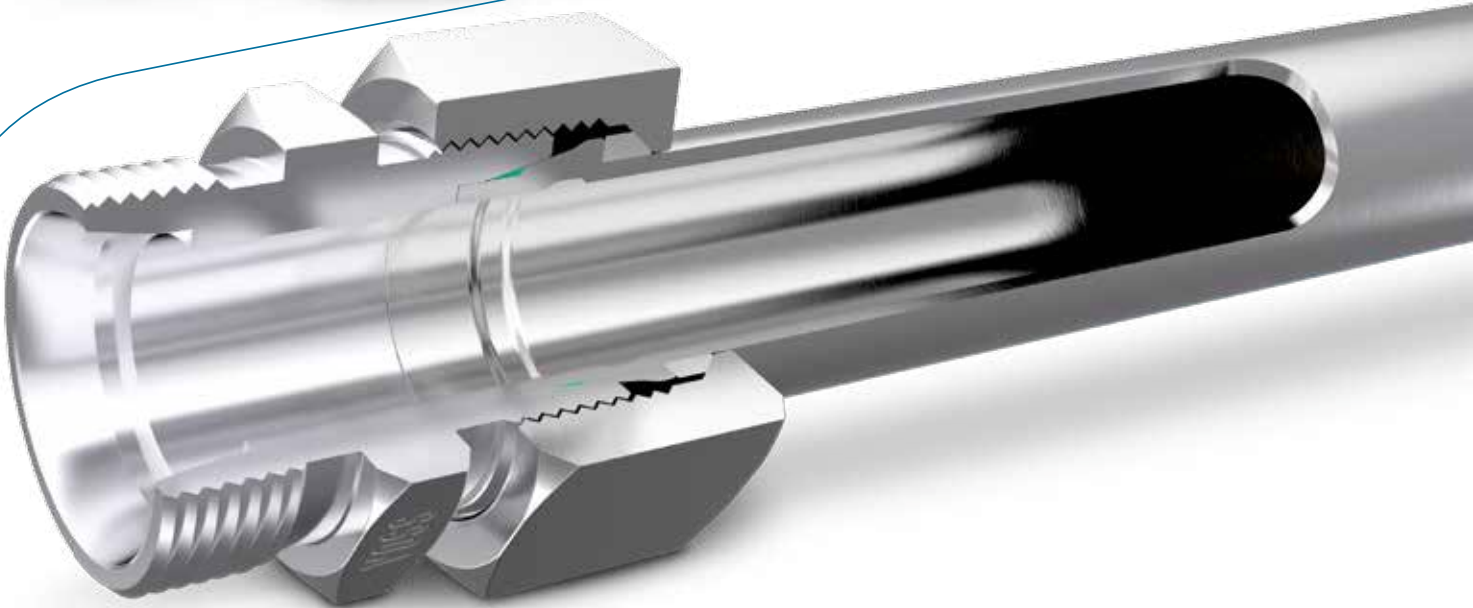
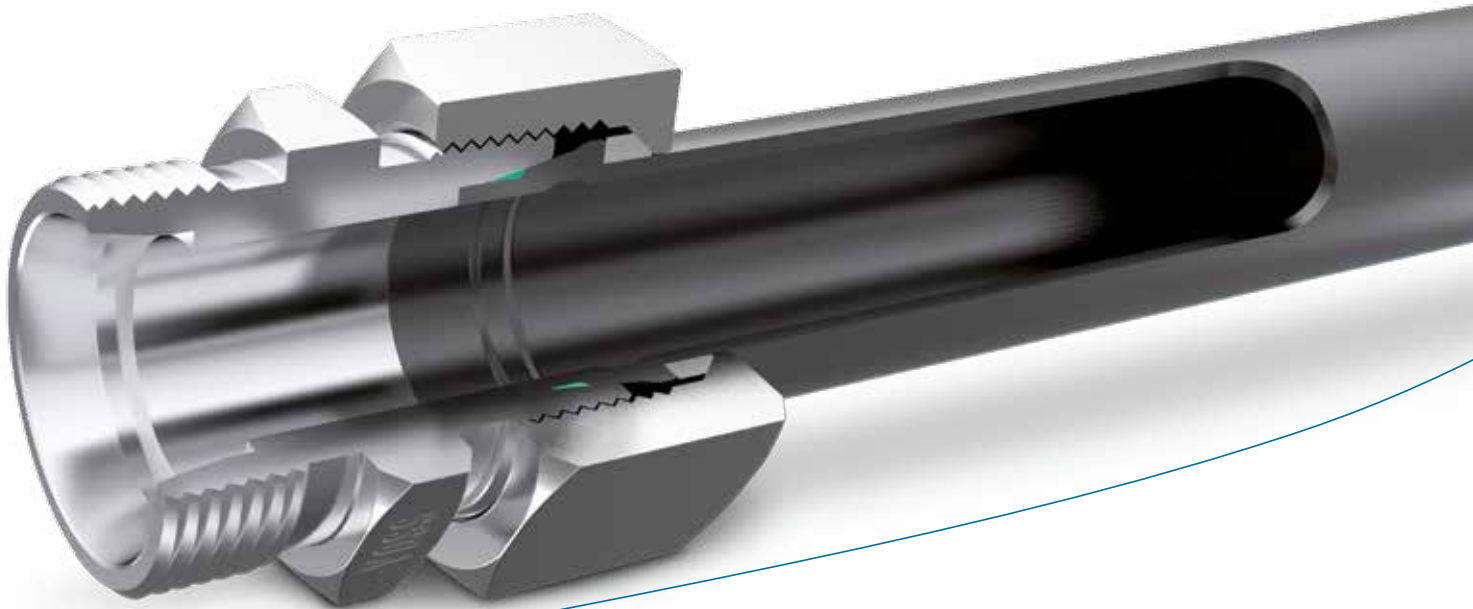


## VOSSForm<sup>SQR</sup> / VOSSForm<sup>SQR</sup>VA tube couplings

- Safety
- Quality
- Reliability



## Product information VOSSForm<sup>SQR</sup> tube couplings

The main requirements placed on hydraulic tube connections can be summed up by three terms:

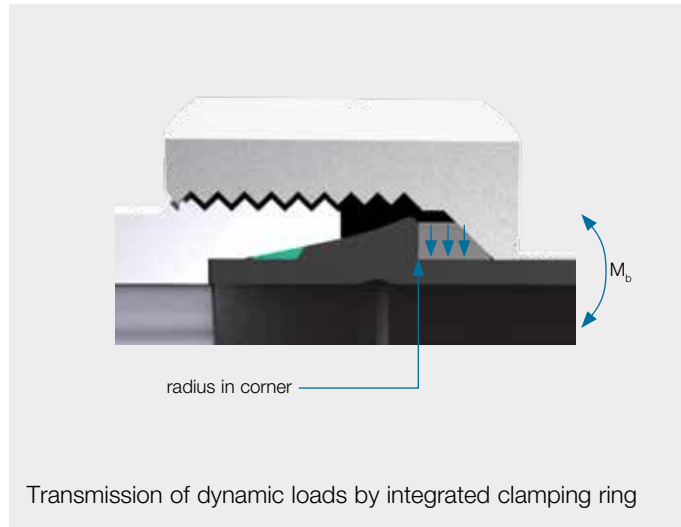
- Safety, as the most important aspect.
- Quality, without which permanent leak-tightness is not possible.
- Reliability, only an economical coupling achieves market success.

The VOSSForm<sup>SQR</sup> tube coupling system fulfils these requirements with its innovative design, based on VOSS's proven design principles.

In the VOSSForm 100 forming machine a contour is shaped at the end of a commercially obtainable hydraulic tube. When a soft seal and the special SQR function nut are added, the result is a simple, high-quality connection.

### Maximum load-bearing capacity and safety

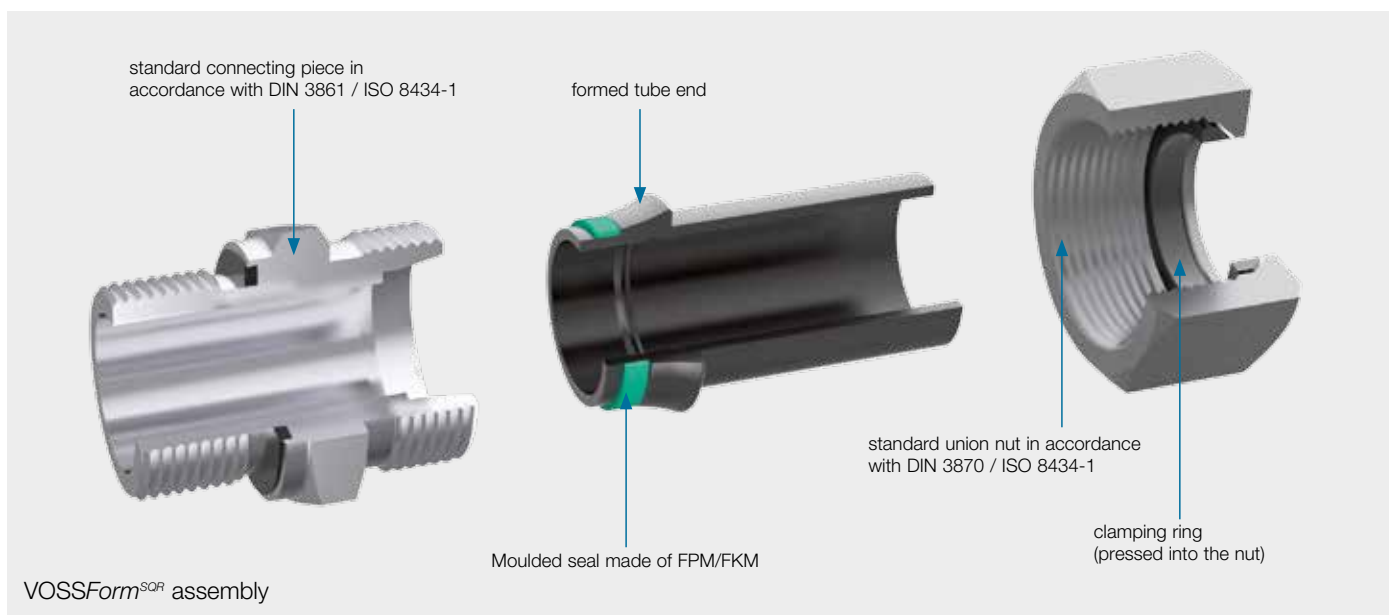
The critical area is the transition from the formed contour to the tube. Here, the forming process can cause the material to become brittle. With the VOSSForm<sup>SQR</sup> system, this weak point is effectively relieved. Firstly, the radius at the transition minimizes the notch effect, and secondly, the SQR nut with integrated clamping ring clamps the tube radially around the circumference, absorbing the dynamic loads outside of the critical area, thus increasing the pressure load-bearing capacity and breakage resistance.



Transmission of dynamic loads by integrated clamping ring

### Safe assembly thanks to sure stop

Safe assemblies mean secure connections. With the VOSSForm<sup>SQR</sup> system, the face of the tube end is pressed against the bottom of a standard DIN/ISO connecting piece during assembly. When the nut is tightened, a noticeable increase in the required torque indicates that assembly is concluded. Slack connections and over-tightening can be virtually eliminated. In addition, the assembly length is reduced and with this, the assembly time. The contour formed on the end of the tube is inserted deeply into the 24° taper to ensure secure seating.



VOSSForm<sup>SQR</sup> assembly

## Tube forming with process safety

Forming tubes with the VOSSForm 100 forming machine is as simple as can be. The tube end is simply pushed in as far as the stop plate and the forming process is monitored, allowing for no mistakes. The inner mandrel on the forming head prevents constriction of the tube in the formed area. The inner tube diameter remains completely unchanged, preventing pressure losses due to inward protrusions.

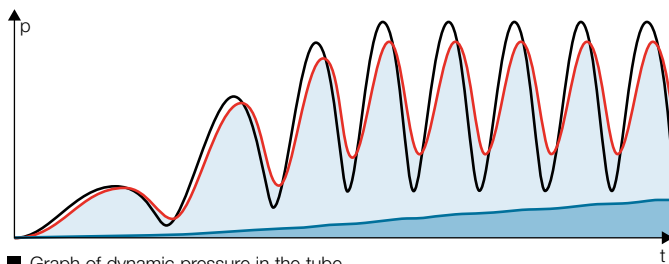
Cycle times between 7 and 15 seconds decrease assembly times, especially in series production.

## Soft seals ensure leak-tightness

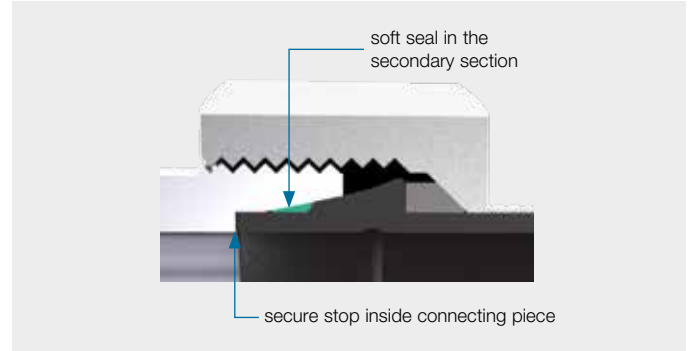
Soft seals offer considerable advantages over purely metallic seals. Any settling that occurs due to mechanical loads is compensated, effectively preventing connection sweating. A connection that remains completely leak-tight even under the most stringent inspection is more economical, protects the environment and demonstrates the quality of the connection, and thus of the entire product.

The concept of locating the soft seal in the secondary section – as with the ES-4 cutting ring – minimizes both static and dynamic loads on the seal. The metallic primary choking of fluid flow by the face of the tube dampens alternating pressure loading effects. When static pressure loads are applied, there is a long time delay before the pressure acts on the seal. This arrangement ensures long-term stability of the elastomer.

VOSS soft seal located in the secondary section of the connection



- Graph of dynamic pressure in the tube
- Conventional connection system with soft seal in primary section
- VOSS system with soft seal in secondary section



## Economical benefits

Avoidance of leaks, minimized assembly time and elimination of maintenance effort and expense make this a sound economical solution. Low material costs and simple parts handling, too, make VOSSForm<sup>SQR</sup> tube couplings ideal for series production.

## Complete product range

Successful use of connection systems requires a wide range of products. The VOSSForm<sup>SQR</sup> system is based on standardized components, meaning that the entire range of VOSS DIN/ISO products can be used with the VOSSForm<sup>SQR</sup> system.

## VOSSForm<sup>SQR</sup>VA

The VOSSForm<sup>SQR</sup>VA forming system is provided for stainless steel applications. All components in this system are made of stainless steel.

The same product characteristics and advantages found in VOSSForm<sup>SQR</sup> for normal steel applications also apply here.



## VOSSForm 100 tube forming machine

The VOSSForm 100 forming machine guarantees time-saving, reliable production of the VOSSForm<sup>SOFR</sup> contours. The monitored process, in conjunction with optimum tube guidance, makes it virtually impossible to produce defective forms due to incorrect operation.

Simple tool changes contribute considerably to reducing processing times. The clamping jaws and forming head can be replaced without tools. The distinctive marking of both tools prevents assembly faults due to incorrect combinations of tools and tube dimensions.

### The forming process

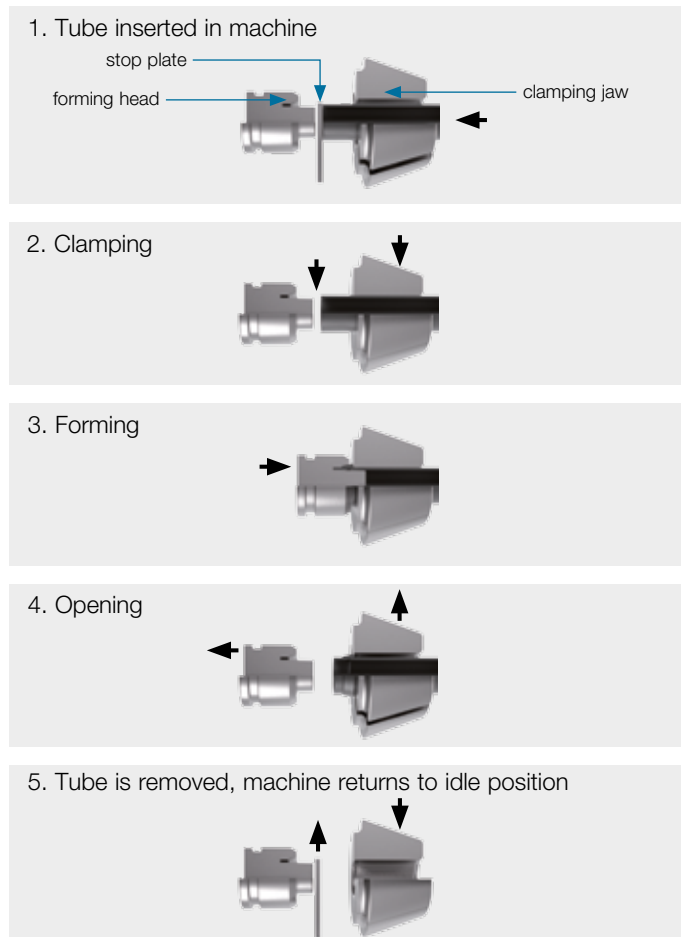
Forming is started by pushing the tube against the stop plate in the forming machine. The process is triggered by pressing the Start button (1.).

The clamping jaws close and clamp the tube in place. The stop plate is swung out of the forming area (2.).

The forming head moves forward and shapes the tube by plastic deformation to produce the VOSSForm<sup>SOFR</sup> contour (3.).

The forming head is retracted and the clamping jaws open again (4.).

Removal of the tube is monitored. This allows the machine to automatically return to the idle position, and the next tube forming sequence can be started without manual reset (5.).



### Forming machine details



Optimum ergonomics and user-friendliness



Single-handed locking by snap catch on the tool magazine



Attachment for crane transportation



Rubber table-top mat

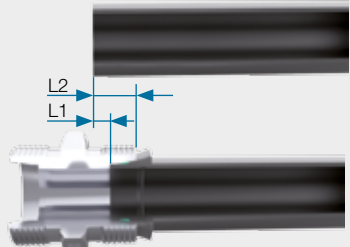


Sastors with PU tyres for easy transportation

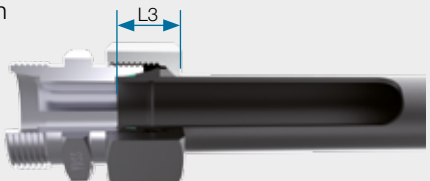


## Design dimensions

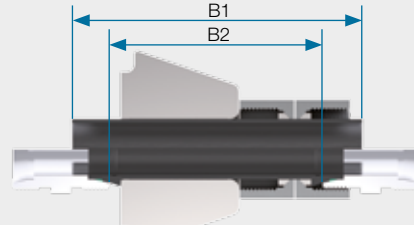
**Tube length calculations**



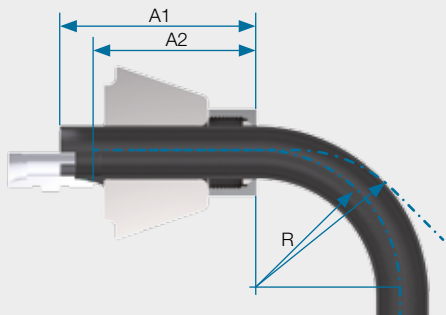
**Height of the completely assembled VOSSForm<sup>SQR</sup> connection**



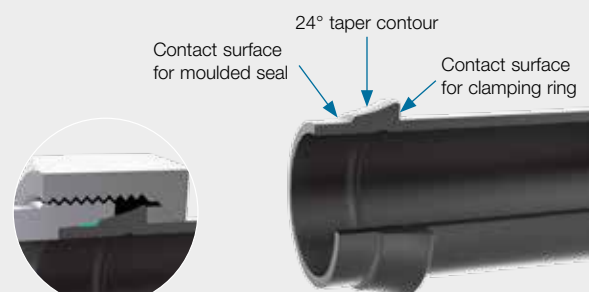
**Minimum lengths for clamping in straight tubes**



**Minimum lengths for clamping in curved tubes (R ≥ 3x Tube OD)**



**Visual quality control of the results**



It is adequate to visually inspect the quality of the three characteristic VOSSForm<sup>SQR</sup> features

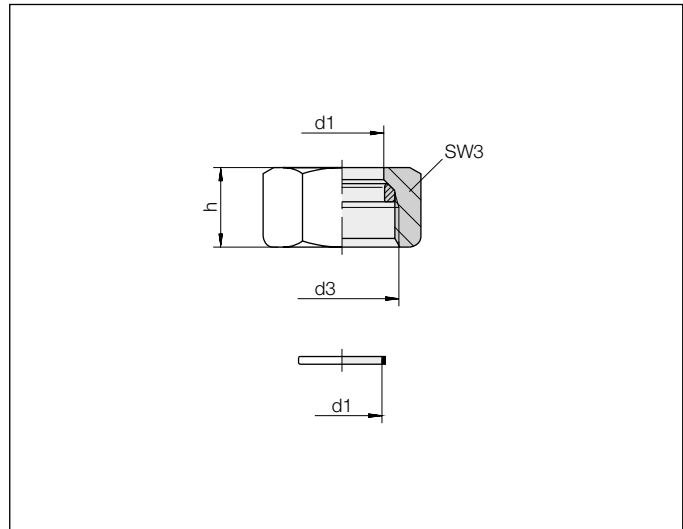
Series	Tube OD [mm]	s [mm]	L1 [mm]		L2 [mm]		L3 approx. [mm]		A1 [mm]		A2 [mm]		B1 [mm]	B2 [mm]
			steel	VA*	steel	VA*	steel	VA*	α≤45°	α≤90°	α≤45°	α≤90°		
L	6	1.5	5.6	5.6	12.6	12.6	15.5	15.5	60	69	47	56	82	56
		2	6.0	6.1	13.0	13.1	16.0	16.0						
		2.5	5.3	5.5	12.3	12.5	16.0	16.0						
L	8	1	5.0	5.5	12.0	12.5	15.5	15.5	60	64	47	51	82	56
		1.5	5.7	5.7	12.7	12.7	16.0	16.0						
		2	5.2	5.2	12.2	12.2	16.0	16.0						
		2.5	4.4	4.7	11.4	11.7	16.0	16.0						
L	10	1	5.2	5.8	12.2	12.8	15.5	15.5	60	60	47	47	83	57
		1.5	5.8	6.0	12.8	13.0	16.0	16.0						
		2	5.1	5.2	12.1	12.2	16.0	16.0						
L	12	1	5.1	5.9	12.1	12.9	15.5	15.5	60	60	47	47	83	57
		1.5	5.8	5.7	12.8	12.7	16.0	16.0						
		2	4.9	5.1	11.9	12.1	16.0	16.0						
L	15	1.5	6.0	6.5	13.0	13.5	17.5	17.5	70	70	56	56	96	68
		2	5.6	5.8	12.6	12.8	17.5	17.5						
		2.5	5.3	5.6	12.3	12.6	17.5	17.5						
L	18	1.5	5.9	6.7	13.4	14.2	18.5	18.5	75	75	61	61	101	73
		2	5.3	5.8	12.8	13.3	18.5	18.5						
		2.5	5.1	5.5	12.6	13.0	18.5	18.5						
		3	5.1	5.8	12.6	13.3	18.5	18.5						
L	22	1.5	6.5	7.1	14.0	14.6	20.0	20.0	85	85	70	70	113	83
		2	5.6	6.6	13.1	14.1	20.0	20.0						
		2.5	5.4	-	12.9	-	20.0	-						
		3	5.3	-	12.8	-	20.0	-						
L	28	2	5.6	6.7	13.1	14.2	20.0	19.5	93	93	79	79	120	92
		2.5	5.4	6.2	12.9	13.7	20.0	19.5						
		3	5.5	6.3	13.0	13.8	20.0	19.5						
		4	7.2	-	17.7	-	25.0	-						
L	35	2	7.6	9.0	18.1	19.5	24.0	24.0	107	107	87	87	142	102
		2.5	7.0	8.1	17.5	18.6	24.0	24.0						
		3	7.5	8.6	18.0	19.1	25.0	25.0						
		4	7.2	-	17.7	-	25.0	-						
L	42	2	7.6	8.4	18.6	19.4	24.5	24.5	117	117	97	97	152	112
		2.5	7.0	-	18.0	-	24.5	-						
		3	7.4	8.6	18.4	19.6	25.5	25.5						
		4	7.0	-	18.0	-	25.5	-						
S	6	1	5.6	5.6	12.6	12.6	16.0	16.0	62	69	49	56	85	59
		1.5	6.0	6.1	13.0	13.1	16.5	16.5						
		2	5.3	5.5	12.3	12.5	16.5	16.5						
S	8	1	5.0	5.5	12.0	12.5	16.0	16.0	62	64	49	51	85	59
		1.5	5.7	5.7	12.7	12.7	16.5	16.5						
		2	5.2	5.2	12.2	12.2	16.5	16.5						
		2.5	4.4	4.7	11.4	11.7	16.5	16.5						
S	10	1.5	6.5	6.7	14.0	14.2	18.5	18.5	64	64	50	50	90	62
		2	5.9	5.9	13.4	13.4	18.5	18.5						
		2.5	5.2	5.5	12.7	13.0	18.5	18.5						
S	12	1.5	6.4	6.3	13.9	13.8	18.5	18.5	64	64	50	50	90	62
		2	5.7	5.7	13.2	13.2	18.5	18.5						
		2.5	5.2	5.3	12.7	12.8	18.5	18.5						
		3	4.9	5.0	12.4	12.5	18.5	18.5						
S	14	1.5	6.7	6.7	14.7	14.7	20.5	20.5	72	72	57	57	101	71
		2	6.3	6.3	14.3	14.3	20.5	20.5						
		2.5	5.8	5.7	13.8	13.7	20.5	20.5						
		3	5.7	5.7	13.7	13.7	20.5	20.5						
S	16	1.5	6.9	7.2	15.4	15.7	21.0	21.0	77	77	61	61	107	75
		2	6.1	6.2	14.6	14.7	21.0	21.0						
		2.5	5.7	6.0	14.2	14.5	21.0	21.0						
		3	5.5	5.8	14.0	14.3	21.0	21.0						
S	20	2	8.1	8.5	18.6	19.0	25.0	25.0	88	88	69	69	122	84
		2.5	7.2	7.7	17.7	18.2	25.0	25.0						
		3	6.8	7.3	17.3	17.8	25.0	25.0						
		3.5	6.6	-	17.1	-	25.0	-						
S	25	4	6.4	-	16.9	-	25.0	-						
		2	7.7	8.7	19.7	20.7	28.0	28.0	103	103	82	82	140	98
		2.5	7.3	8.0	19.3	20.0	28.0	28.0						
		3	7.0	7.6	19.0	19.6	28.0	28.0						
S	30	4	6.6	7.6	18.6	19.6	28.0	28.0						
		2	7.9	-	21.4	-	30.5	-	114	114	92	92	155	111
		2.5	7.3	8.1	20.8	21.6	30.5	30.5						
		3	8.1	8.7	21.6	22.2	31.5	31.5						
S	38	4	7.6	8.4	21.1	21.9	31.5	31.5						
		5	7.3	-	20.8	-	31.5	-						
		6	7.0	-	20.5	-	32.0	-						
		3	9.1	10.3	25.1	26.3	34.5	34.5	134	134	108	108	180	128
		4	9.2	10.2	25.2	26.2	35.5	35.5						
		5	9.1	9.8	25.1	25.8	35.5	35.5						
		6	9.0	-	25.0	-	35.5	-						
7	9.0	-	25.0	-	36.0	-								

\* stainless steel

Steel / stainless steel set comprising:

- SQR-function nuts
- Moulded seals

Standard moulded seal material is FPM/FKM



Series Tube OD d1	d3	Pressure	SW3	h	kg/100 approx.	Order designation steel	Order designation stainless steel
L 6	M 12 x 1.5	PN 500	14	14.5	1.1	24-SQRNMS-L6	24-SQRNMS-L6-SST
L 8	M 14 x 1.5	PN 500	17	14.5	1.7	24-SQRNMS-L8	24-SQRNMS-L8-SST
L 10	M 16 x 1.5	PN 500	19	15.5	2.0	24-SQRNMS-L10	24-SQRNMS-L10-SST
L 12	M 18 x 1.5	PN 400	22	15.5	2.8	24-SQRNMS-L12	24-SQRNMS-L12-SST
L 15	M 22 x 1.5	PN 400	27	17	4.7	24-SQRNMS-L15	24-SQRNMS-L15-SST
L 18	M 26 x 1.5	PN 400	32	18	6.9	24-SQRNMS-L18	24-SQRNMS-L18-SST
L 22	M 30 x 2	PN 250	36	20	8.9	24-SQRNMS-L22	24-SQRNMS-L22-SST
L 28	M 36 x 2	PN 250	41	21	9.4	24-SQRNMS-L28	24-SQRNMS-L28-SST
L 35	M 45 x 2	PN 250	50	24	15.0	24-SQRNMS-L35	24-SQRNMS-L35-SST
L 42	M 52 x 2	PN 250	60	24	23.0	24-SQRNMS-L42	24-SQRNMS-L42-SST
S 6	M 14 x 1.5	PN 800	17	16.5	2.0	24-SQRNMS-S6	24-SQRNMS-S6-SST
S 8	M 16 x 1.5	PN 800	19	16.5	2.3	24-SQRNMS-S8	24-SQRNMS-S8-SST
S 10	M 18 x 1.5	PN 800	22	17.5	3.5	24-SQRNMS-S10	24-SQRNMS-S10-SST
S 12	M 20 x 1.5	PN 630	24	17.5	3.9	24-SQRNMS-S12	24-SQRNMS-S12-SST
S 14	M 22 x 1.5	PN 630	27	20.5	5.8	24-SQRNMS-S14	24-SQRNMS-S14-SST
S 6	M 24 x 1.5	PN 630	30	20.5	7.1	24-SQRNMS-S16	24-SQRNMS-S16-SST
S 20	M 30 x 2	PN 420	36	24	11.3	24-SQRNMS-S20	24-SQRNMS-S20-SST
S 25	M 36 x 2	PN 420	46	27	21.2	24-SQRNMS-S25	24-SQRNMS-S25-SST
S 30	M 42 x 2	PN 420	50	29	23.3	24-SQRNMS-S30	24-SQRNMS-S30-SST
S 38	M 52 x 2	PN 420	60	32.5	34.4	24-SQRNMS-S38	24-SQRNMS-S38-SST

To reduce the assembly forces,  
the union nuts are coated with wax  
lubricant.

## A consistent concept

Always the right connection for your application. With the introduction of the *VOSSForm<sup>SQR</sup>* screw coupling system, another solution option has been added to our consistent concept. The optimum solution for your applications must meet technical requirements to the full. But it is at least as important to employ the most economical technology. The major factors in this context are material, assembly and maintenance costs. This means that the optimum solution can only be found if the coupling's performance requirements are determined in detail.

Generally speaking, welded connections are considered to be the safest of all. But the total cost of any connection should take account of more economical solutions which will provide the equivalent degree of safety under the same operating conditions.

VOSS can supply four different systems for DIN/ISO standard technologies to cover the entire range of requirements.

## System comparison on the basis of decisive application criteria

Requirements System features	<b>2S</b> The proven reliable solution	<b>2S plus</b> For that extra bit of safety	<b>ES-4</b> The soft-seal connection with 4-fold benefits	<b>VOSSForm<sup>SQR</sup></b> The innovative solution with a consistent soft-seal concept	<b>BV-10</b> For extreme load conditions
Standard	DIN EN ISO 8434-1	DIN EN ISO 8434-1	DIN EN ISO 8434-1	DIN EN ISO 8434-1	DIN EN ISO 8434-1
Type of seal	metallic	metallic	metallic + soft sealing	metallic + soft sealing	metallic + soft sealing
Material	steel/stainless steel	steel	steel/stainless steel	steel/stainless steel	steel
Series	L/S	L/S	L/S	L/S	L/S
Tube-OD	6-42	6-42	6-42	6-42	6-42
Pressure load capability - static/dynamic loads - transmission of external forces	●	●	●	●●	●
Temperature resistance	●	●	●	●	●
Corrosion resistance	●●	●●	●●	●●	●●
Media resistance	●	●	●	●	●
Ease of assembly - pre-assembly and final assembly - sources of error, testing possibilities	●	●●	●●	●●	●
On-site assembly - without special tools - possible repair solutions	●	●	●	○	●
Maintenance - settling behaviour under continuous load - permanent fine sealing	○	●	●●	●●	●●
Flow behaviour - cross-section reduction, dead spaces - pressure loss, noise	●	●	●	●	○
System reliability - tearing out, tube fracture - reliability of assembly	●	●	●	●●	●●

●● excellent

● very good

● good

○ average

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