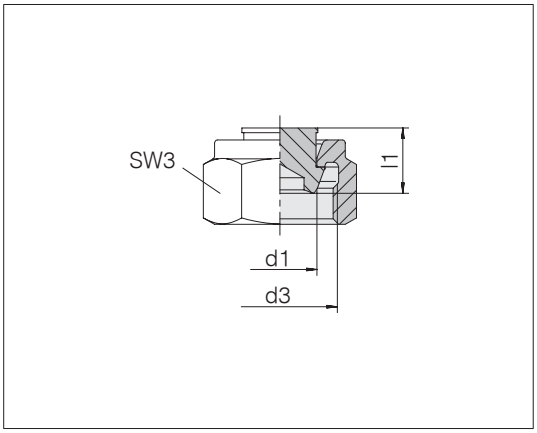
Tube OD d1	d2 BSPP	dy	lg	l2	SW1	i	kg/100 ca.	Order-No.	Designation
6	G 1/8 A	4.5	25.5	22.9	17	8.5	2.9	7005764400	40-S-6-IG1/8-SST
8	G 1/4 A	6.5	31.5	28.8	19	12.5	4.3	7005764300	40-S-8-IG1/4-SST
10	G 1/4 A	8	31.5	28.5	19	12.5	4.8	7005764200	40-S-10-IG1/4-SST
12	G 3/8 A	10	33.5	30.4	22	12.5	6.5	7005764100	40-S-12-IG3/8-SST
14	G 1/2 A	11.5	36	32.8	27	14.5	10.5	7005764000	40-S-14-IG1/2-SST
15	G 1/2 A	12	36	32.7	27	14.5	10.3	7005763900	40-S-15-IG1/2-SST
16	G 1/2 A	13	36	32.5	27	14.5	10.0	7005763800	40-S-16-IG1/2-SST
18	G 1/2 A	15	38	34.4	27	14.5	10.9	7005763700	40-S-18-IG1/2-SST
20	G 3/4 A	16	40.5	36.8	36	16.5	21.1	7005763600	40-S-20-IG3/4-SST
22	G 3/4 A	18	40.5	36.5	36	16.5	20.1	7005763500	40-S-22-IG3/4-SST

Caps



Caps

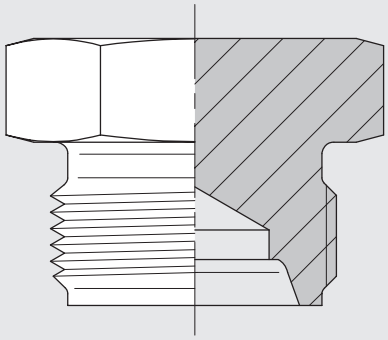
For blind closing of VOSS *Lok* [40] tube couplings



Tube OD d1	d3 UN/UNF	l1	SW3	kg/100 ca.	Order-No.	Designation
6	7/16 - 20 UNF	10	14	1.2	7001215400	40-PLC-6-SST
8	1/2 - 20 UNF	10.6	16	1.7	7001215500	40-PLC-8-SST
10	5/8 - 20 UN	11.4	19	2.4	7001215600	40-PLC-10-SST
12	3/4 - 20 UNEF	12	22	3.2	7001215700	40-PLC-12-SST
14	7/8 - 20 UNEF	12.1	25	4.0	7001215800	40-PLC-14-SST
15	7/8 - 20 UNEF	12.3	25	4.3	7001215900	40-PLC-15-SST
16	7/8 - 20 UNEF	12.4	25	4.4	7001216000	40-PLC-16-SST
18	1 - 20 UNEF	12.5	30	6.7	7001216100	40-PLC-18-SST
20	1 1/8 - 20 UN	12.7	32	7.3	7001216200	40-PLC-20-SST
22	1 1/8 - 20 UN	12.9	32	7.9	7001216300	40-PLC-22-SST

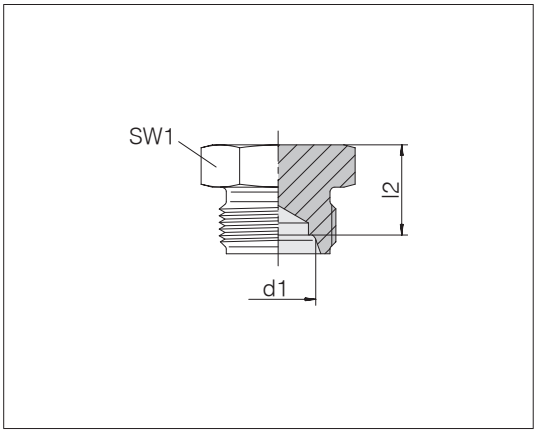
The union nuts are silver plated to reduce the assembly forces inside.

Plugs



Plugs

For blind closing of VOSS *Lok 40* tube couplings



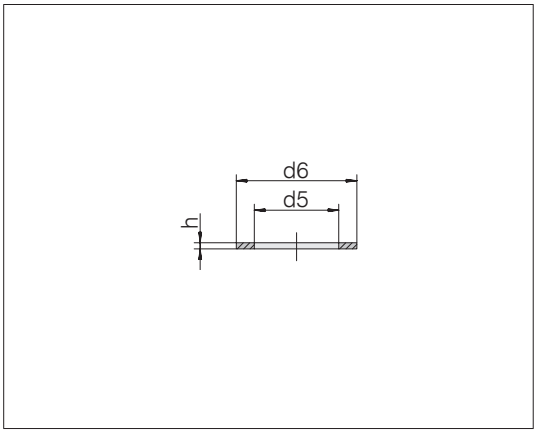
Tube OD d1	l2	SW1	kg/100 ca.	Order-No.	Designation
6	17.1	12	0.9	7000941300	40-TBS-6-SST
8	18.2	14	1.3	7000941400	40-TBS-8-SST
10	18.5	17	1.9	7000941500	40-TBS-10-SST
12	20.1	22	3.4	7000941600	40-TBS-12-SST
14	20.2	24	4.4	7000941800	40-TBS-14-SST
15	20.3	24	4.3	7000941900	40-TBS-15-SST
16	20.5	24	4.1	7000942000	40-TBS-16-SST
18	22.1	27	5.8	7000942100	40-TBS-18-SST
20	22.2	30	7.5	7000942200	40-TBS-20-SST
22	22.5	30	7.0	7000942300	40-TBS-22-SST

Sealing rings

Sealing rings for threaded studs according to

DIN 3852-1 Form A (metric)
DIN 3852-2 Form A (BSPP)

The standard material of the sealing rings is copper



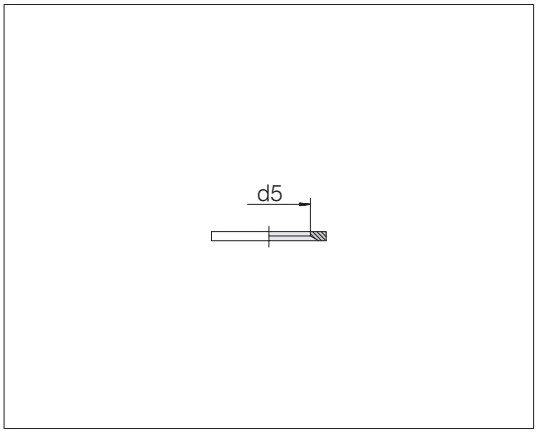
Male connector	d5	d6	h	kg/100 ca.	Order-No.	Designation
M 10 x 1 / G 1/8 A	10.2	13.9	1	0.1	0082115900	GP-SR-A10x14-CO-7603-PU100
M 12 x 1.5	12.2	16.9	1.5	0.1	7004600100	GP-SR-A12x17-CO-7603-PU100
M 14 x 1.5	14.2	17.9	1.5	0.1	7004600200	GP-SR-A14x18-CO-7603-PU100
M 16 x 1.5	16.2	19.9	1.5	0.1	7004600300	GP-SR-A16x20-CO-7603-PU100
M 18 x 1.5	18.2	21.9	1.5	0.2	7004600400	GP-SR-A18x22-CO-7603-PU50
M 22 x 1.5	22.2	26.9	1.5	0.2	7004600500	GP-SR-A22x27-CO-7603-PU50
M 26 x 1.5	26.3	30.9	2	0.4	7004600600	GP-SR-A26x31-CO-7603-PU25
M 27 x 2	27.3	31.9	2	0.4	7004600800	GP-SR-A27x32-CO-7603-PU25
M 33 x 2 / G 1 A	33.3	38.9	2	0.5	0082585900	GP-SR-A33x39-CO-7603-PU25
M 42 x 2 / G 1 1/4 A	42.3	48.9	2	0.8	0082665900	GP-SR-A42x49-CO-7603-PU25
M 48 x 2 / G 1 1/2 A	48.3	54.9	2	0.9	0082705900	GP-SR-A48x55-CO-7603-PU25
G 1/4 A	13.3	17.9	1.5	0.1	7001613800	GP-SR-A13,3x17,9x1,5-CO-PU100
G 3/8 A	17.2	20.9	1.5	0.1	7003166000	GP-SR-A17x21-CO-7603-PU50
G 1/2 A	21.2	25.9	1.5	0.2	0082385900	GP-SR-A21x26-CO-7603-PU50
G 3/4 A	26.6	31.9	2	0.4	7001613900	GP-SR-A26,6x31,9x2-CO-PU25

The order is placed in packaging units, for example PU100=packing unit 100 pieces.

Sealing rings for threaded studs according to

ISO 9974-2 Form E (metric)
ISO 1179-2 Form E (BSPP)

The standard material of the profile sealing rings PEFLEX is FKM

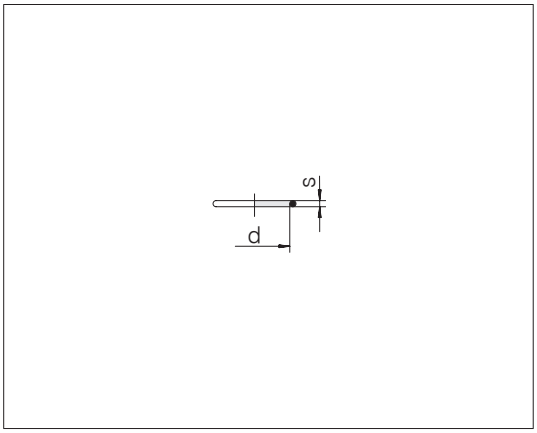


Male thread d2	PEFLEX d5	Order-No.	Designation
M 10 x 1	8.4	0905229700	GP-PEFLEX-M10-G1/8-FKM80
M 14 x 1.5	11.6	0905029700	GP-PEFLEX-M14-G1/4-FKM80
M 26 x 1.5	23.9	0905109700	GP-PEFLEX-M26-M27-G3/4-FKM80
M 27 x 2	23.9	0905109700	GP-PEFLEX-M26-M27-G3/4-FKM80
G 1/8 A	8.4	0905229700	GP-PEFLEX-M10-G1/8-FKM80
G 1/4 A	11.6	0905029700	GP-PEFLEX-M14-G1/4-FKM80
G 3/8 A	14.7	0905049700	GP-PEFLEX-G3/8-FKM80
G 1/2 A	18.5	0905079700	GP-PEFLEX-G1/2-FKM80
G 3/4 A	23.9	0905109700	GP-PEFLEX-M26-M27-G3/4-FKM80

Sealing rings for threaded studs according to

ISO 11926-2 / -3 Form F (UN/UNF)
SAE J1926-2 / -3 Form F (UN/UNF)

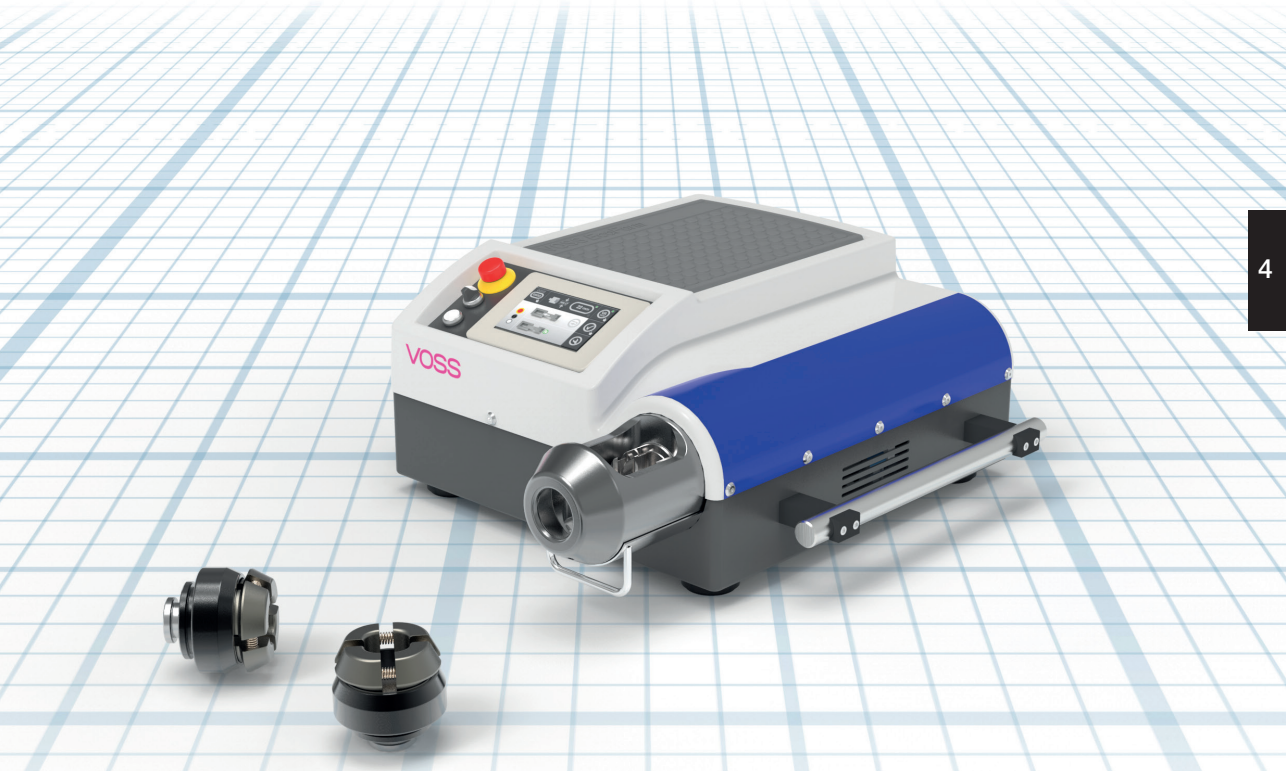
The standard material of the O-rings is FKM



Male thread d2	O-ring d x s	Order-No.	Designation
7/16-20 UNF-2A	8.92 x 1.83	7001411800	GP-OR-8,92x1,83-FKM80-CP
1/2-20 UNF-2A	10.52 x 1.83	7001411900	GP-OR-10,52x1,83-FKM80-CP
9/16-18 UNF-2A	11.89 x 1.98	7001412000	GP-OR-11,89x1,98-FKM80-CP
3/4-16 UNF-2A	16.36 x 2.21	7001412100	GP-OR-16,36x2,21-FKM80-CP
7/8-14 UNF-2A	19.18 x 2.46	7001412200	GP-OR-19,18x2,46-FKM80-CP
1 1/16-12 UN-2A	23.47 x 2.95	7001412300	GP-OR-23,47x2,95-FKM80-CP

Pre-assembly devices and tools

Quick and precise forming



Simple, quick and precise tube forming

VOSS *Lok* 40

Fully automatic manufacture of the VOSS *Lok* 40 tube contour

The VOSS *Lok*40 forming machine is designed especially for the economical series production of the innovative VOSS *Lok*40 tube contour. It impresses with the special design especially with tight tube bends and short clamping lengths. The newly developed VOSS tool concept integrates clamping jaw and forming head in one unit and is adjusted to the tube outside diameter independent of the wall thickness. This saves time, costs and eases handling, most of all due to the fact that tubing of any wall thickness can be formed with only one tool.

- Short cycle times of 3 to 5 seconds!
- Intuitive operating concept
- Automatic tool recognition
- Automatic machine setting of the forming parameters
- Manual, individual adjustment of forming parameters
- For metric and imperial tube dimensions
- Processing of steel and stainless tubes or tubes made of custom materials
- Piece counter with lot size setting

Systems
VOSS *Lok* 40: Tubes from 6-22 mm (3/16"-1") tube OD

Area of application
Stationary machines, series production, area of application e.g. in CNG applications acc. to ECE R110

See Page 66 for ordering information.

Forming machines

VOSS *Lok 40*

Forming machine for electric connection
3~400 V/16 A AC - 3Ph/N/PE 50 Hz
(460 V/60 Hz)

Type	Order no.	Designation
For mechanical forming of VOSS *Lok 40* contours for steel and stainless steel tubes of 6-22 mm (3/16" - 1") tube OD.	5993976200	TD-TYPE40VL

5-pole CEE plug

Dimensions

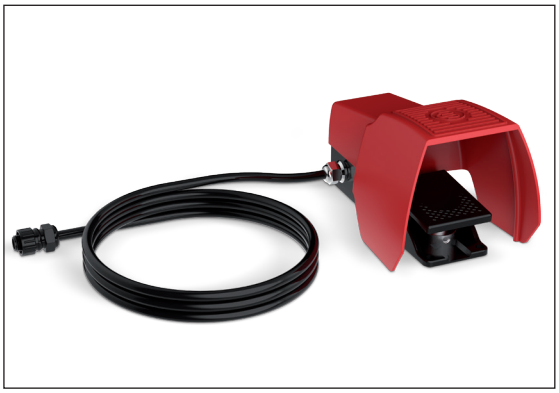
Width:	800	mm
Height:	335	mm
Depth:	835	mm

Weight:	160	kg
Noise level:	ca. 75	dBA

Divergent voltage supply on request.

Foot switch for pre-assembly devices

Plug: CA 3 LS
Protection class: IP65



4

Type	Order no.	Designation
Safety foot switch with accident prevention hood and safety locking.	9799600139	TD-FOOTSWITCH1

To control the pre-assembly devices:
Type 90 Basic II
Type 90 Comfort
VOSSForm 100
VOSS Form 100 Compact
VOSS *Lok* 40

Cable length min. 3 m

Dimensions
Width: 156 mm
Height: 146 mm
Depth: 250 mm

VOSS *Lube* *MP*

Assembly paste for the correct assembly of stainless steel couplings.

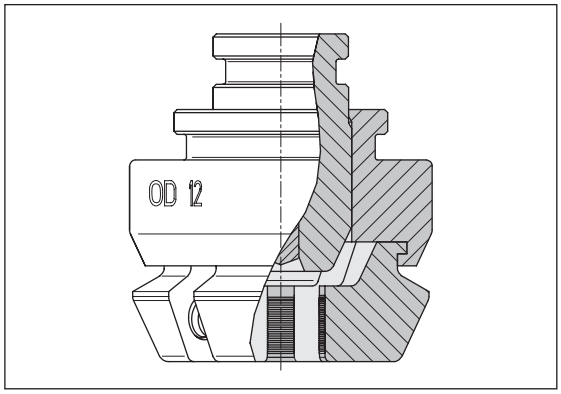
Type	Order no.	Designation
Assembly paste	7005253600	TD-VOSSLUBE-250G

VOSS forming oil

For perfect mechanical forming of tube contours with VOSS forming systems on stainless steel tubes.

Type	Order no.	Designation
Forming oil	9499300069	TD-FCO-HADOL-1455-1L

VOSS *Lok 40* forming tools

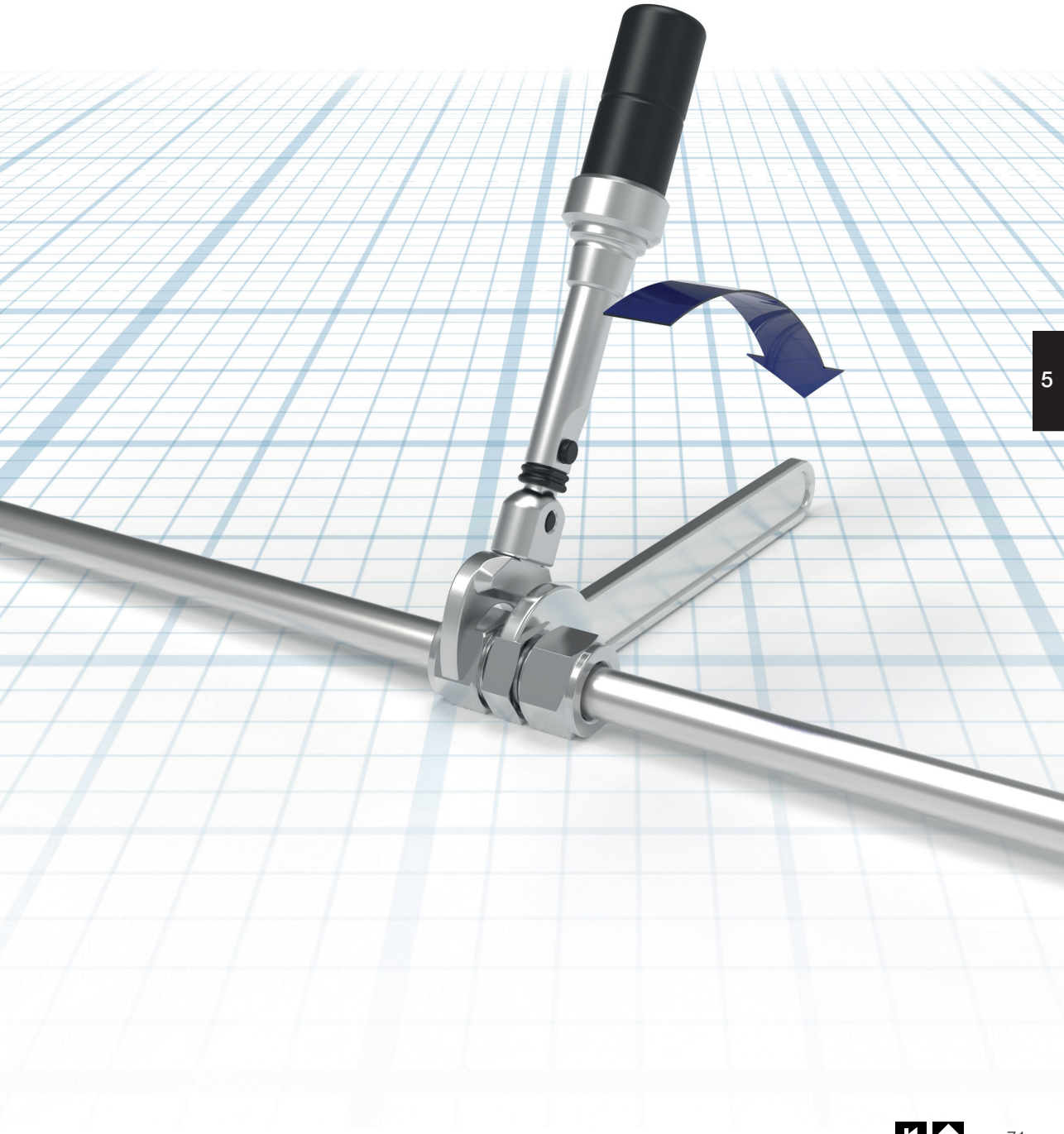


Tube OD mm	Order no.	Designation	Tube OD Inch	Order no.	Designation
6	5993024300	TD-40MFT-6	3/16"	7000215500	TD-40MFT-3/16
8	5993024400	TD-40MFT-8	1/4"	7000215600	TD-40MFT-1/4
10	5993024500	TD-40MFT-10	5/16"	7000215700	TD-40MFT-5/16
12	5993024600	TD-40MFT-12	3/8"	7000215800	TD-40MFT-3/8
14	5993024700	TD-40MFT-14	1/2"	7000215900	TD-40MFT-1/2
15	5993024800	TD-40MFT-15	5/8"	7000216000	TD-40MFT-5/8
16	5993024900	TD-40MFT-16	3/4"	7000216100	TD-40MFT-3/4
18	5993025000	TD-40MFT-18	7/8"	7000216200	TD-40MFT-7/8
20	5993025100	TD-40MFT-20	1”	7000216300	TD-40MFT-1
22	5993025200	TD-40MFT-22			

VOSS

Assembly instructions

For a process reliable and correct assembly of the system



Content	Type/Page
Important notes on VOSS assembly instructions	P.74
Assembly instructions VOSS *Lok 40* tube forming system	P.76
Assembly instructions VOSS*Lok40* 40° taper couplings	P.82
Assembly instructions VOSS *Lok 40* BSPP male stud connectors	P.84
Assembly instructions VOSS *Lok 40* UN/UNF male stud connectors	P.86
Assembly instructions VOSS *Lok 40* NPT male stud connectors	P.87

Important notes on VOSS assembly instructions

To achieve the greatest possible performance security and functional reliability of the VOSS products it is mandatory to comply with every assembly instruction, the operating conditions and the tube recommendations.

Only start assembly if you are sure that you have understood the operating and assembly instructions of all VOSS pre-assembly devices, tools and products. Incorrect handling can lead to risks for the safety and leak tightness and can lead to the complete failure of the connection.

The manufacturer cannot monitor the compliance with the operating and assembly instructions of the VOSS Fluid pre-assembly machine/ devices, tool and products nor the operations and methods used during installation, operation, use and maintenance of the individual products. Improper execution can lead to property damage and as a consequence can endanger persons. Therefore VOSS Fluid GmbH does not accept any responsibility and liability whatsoever for losses, damages or costs that result from or are in any way related to incorrect installation, improper operation and false use and incorrect maintenance. Non-compliance results in the loss of the warranty.

VOSS Fluid GmbH reserves the right to make changes and additions to the information provided without prior notification. If required, please request the latest version of the operating and assembly instructions or visit our download section at www.voss-fluid.net

General notes on VOSS assembly instructions

Pay attention to the cleanliness of all components, including the tubes, before and during the whole assembly process. Contamination may lead to the system failing.

During assembly, ensure that all preventative measures are taken in accordance with the respective instructions.

Please only use precision tubes in accordance with the specification in Chapter 6 for assembly.

The tube preparations should be performed as carefully as the actual pre-assembly and final assembly of the connection. Please check end parts for damage or deformation, especially on longer tubes.

Providing pre-assembled tubes which are not directly assembled at the end with protective caps is recommended.

At the start of assembly of VOSS components with elastomer deal, the following must be checked:

- The nut and/or seal surface must be clean and free from damage
- The elastomer seal must be clean and free from damage

Explanation of symbols and additional information


Visual inspection


Tighten by hand or perform another manual activity


Tighten using the tool in accordance with the stipulations in the instructions


Oil, lubricate the point marked with the arrow

All information is in millimeters [mm]

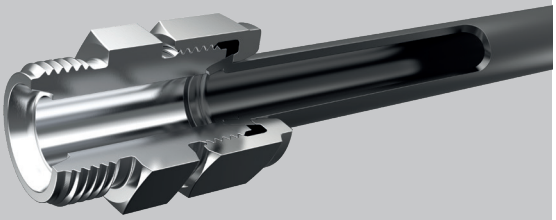
Assembly instructions VOSS *Lok* [40] tube forming system

1 Notes

Follow the general information in the catalog before starting assembly and check that the assembly instructions are up to date!

These assembly instructions describe the tube forming and final assembly of VOSS *Lok* [40].

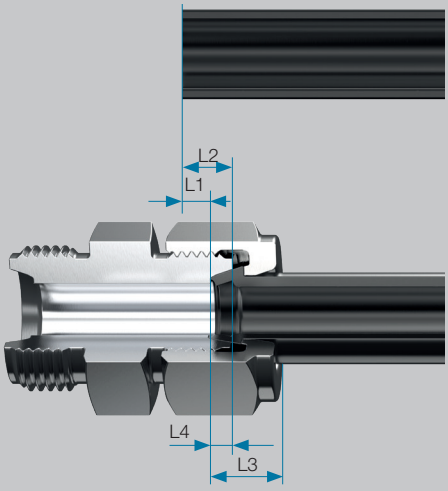
These assembly instructions do not replace the extensive user instructions of the forming machine used. Only significant steps for tube preparation, forming and final assembly are explained.



2 Tube preparation

2.1 When determining the tube lengths, dimensions L1 and L2 must be taken into account. The tube is compressed by dimension L1 during the forming process.

The minimum lengths for tube clamping A0, A1, A2 and B0, B1, B2 at the ends of the tubes need to be taken into account.

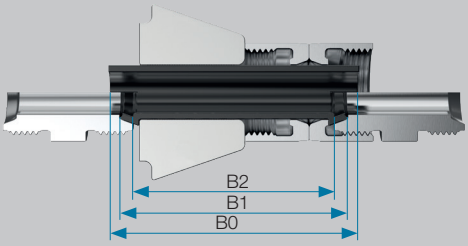


For metric tubes, stainless steel

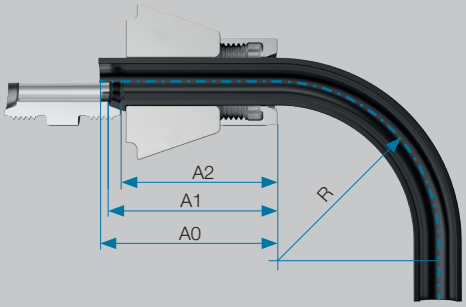
Tube		Forming lengths		Design dimensions		Straight clamping lengths					
AD [mm]	S [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	A0 [mm]	A1 [mm]	A2 [mm]	B0 [mm]	B1 [mm]	B2 [mm]
6	1	3.3	5.9	7.1	2.6	39	36	33	51	44	39
	1.5	3.0	5.6								
	2	2.6	5.2								
8	1	3.5	6.2	7.8	2.7	42	38	35	56	49	44
	1.5	3.2	5.9								
	2	2.9	5.6								
	2.5	2.5	5.2								
10	1	3.9	6.9	8.5	3.0	46	42	39	61	53	47
	1.5	3.6	6.6								
	2	3.2	6.2								
	2.5	2.9	5.9								
	3	2.5	5.5								
12	1	4.1	7.2	9.2	3.1	49	45	42	65	57	51
	1.5	3.8	6.9								
	2	3.4	6.5								
	2.5	3.1	6.2								
	3	2.7	5.8								
	3.5	2.4	5.5								
14	1.5	4.0	7.2	9.3	3.2	51	47	44	70	62	56
	2	3.7	6.9								
	2.5	3.3	6.5								
	3	3.0	6.2								
	3.5	2.6	5.8								
	4	2.3	5.5								
15	1.5	4.2	7.5	9.4	3.3	52	48	45	72	64	57
	2	3.8	7.1								
	2.5	3.5	6.8								
	3	3.1	6.4								
	3.5	2.8	6.1								
	4	2.5	5.8								
16	1.5	4.4	7.9	9.6	3.5	53	49	46	75	66	59
	2	4.0	7.5								
	2.5	3.7	7.2								
	3	3.4	6.9								
	3.5	3.0	6.5								
	4	2.7	6.2								
18	1.5	4.6	8.2	9.7	3.6	57	52	48	79	70	63
	2	4.2	7.8								
	2.5	3.9	7.5								
	3	3.6	7.2								
	3.5	3.2	6.8								
	4	2.9	6.5								
20	1.5	4.8	8.5	9.8	3.7	59	54	50	85	75	68
	2	4.4	8.1								
	2.5	4.1	7.8								
	3	3.8	7.5								
	3.5	3.4	7.1								
	4.0	3.1	6.8								
22	1.5	5.1	9.1	10.1	4.0	61	56	52	89	79	71
	2	4.8	8.8								
	2.5	4.5	8.5								
	3	4.1	8.1								

VOSS *Lok*[40] tube forming system

Minimum lengths for clamping straight tubes.



Minimum lengths for clamping bent tubes.



Attention!
The dimensions A0, A1 and A2 can be reduced by the measure of the union nut height h for bending radii R ≥ 2 x AD.
In this case, the union nut can be slid over the tube bend for forming.

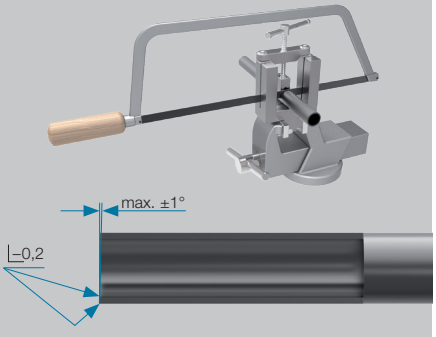
Information on the tube range:
When using thin-walled tubes, particularly attention should be paid to ensure that the deburring on the inside is not excessive. Otherwise, there is a risk that the cone contour on the tube does not form neatly (inner shrink of the tube material).

In large tubes, the wall thickness is limited by the forming power of the machine. Therefore please always take the lower and upper limits of the tube wall thickness, according to the table, into account!

2.2 Saw the stainless steel tube at a right angle. An angular tolerance of ±1° is permissible. Do not use a tube separator or an angle grinder.

For inch tubes, stainless steel

Tube				Forming lengths		Design dimensions		Straight clamping lengths					
OD [inch]	OD [mm]	s [BWG]	s [mm]	L1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	A0 [mm]	A1 [mm]	A2 [mm]	B0 [mm]	B1 [mm]	B2 [mm]
3/16	4.76	20	0.89	3.2	5.7	7.0	2.5	37	34	32	48	42	37
		19	1.07	3.1	5.6								
		18	1.24	3.0	5.5								
1/4	6.35	18	1.24	3.2	5.8	7.2	2.6	38	35	32	50	44	39
		17	1.47	3.1	5.7								
		16	1.65	2.9	5.5								
		15	1.83	2.8	5.4								
		14	2.11	2.6	5.2								
5/16	7.94	18	1.24	3.4	6.1	7.8	2.7	41	38	35	56	49	44
		17	1.47	3.3	6.0								
		16	1.65	3.1	5.8								
		15	1.83	3.0	5.7								
		14	2.11	2.8	5.5								
3/8	9.53	18	1.24	3.6	6.5	8.5	2.9	45	41	38	60	53	47
		17	1.47	3.5	6.4								
		16	1.65	3.3	6.2								
		15	1.83	3.2	6.1								
		14	2.11	3.0	5.9								
		13	2.41	2.8	5.7								
		12	2.77	2.6	5.5								
1/2	12.70	18	1.24	4.0	7.1	9.2	3.1	50	46	43	67	59	53
		17	1.47	3.9	7.0								
		16	1.65	3.8	6.9								
		15	1.83	3.6	6.7								
		14	2.11	3.4	6.5								
		13	2.41	3.2	6.3								
		12	2.77	3.0	6.1								
		11	3.05	2.8	5.9								
		10	3.40	2.6	5.7								
5/8	15.88	16	1.65	4.2	7.6	9.5	3.4	53	49	46	74	66	59
		15	1.83	4.0	7.4								
		14	2.11	3.8	7.2								
		13	2.41	3.6	7.0								
		12	2.77	3.4	6.8								
		11	3.05	3.2	6.6								
		10	3.40	3.0	6.4								
3/4	19.05	16	1.65	4.6	8.3	9.8	3.7	58	53	49	82	73	66
		15	1.83	4.5	8.2								
		14	2.11	4.3	8.0								
		13	2.41	4.1	7.8								
		12	2.77	3.9	7.6								
		11	3.05	3.7	7.4								
		10	3.40	3.4	7.1								
7/8	22.23	16	1.65	5.0	8.9	10.1	3.9	61	56	52	89	79	71
		15	1.83	4.9	8.8								
		14	2.11	4.7	8.6								
		13	2.41	4.5	8.4								
		12	2.77	4.3	8.2								
		11	3.05	4.1	8.0								
1	25.40	16	1.65	5.4	9.6	11.9	4.2	65	60	56	95	84	76
		15	1.83	5.3	9.5								
		14	2.11	5.1	9.3								
		13	2.41	4.9	9.1								
		12	2.77	4.7	8.9								



2.3 Lighting deburr the inside and outside of the ends of the tube. Clean the tubing.

Attention!
Ridges on the outside and inside diameter can impair the forming procedure. Tubes which are sawn in a lopsided way or incorrectly deburred tubes reduce the service life and seal of the connection.

3 Lubrication of the tools and tube

3.1 Lubricating the tools

We recommend lightly lubricating the clamping elements, on the outside on the cone, with hydraulic oil and a non-gumming lubricant containing MoS_2, either every time the tool is changed or after around 100 forming operations. Other suitable lubricants should be selected depending on the sector and individual application!

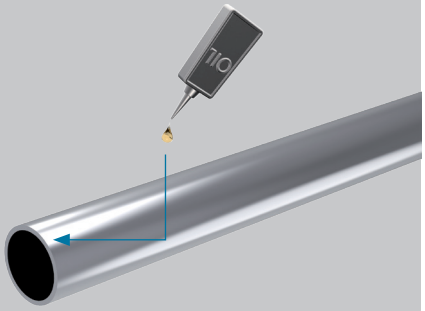
VOSS recommends using a separated clamping die set if steel and stainless tubes are used at the same time.

Attention!
Ensure that no oil enters the clamping jaw toothing to prevent the holding function being impaired.

3.2 Lubricating the stainless steel tube

We recommend moistening around each tenth tube in the forming area with a thin oil film on the outside (VOSS forming oil) to increase the service life of the tools.

Attention!
Other suitable lubricants should be selected depending on the sector and individual application!



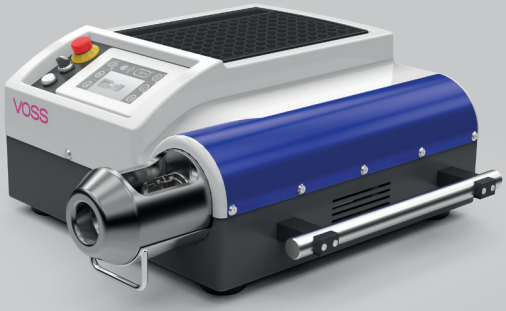
VOSS *Lok*[40] tube forming system

4 Tube forming

4.1 Prepare the tube forming machine in accordance with the user instructions.

4.2 Fit the VOSS *Lok*[40] union nut or retaining screw on the prepared end of the tube.

4.3 Perform the tube forming in accordance with the user instructions.



5 Control

A visual control is sufficient for checking the forming quality.

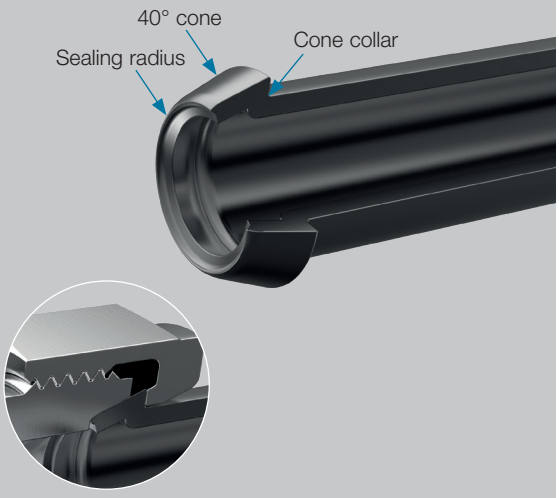
5.1 The formed tube end is not permitted to show damage or furrows.

5.2 The 40° cone must be evenly formed.

5.3 A smooth sealing radius must be visible over the whole circumference on the tube opening.

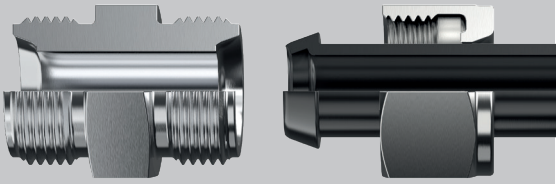
5.4 The cone collar must be formed at a right angle to the tube (contact surface of the VOSS *Lok*[40] union nut). Fine ridges due to the tool connection points are permitted.

5.5 The transition area between the 40° cone and the cone collar should be free from ridges and slightly rounded.



6 Final assembly

6.1 Insert the formed tube end into the cone of the screw socket.



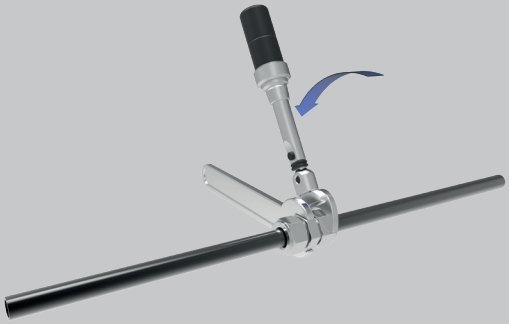
6.2 Tighten the VOSS *Lok* [40] union nut by hand.

6.3 Assemble the union nut with torque in accordance with the table below.

Note:
It must be assembled dry, since union nuts are silver-plated as standard and do not require any lubricant.

For assembly within tubing, hold the screw sockets with a wrench.

Information:
As an alternative to the recommended torque assembly, the travel path-dependent assembly can also be performed. The torque distances in the table below are guide values. A marking line on the VOSS *Lok* [40] union nut and tube facilities compliance with the torque distance for this.



Tube OD (metric)	Tightening torque* Nm ± 5%	Torque distance* (after tightening by hand)
6	15	ca. 120°
8	22	ca. 120°
10	32	ca. 120°
12	50	ca. 120°
14	60	ca. 120°
15	70	ca. 120°
16	80	ca. 120°
18	95	ca. 120°
20	110	ca. 120°
22	125	ca. 120°

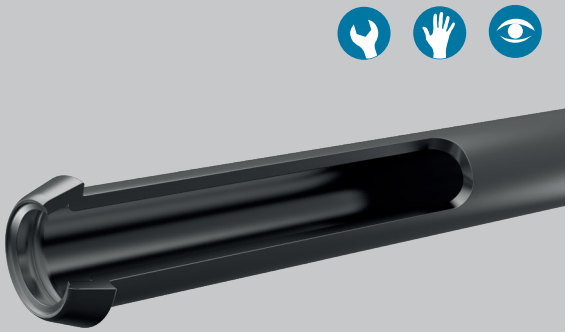
* Values for inch-based tube dimensions and retaining screws are available on request

VOSS *Lok*[40] tube forming system

7 Repeat assemblies

7.1 After each time the tube connection is released, check the sealing contour of the tube and coupling connectors for damage and cleanliness (see also 5. Control).

7.2 If re-assembled, the VOSS *Lok*[40] union nut must be assembled with the same tightening torque after hand tightening as for the initial assembly. The alternative tightening distances are shortened after repeated assembly by around half to 60°.



Assembly instructions VOSS *Lok*[40] 40° taper couplings

1 Notes

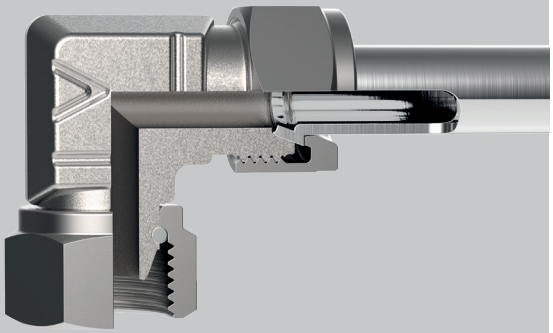
Follow the general information in the catalog before starting assembly and check that the assembly instructions are up to date!

The assembly instructions describe the assembly of VOSS *Lok*[40] couplings and coupling parts with taper connections.

Information:
The direction of 40° taper couplings can be set and their angular position can be adjusted as desired.

For compression fittings, these couplings are called adapters and must be completed with clamping rings and union nuts during assembly. This does not apply to VOSS tapered couplings.

Attention!
During assembly of the tube connection side, the tapered coupling must be held by a wrench.



2 Assembly of the taper couplings

Order of assembly

1. Check the taper couplings for damage or contamination.

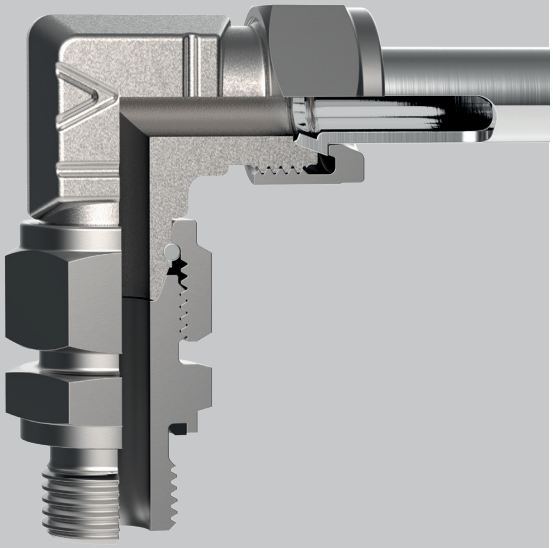
2. Insert the taper coupling into the opposite cone.

3. Align the coupling.

4. Tighten the taper nut by hand.

5. Then perform final assembly of the taper nut with torque in accordance with the table below.

Information:
Due to the silver-plated taper nut, no lubricant is required for assembly.

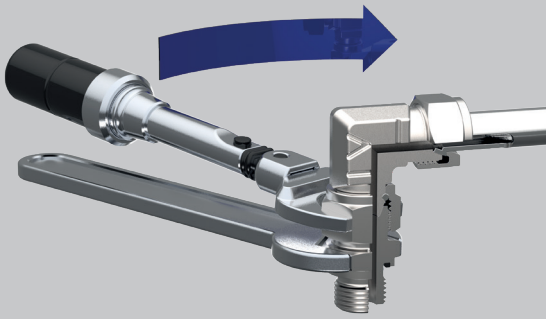


VOSS *Lok*[40] 40° taper couplings

Note:
As an alternative to the recommended torque assembly, the travel path-dependent assembly can also be performed. To do this, the tapered nut is tightened by hand until it stops. The following torque distances in the table are guide values.

A marking line on the taper nut and opposing connector facilitate compliance with the torque distance.

Attention!
The torque of the taper connection is provided via the taper nut. The connectors are held by a wrench during this.



Tube OD (metric)	Tightening torque for initial assembly and repeated assembly* Nm ±5 %	Torque distance initial assembly* (after tightening by hand)	Torque distance repeated assembly* (after tightening by hand)
6	15	ca. 1/2 turn	ca. 60°
8	22	ca. 1/2 turn	ca. 60°
10	32	ca. 1/2 turn	ca. 60°
12	50	ca. 1/2 turn	ca. 60°
14	60	ca. 1/2 turn	ca. 60°
15	70	ca. 1/2 turn	ca. 60°
16	80	ca. 1/2 turn	ca. 60°
18	95	ca. 1/2 turn	ca. 60°
20	110	ca. 1/2 turn	ca. 60°
22	125	ca. 1/2 turn	ca. 60°

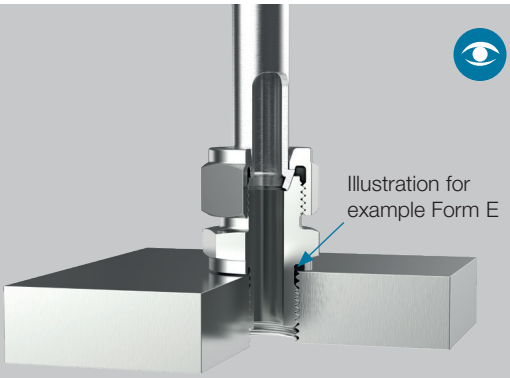
* Values for inch-based tube dimensions are available on request.

Assembly instructions VOSS *Lok* [40] BSPP male stud connectors

1 Notes

Follow the general information in the catalog before starting assembly and check that the assembly instructions are up to date!

These assembly instructions describe the assembly of VOSS *Lok* [40] male stud connectors with cylindrical British tube thread BSPP.



2 Order of assembly

1. Check the male thread and soft-sealing for any damage. Exchange components if necessary.

1.1. When using male stud connectors components with flat face sealing (Form A), tighten the copper sealing ring.

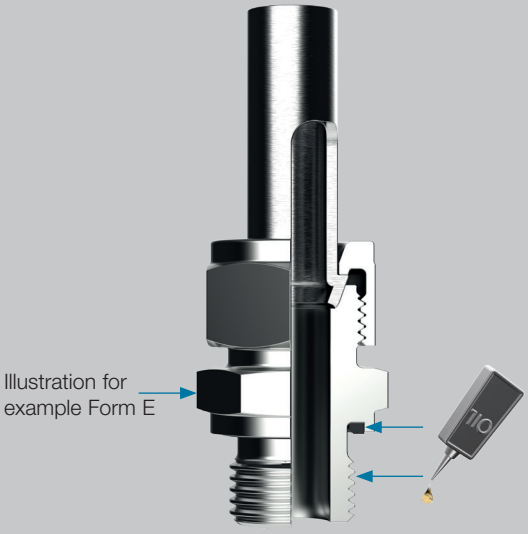
2. Lubricate thread

2.1. Sealing (flat face) (Form A)/Sealing edge (Form B). Lightly lubricate the male thread with VOSS *Lube* [MP] assembly paste!

2.2. Sealing via PEFLEX (Form E)
Lightly lubricate the male thread and soft-sealing with mineral-oil based hydraulic oil (for example HLP32)!

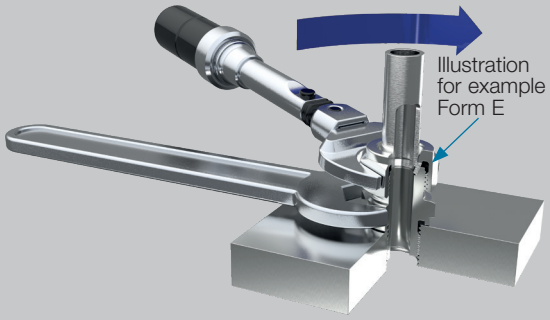
3. Tighten the male stud connector in the threaded bore by hand.

4. Tighten the male stud connector in accordance with the table below, using the torque wrench.



VOSS *Lok* [40] BSPP male stud connectors

Male thread size inch	Male stud connector to DIN 3852-1 with sealing surface (Form A) and copper sealing ring Starting torque and final tightening distance Nm ± 5%	ISO 1179-4 with sealing edge (Form B) End torque Nm ± 5%	ISO 1179-2 with PEFLEX seal (Form E) End torque Nm ± 5%
G 1/8 A	12 Nm + 60°	40	40
G 1/4 A	25 Nm + 60°	80	80
G 3/8 A	40 Nm + 60°	120	120
G 1/2 A	60 Nm + 60°	160	160
G 3/4 A	80 Nm + 60°	220	220



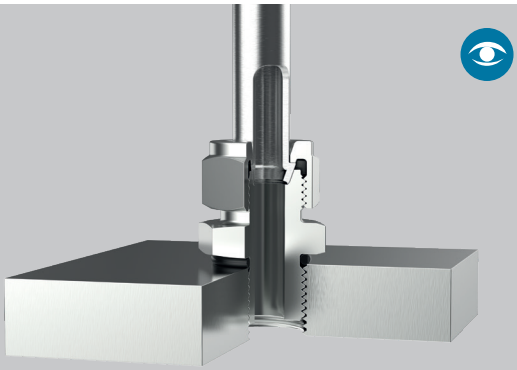
Attention!
The recommended tightening torques relate to VOSS *Lok* [40] stainless steel couplings combined with austenitic stainless steel to EN 10088-3 as a mating material (contact surfaces are lubricated with assembly paste/hydraulic oil). For mating material made from deviating materials, strength, elasticity modules and friction coefficients, the tightening torque must be empirically determined by the user.

Assembly instructions VOSS *Lok* [40] UN/UNF male stud connectors

1 Notes

Follow the general information in the catalog before starting assembly and check that the assembly instructions are up to date!

These assembly instructions describe the assembly of VOSS *Lok* [40] male stud connectors with cylindrical, American unified UN/UNF threads.



2 Order of assembly

1. Check the male thread and soft-sealing for any damage. Exchange components if necessary.

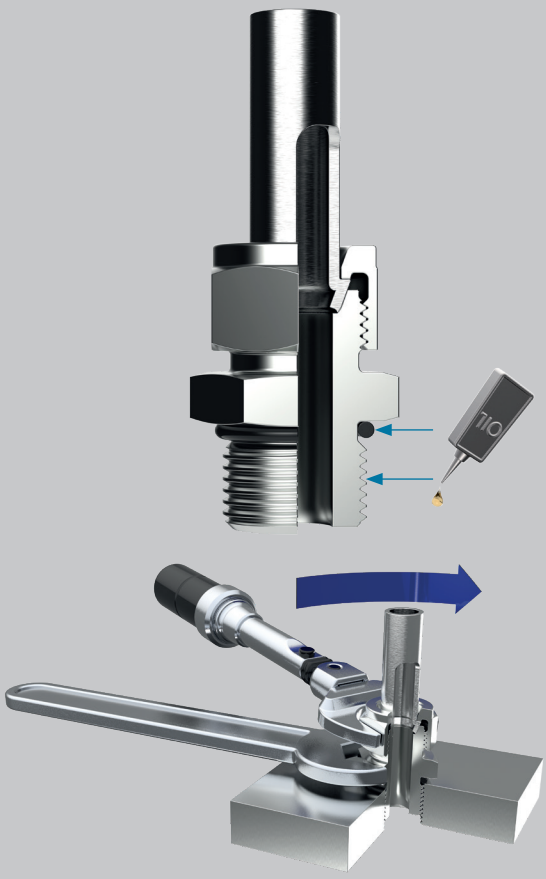
2. Lightly lubricate the male thread and soft-sealing with mineral-oil based hydraulic oil (for example HLP32)!

3. Tighten the male stud connector in the threaded bore by hand.

4. Tighten the male stud connector in accordance with the table below, using the torque wrench.

Male thread size UN/UNF	Male stud connector to ISO 11926-2/3 (SAE J 1926-2/3) with O-ring seal Nm ± 5%
7/16-20 UNF-2B	40
1/2-20 UNF-2B	60
9/16-18 UNF-2B	80
3/4-16 UNF-2B	120
7/8-14 UNF-2B	160
1 1/16-12 UN-2B	220

Attention!
The recommended tightening torques relate to VOSS *Lok* [40] couplings combined with austenitic stainless steel to EN 10088-3 as a mating material (contact surfaces lubricated with hydraulic oil). For mating material made from deviating materials, strength, elasticity modules and friction coefficients, the tightening torque must be empirically determined by the user.

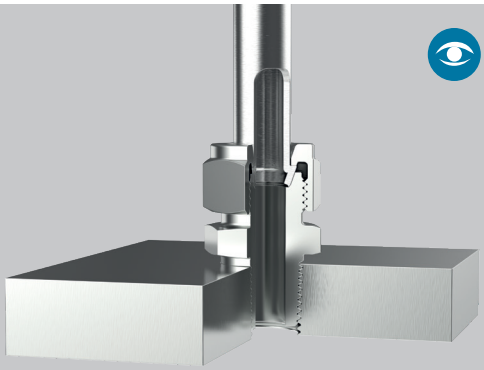


Assembly instructions VOSS *Lok* [40] NPT male stud connectors

1 Notes

Follow the general information in the catalog before starting assembly and check that the assembly instructions are up to date!

These assembly instructions describe the assembly of VOSS *Lok* [40] male stud connectors with tapered American pipe thread NPT.



2 Order of assembly

1. Check the male thread for any damage. Exchange components if necessary.

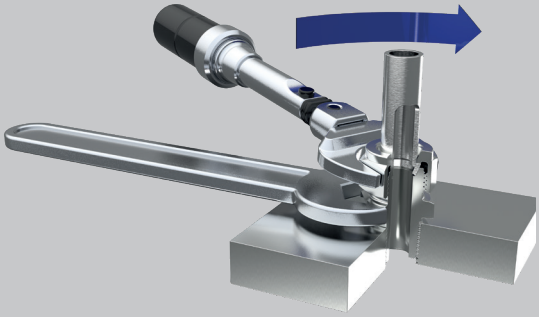
2. Since this thread can only be sealed using sealant, we recommend covering the male thread with suitable sealing tape (for example PTFE) or applying a fluid sealant.

3. Tighten the male stud connector in the threaded bore by hand.

4. Tighten the male stud connector in accordance with the table below, using the torque wrench.

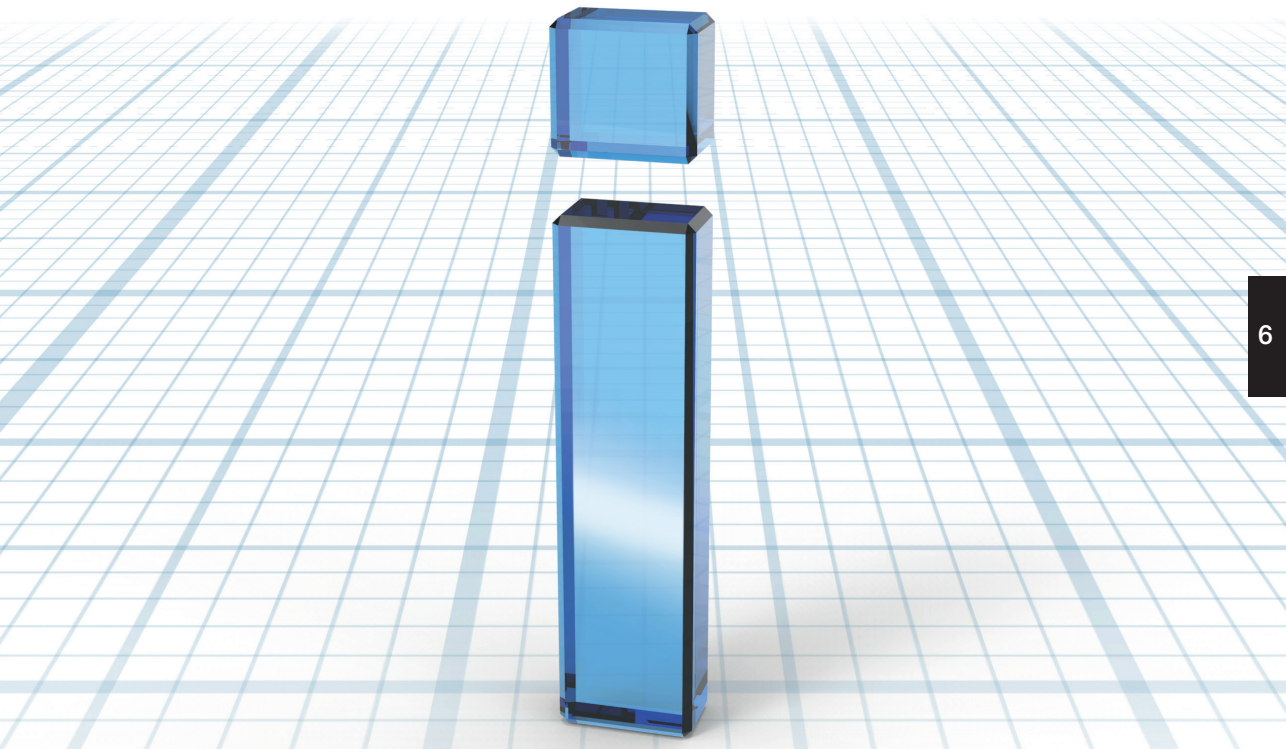
Male thread size NPT	Male stud connector to ASME B 1.20.1 with conical thread Nm ± 5%
1/8	12
1/4	25
3/8	40
1/2	75
3/4	120

Attention!
The recommended tightening torques relate to VOSS *Lok* [40] couplings combined with austenitic stainless steel to EN 10088-3 as a mating material (male thread covered with two layers of PTFE sealing tape). For mating material made from deviating materials, strength, elasticity modules and friction coefficients, the tightening torque must be empirically determined by the user.



General technical instructions / Certification and approvals

Technical notes · seal types and threaded holes



Content	Type/Page
General information	P.91
Permitted pressures	P.92
Permitted operating temperatures	P.93
Materials	P.94
Broad overview of standard threads	P.95
Screw-in/seal types and threaded bores	P.96
Certification and approvals	P.99

General information

General safety information

- The technical notes listed below relate to the VOSS *Lok* 40 range with stainless steel coupling components and for use with metric stainless steel tube with outside tube diameters of 6 to 22 mm.

  VOSS *Lok* 40 components made from special components or for use with inch tubes (from 3/16 to 1 inch) are available on request.
- To achieve the greatest possible performance security and functional reliability with VOSS products it is mandatory to comply with every assembly instruction, the operating conditions and the tube recommendations. Failing to comply with this instruction may impair functioning and invalidate our warranty.
- Re-tightening or releasing pressurized connecting elements is not permitted. Attention, risk of death!
- Tubes must be designed so that they are free from tension in unassembled condition and all connecting elements are easy to use.
- Please pay attention to cleanliness when handling coupling components. Contamination or damage may impair the function of individual components or the whole system.
- Please follow the respective manufacturer instructions when handling lubricants.
- Please always follow the respective operating instructions when handling VOSS pre-assembly machines/ devices and tools. Failing to do so may cause dangers to people and the environment.

Construction

The VOSS *Lok* 40 coupling system based on a 40° cone contour with sealing and holding function formed at the end of the tube. This system is a process-safe and economical alternative to standard clamping ring systems. The installation and connection dimensions correspond to those of clamping ring systems, so converting to VOSS *Lok* 40 is simple.

Standards

The VOSS *Lok* 40 system is not subject to standards in principle, as for conventional clamping ring systems.

For the thread range, the standards listed under the point “thread and seal types and threaded bores” apply.

Dimensions

The dimensions in the catalog are adapted to current standards. We reserve the right to make changes due to technical developments.

Patents

We refer to our domestic and foreign patents, utility models, trademarks and applications for property rights.

Orders

All products listed in this catalog are supplied as depicted. To improve warehousing and to protect against contamination and damage, products are supplied in sealed packaging units.

Orders should be matched to the content of these packaging units. You can find the quantities for the individual packaging units in the respective price list. For smaller required quantities which are lower than the contents of a packaging unit, we recommend obtaining these from our dealers.

Our general terms and conditions, are available at www.voss-fluid.net.

Customer service

Our customer service department is happy to advise you. Please contact our sales service or one of one external sales employees.

Permitted pressures

To determine the maximum working pressure for general technical fluid applications, the whole VOSS *Lok* [40] range was subject to static and dynamic inspections to ISO 19879.

All VOSS *Lok* [40] components have a static burst pressure safety of S=4, in addition to the working pressures indicated here.

Tube OD	VOSS *Lok* [40] tube connection and VOSS *Lok* [40] taper coupling
6	50 MPa
8	
10	
12	40 MPa
14	
15	
16	32 MPa
18	
20	25 MPa
22	

1 MPa = 10 bar

For the thread side, the partially reduced working pressures apply in accordance with the table below.

	Male stud coupling									
Tube OD	BSPP thread, cylindrical Form A (For example cooper sealing ring)		BSPP thread, cylindrical Form B (sealing edge)		BSPP thread, cylindrical Form E (PEFLEX)		UN/UNF, cylindrical O-Ring		NPT thread, conical (For example PTFE thread sealing tape)	
6	G 1/8 A		G 1/8 A		G 1/8 A		7/16-20 UNF-2A		1/8 NPT	
8	G 1/4 A	35 MPa	G 1/4 A	50 MPa	G 1/4 A	50 MPa	1/2-20 UNF-2A	50 MPa	1/4 NPT	50 MPa
10	G 1/4 A		G 1/4 A		G 1/4 A		9/16-18 UNF-2A		1/4 NPT	
12	G 3/8 A	30 MPa	G 3/8 A	40 MPa	G 3/8 A		3/4-16 UNF-2A		3/8 NPT	
14	G 1/2 A		G 1/2 A		G 1/2 A	40 MPa	7/8-14 UNF-2A	40 MPa	1/2 NPT	40 MPa
15	G 1/2 A	32 MPa	G 1/2 A	32 MPa	G 1/2 A		7/8-14 UNF-2A		1/2 NPT	
16	G 1/2 A		G 1/2 A		G 1/2 A	32 MPa	7/8-14 UNF-2A	32 MPa	1/2 NPT	32 MPa
18	G 1/2 A	25 MPa	G 1/2 A		G 1/2 A		7/8-14 UNF-2A		1/2 NPT	
20	G 3/4 A	20 MPa	G 3/4 A	25 MPa	G 3/4 A	25 MPa	1 1/16-12 UN-2A	25 MPa	3/4 NPT	25 MPa
22	G 3/4 A		G 3/4 A		G 3/4 A		1 1/16-12 UN-2A		3/4 NPT	

1 MPa = 10 bar

Permitted operating temperatures

VOSS *Lok* 40 stainless steel couplings without soft-sealing can be used for general technical fluid applications at operating temperatures from -60 °C to +200 °C.

At operating temperatures above 20 °C, pressure reductions must be taken into account following DIN 3859-1.

The temperature range for use of elastomer seals made from FKM for general technical fluid applications is -25 °C to +200 °C. Other sealing materials (NBR, HNBR, EPDM) are available on request.

Temperature	Pressure resistance
-60 to + 20 °C	100 %
+50 °C	96 %
+100 °C	89 %
+200 °C	80 %

The intermediate values must be linearly interpolated.

Coupling component materials

All VOSS *Lok 40* components are manufactured from austenitic stainless steel 1.4404 to EN 10088-3 (AISI 316L) as standard. This material is characterized by high corrosion or acid resistance and is increasingly replacing established material 1.4571, at least in German-speaking regions.

Union nuts and retaining screws are silver-plated to obtain lower assembly torque in the thread area.

Sealing materials

FKM as standard (for example Viton®)

- for couplings, 80 Shore A
- Temperature range -25° C to +200° C

For elastomer sealings, instructions in DIN 7716 (requirements for storage, cleaning and maintenance) must be followed.

- Store dry and do not exceed +25° C
- Protect from sunlight, ozone and strong artificial light

Alternative materials for VOSS *Lok 40* coupling components and alternative sealing materials are available on request.

Specification of permitted stainless steel tubes:

We recommend the following coupling components made from stainless steel for use with VOSS *Lok 40* :
Seamless, cold-formed, scale-free stainless steel tube to DIN EN 10216-5, material X6CrNiMoTi17-12-2, M. No. 1.4571, CFA or CFD delivery condition, with dimensions and limited tolerances to DIN EN 10305-1. Maximum tube hardness 90 HRB.

Please order the tubes by the external diameter and interior diameter.

All approval inspections for general fluid technology applications of the VOSS *Lok 40* system were performed with tubes made from 1.4571 and the specification listed above.

Beyond this example, VOSS has already had good experience with tubes made from other austenitic stainless steels (1.4404, 1.4541, 1.4435, 1.4301/1.4306), carbon steel tubes (E235, E355) and copper and aluminum alloy tubes.

Use of special tube materials must be checked on an individual basis.

Broad overview of standard threads of VOSS *Lok*[40] connecting components

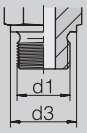
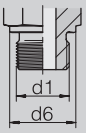
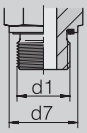
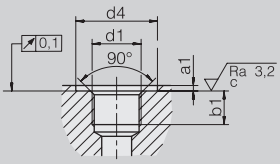
Tube OD [mm]	Union and taper nuts	Retaining screw	Screw-in side		
	UN/UNF thread	**Metric fine thread**	**BSSP thread**	**UN/UNF thread**	**NPT thread**
6	7/16 - 20 UNF	M 12 x 1.5	G 1/8 A	7/16 - 20 UNF-2A	1/8 NPT
8	1/2 - 20 UNF	M 14 x 1.5	G 1/4 A	1/2 - 20 UNF-2A	1/4 NPT
10	5/8 - 20 UN	M 16 x 1.5	G 1/4 A	9/16 - 18 UNF-2A	1/4 NPT
12	3/4 - 20 UNEF	M 18 x 1.5	G 3/8 A	3/4 - 16 UNF-2A	3/8 NPT
14	7/8 - 20 UNEF	M 20 x 1.5	G 1/2 A	7/8 - 14 UNF-2A	1/2 NPT
15	7/8 - 20 UNEF	M 21 x 1.5	G 1/2 A	7/8 - 14 UNF-2A	1/2 NPT
16	7/8 - 20 UNEF	M 22 x 1.5	G 1/2 A	7/8 - 14 UNF-2A	1/2 NPT
18	1 - 20 UNEF	M 24 x 1.5	G 1/2 A	7/8 - 14 UNF-2A	1/2 NPT
20	1 1/8 - 20 UN	M 26 x 1.5	G 3/4 A	1 1/16 - 12 UN-2A	3/4 NPT
22	1 1/8 - 20 UN	M 28 x 1.5	G 3/4 A	1 1/16 - 12 UN-2A	3/4 NPT

In addition to standard dimensions, additional thread dimensions are also available on the screw-in side. Detailed information on the dimensions is listed on the respective pages of the catalog.

Information for inch tubes is available on request.

Screw-in/seal types and threaded bores

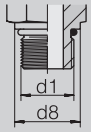
The screw-in/seal types and standards and dimensions of the corresponding threaded bores offered for VOSS *Lok* [40] are listed below.

Male thread: British pipe thread BSPP (cylindrical)			
Screwed plugs			
	DIN 3852-2 Form A (Flat face sealing with copper seal)	ISO 1179-4 Form B (sealing edge)	ISO 1179-2 Form E (PEFLEX profile seal)
Threaded bore			
	ISO 1179-1 Form N (narrow design)		

Thread d1	d3 = d6 [-0.4]	d7 [-0.2]	d4 (narrow) min.	a1 max.	b1 min.	
G 1/8 A	14.0	13.9	15.0	1.0	8.5	
G 1/4 A	18.0	18.9	20.0	1.5	12.5	
G 3/8 A	22.0	21.9	23.0	2.0	12.5	
G 1/2 A	26.0	26.9	28.0	2.5	15.0	
G 3/4 A	32.0	31.9	33.0	2.5	16.5	
G 1 A	39.0	39.9	41.0	2.5	19.0	
G 1 1/4 A	49.0	49.9	51.0	2.5	21.5	
G 1 1/2 A	55.0	54.9	56.0	2.5	22.5	

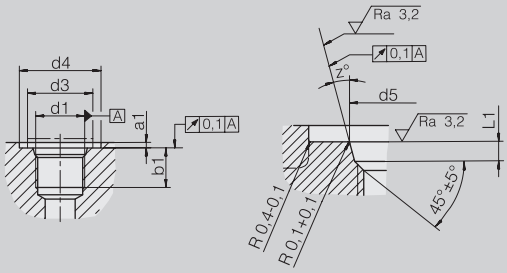
Male thread: American Unified thread UN/UNF (cylindrical)

Screwed plugs



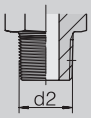
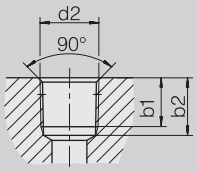
ISO 11926-2/3
(SAE J1926-2/3)

Threaded bore



ISO 11926-1
(SAE J1926-1)

Thread d1	d8 [±0.2]	d4 min.	d3 min.	d5 [±0.05]	a1 max.	b1 min.	Z [±1°]
7/16-20 UNF-2B	13.8	21.0	15.0	12.45	1.6	11.5	12
1/2-20 UNF-2B	16.8	23.0	16.0	14.05	1.6	11.5	12
9/16-18 UNF-2B	16.8 (18.8)	25.0	18.0	15.70	1.6	12.7	12
3/4-16 UNF-2B	21.8 (23.8)	30.0	22.0	20.65	2.4	14.3	15
7/8-14 UNF-2B	26.8	34.0	26.0	24.00	2.4	16.7	15
1 1/16-12 UN-2B	31.8	41.0	32.0	29.20	2.4	19.0	15
1 3/16-12 UN-2B	35.8	45.0	35.0	32.40	2.4	19.0	15
1 5/16-12 UN-2B	40.8	49.0	38.0	35.55	3.2	19.0	15

Male thread: American pipe thread NPT (tapered)							
Screwed plugs							
	ASME B1.20.1						
Threaded bore							
	ASME B1.20.1						

Thread d2	b1 min.	b2 min.					
1/8 NPT	6.9	11.6					
1/4 NPT	10.0	16.4					
3/8 NPT	10.3	17.4					
1/2 NPT	13.6	22.6					
3/4 NPT	14.1	23.1					
1 NPT	16.8	27.8					
1 1/4 NPT	17.3	28.3					

Certification and approvals

VOSS Fluid is certified to ISO 9001 and ISO 14001 by TÜV Rheinland.

VOSS *Lok* [40] tube connections are approved by the following major inspection companies.

- TÜV Rheinland
  - ECE R110-02…
  - EC No 79/2009
- DVGW
- DNV · GL

Additional certifications are available on request.

Applications

The VOSS *Lok* [40] system is suitable and authorized for various special applications, in addition to use in general fluid technology.

Overview of pressure ranges, safety factors and temperature ranges of the potential applications of VOSS *Lok* [40]

		Fluid technology General **DIN EN ISO 19879**	**CNG (Compressed natural gas)** **ECE R110**	**H2 hydrogen** **EG79/EC79/EU406**	**DVGW** **DIN 3387-1**	**DNV • GL** **GL VI-7-8**
Temperature range		-40 °C to +120 °C	-40 °C to +120 °C	-40 °C to +120 °C	-20 °C to +60 °C	-55 °C to +200 °C
Nominal pressure PN per tube OD [mm]	**6**	50 MPa	26 MPa	70 MPa	25 MPa	50 MPa
	8					
	10					
	12	40 MPa				40 MPa
	14					
	15					
	16	32 MPa				32 MPa
	18					
	20	25 MPa				25 MPa
	22					
Safety factor		4	1.5	1.5	4	4

Information for imperial tubes is available on request.

permitted pressure ranges
non-relevant pressure ranges/tube diameter

Designation directory

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