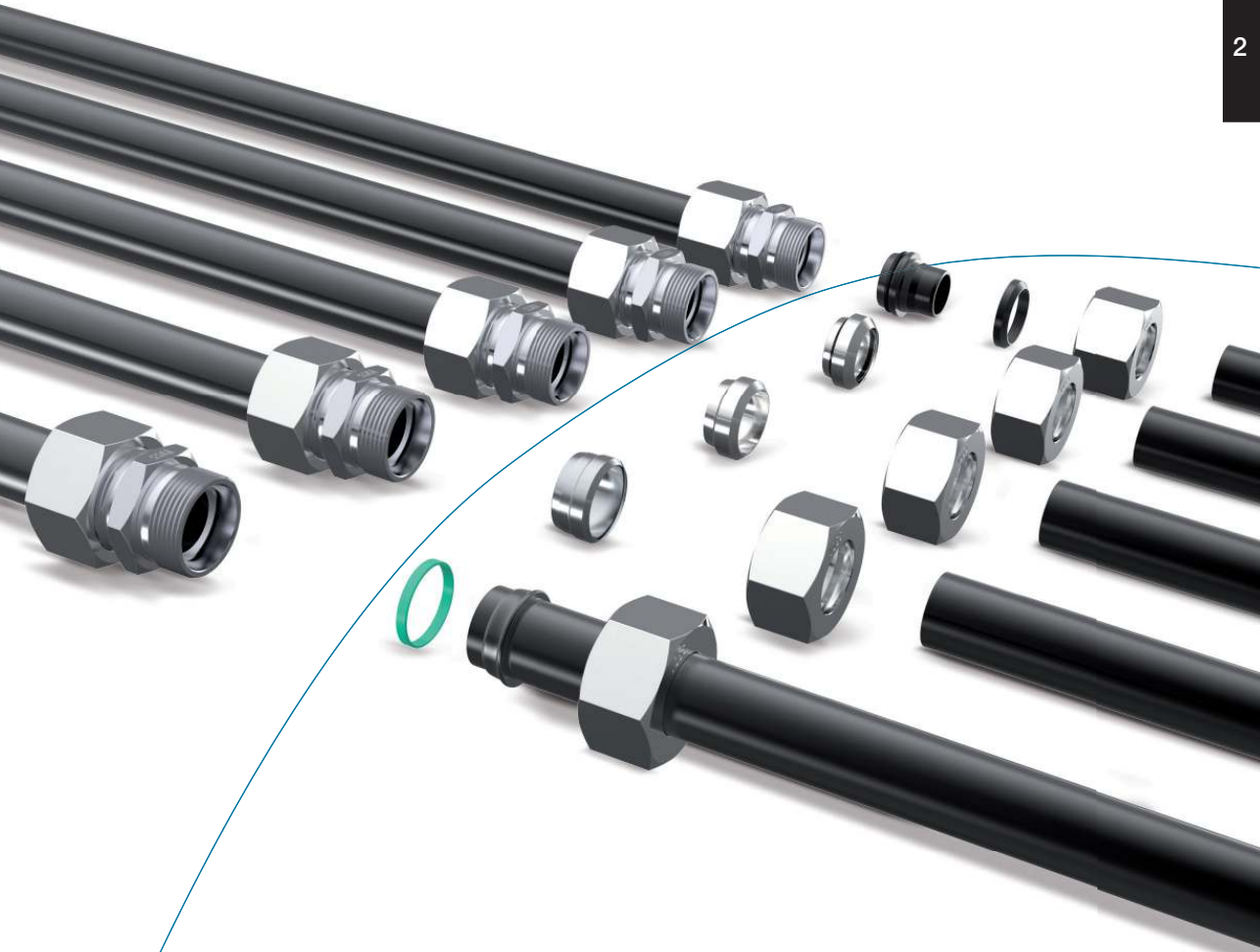


Overview of 24° tube couplings



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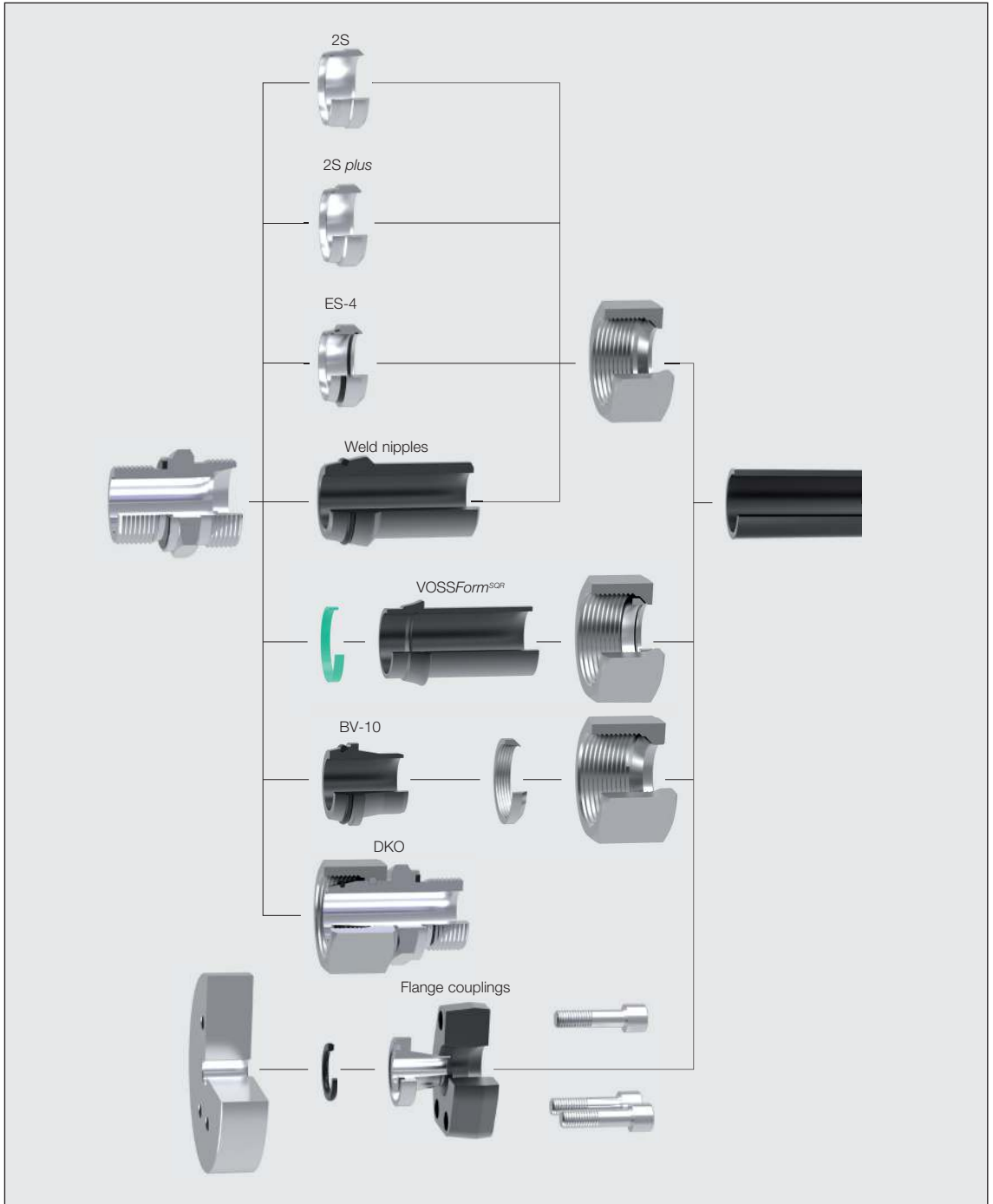
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The right connections for all applications



The complete range of VOSS couplings

Connection components

<p>2S cutting rings</p>  <p>P. 58 24-2S-...</p>	<p>2S plus cutting rings</p>  <p>P. 59 24-2SP-...</p>	<p>ES-4 cutting rings</p>  <p>P. 60 24-ES4-...</p>	<p>2SVA cutting rings</p>  <p>P. 58 24-2S-...-SST</p>	<p>ES-4VA cutting rings</p>  <p>P. 60 24-ES4-...-SST</p>	<p>Union nuts</p>  <p>P. 62 24-N-...</p>
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<p>SQR-Function nuts and seals</p>  <p>P. 64 24-SQRNMS-...</p>	<p>SQRVA-Function nuts and seals</p>  <p>P. 64 24-SQRNMS-...-SST</p>	<p>BV-10 Flared cones</p>  <p>P. 66 24-BV10C-...</p>	<p>BV-10 Clamping rings</p>  <p>P. 68 24-BV10R-...</p>	<p>BV-10 Union nuts</p>  <p>P. 69 24-BV10N-...</p>
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Male stud couplings

<p>metric/imperial/NPT tapered</p>  <p>P. 80 24-SDS-...</p>	<p>metric/imperial, parallel, seal edge</p>  <p>P. 85 24-SDS-...</p>	<p>metric/imperial, parallel, PEFLEX</p>  <p>P. 91 24-SDS-...</p>	<p>UN/UNF, O-ring</p>  <p>P. 97 24-SDS-...</p>	<p>Straight</p>  <p>P. 112 24-S-...</p>	<p>Reducing couplings</p>  <p>P. 113 24-S-...-...</p>	<p>Elbow</p>  <p>P. 115 24-E-...</p>
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Connecting adapters

Adjustable couplings with tube socket




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24° Taper couplings

<p>Straight, DKO</p>  <p>P. 158 24-SW2OS-...</p>	<p>Elbow, DKO</p>  <p>P. 164 24-SWOE-...</p>	<p>45°, DKO</p>  <p>P. 165 24-SWOE45-...</p>	<p>T, DKO</p>  <p>P. 166 24-SWOT-...</p>	<p>L, DKO</p>  <p>P. 167 24-SWOL-...</p>	<p>Stud standpipe adapters, DKO, metric/imperial, parallel, PEFLEX</p>  <p>P. 168 24-SWOSDS-...</p>	<p>Reducing couplings, DKO</p>  <p>P. 171 24-SWOS-...-...</p>
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Banjo and rotary couplings

Welding couplings

<p>metric/imperial parallel, Standard design</p>  <p>P. 126 24-BSE-...</p>	<p>metric/imperial, parallel, Low-restrictive design</p>  <p>P. 130 24-BEE-...</p>	<p>metric/imperial, parallel, high pressure</p>  <p>P. 134 24-BCE-...</p>	<p>metric/imperial, parallel, rotary coupling</p>  <p>P. 140 24-PCE-...</p>	<p>Straight welding bosses</p>  <p>P. 186 24-WDS-...</p>	<p>Welding bulkhead couplings</p>  <p>P. 187 24-WDBHS-...</p>	<p>Welding nipples with O-ring seal</p>  <p>P. 188 24-WDNPSO-...</p>
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Bulkhead couplings

Adjustable couplings with lock nut

<p>Straight</p>  <p>P. 122 24-BHSLN-...</p>	<p>Elbow</p>  <p>P. 123 24-BHELN-...</p>	<p>Elbow, metric/imperial, parallel</p>  <p>P. 178 24-SDAE-...</p>	<p>Elbow, metric, parallel, ISO 6149, O-ring</p>  <p>P. 180 24-SDAE-...</p>	<p>45°, metric, parallel, ISO 6149, O-ring</p>  <p>P. 181 24-SDAE45-...</p>	<p>L, metric, parallel, ISO 6149, O-ring</p>  <p>P. 182 24-SDAL-...</p>	<p>T, metric, parallel, ISO 6149, O-ring</p>  <p>P. 183 24-SDAT-...</p>
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Female stud and gauge couplings

Flange couplings

<p>Straight female stud couplings, metric/imperial</p>  <p>P. 192 24-S-...</p>	<p>Gauge couplings, standard couplings</p>  <p>P. 195 24-PGS-...</p>	<p>Straight, square</p>  <p>P. 248 24-FSO-...-HC-...-...</p>	<p>Elbow, square</p>  <p>P. 249 24-FEO-...-HC-...-...</p>	<p>ZAKO tube-to-port flange couplings, SAE, 3000/6000 psi</p>  <p>P. 266 Z-TPO-...</p>	<p>ZAKO tube-to-tube flange couplings, SAE, 3000/6000 psi</p>  <p>P. 270 Z-TTO-...</p>	<p>ZAKO tube-to-port flange couplings, square</p>  <p>P. 274 Z-TPO-...-HC-...-...-...</p>
<p>Gauge couplings, male version</p>  <p>P. 196 24-SWPGS-...</p>	<p>Gauge couplings, DKO</p>  <p>P. 197 24-SWOPGS-...</p>	<p>Straight, SAE</p>  <p>P. 252 24-FSO-...</p>	<p>Elbow, SAE</p>  <p>P. 254 24-FEO-...</p>	<p>ZAKO tube-to-tube flange couplings, square</p>  <p>P. 276 Z-TTO-...-HC-...-...-...</p>	<p>ZAKO LP tube-to-port flange couplings, SAE</p>  <p>P. 288 Z-TPO-LP-...</p>	<p>ZAKO LP tube-to-tube flange couplings, SAE</p>  <p>P. 289 Z-TTO-LP-...</p>

Component parts and accessories for couplings

<p>Thread reducing couplings, straight</p>  <p>P. 198 GP-SDS-...</p>	<p>Blanking screws</p>  <p>P. 203 GP-PLIH-...</p>	<p>Blanking plugs</p>  <p>P. 206 24-PLOC-...</p>	<p>Tube blanking screws</p>  <p>P. 209 24-TBS-...</p>	<p>Reinforcing sleeves</p>  <p>P. 211 24-RS-...</p>
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Hydraulic-Valves

<p>Non-return valves tube coupling on both ends</p>  <p>P. 311 24-VNRO-...</p>	<p>Non-return valves female thread</p>  <p>P. 312 GP-VNROI-...</p>	<p>Non-return valves screw in thread</p>  <p>P. 314 24-VNROPT-...</p>	<p>Non-return valves screw in thread</p>  <p>P. 316 24-VNROTP-...</p>	<p>Non-return valves plug-in cartridges</p>  <p>P. 323 GP-VNRCO-...</p>	<p>Shuttle valves ball seat/soft sealing</p>  <p>P. 325 24-VST-...</p>
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24° coupling range with a wide variety of system solutions

VOSS 24° DIN tube couplings as specified in ISO 8434-1 and DIN 2353 are among the most widespread hydraulic coupling systems worldwide. Thanks to their tremendous advantages, this type of tube connection has become firmly established, particularly in Europe, Asia and South America.

Product details

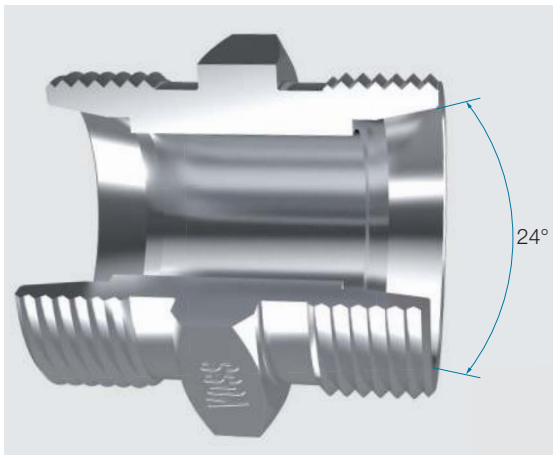
This product range consists of a low and a high series (L and S) which differ with regard to pressure ratings and dimensions.

All stated nominal pressure ratings (PN) are designed for a four-fold safety factor.

For the tube connection end, various coupling systems can be adapted to suit the particular application, with the 24° conical bore serving as the sealing surface.

The broad range of VOSS Fluid screw couplings covers a wide variety of shapes, such as elbow, T and L couplings. These are available in a variety of designs, such as connection couplings, bulkhead couplings, stud couplings and stud couplings with adjustable flow direction. To supplement this range, VOSS also offers diverse special designs such as adapters, gauge couplings, blanking plugs and non-return valves.

A wide variety of thread and seal types conforming to international standards can be supplied for the screw connections.



The main advantages of 24° couplings

- This type of coupling is leak-tight and can resist alternating bending moments and pressure transients as well as preventing tubes from tearing out of the connection.
- The connection can be taken apart and re-assembled as often as desired. This is particularly important for servicing and maintenance.
- Various tube connection systems can be combined with the 24° coupling bodies to suit the application. This makes it possible to modify a system which normally uses purely metallic sealing into one with additional soft sealing functions.
- These tube couplings provide maximum leak-tightness even when subjected to very high system pressures (up to 800 bar), although they have compact external dimensions and are easy to assemble and install.
- The permitted system pressures of the couplings are specified for a safety factor of 4. This ensures adequate reserve strength in case of overloads.
- A wide range of designs is available, making it possible to apply a modular design concept when selecting components. In this way special couplings and unnecessary tube loops in installation spaces can be avoided. A wide variety of metric and imperial threads and seal types is also available for the male threaded variants.
- The 24° system is a universal standard and is therefore in widespread use, particularly in Europe, Asia and South America. Hose couplings can also be connected easily to this system.
- These tube connections are easy to assemble.
- Under normal conditions, subsequent re-tightening is not necessary when 24° coupling systems are used. The coupling cannot come apart by itself.
- A “lightweight” series is available for lower system pressures up to 500 bar. These couplings cost less, save weight, occupy less space and permit higher flow rates.
- The optimum tube clamping achieved by the 24° coupling system keeps the connection flexible enough to absorb piping system vibration. As opposed to this, permanent connections are rigid and often tend to tear apart.
- All VOSS couplings are supplied with a VOSS coat protective finish as a standard feature. This provides the best possible corrosion protection.
- Many independent certification bodies have confirmed the functional characteristics of the entire coupling system.

How to obtain a permanently leak-free connection system

Couplings that are leak-tight at all times improve the cost-effectiveness of your products and improve their image. The diversity of VOSS coupling systems and the wide range of types available offer a suitable solution for almost any application.

Taking the respective purpose and application into account, we offer the following recommendations concerning design and selection of the correct coupling system.

Pay attention to the essentials

All main parameters – such as pressure, volume flow rate, ambient temperature, external influences, standard and/or statutory requirements as well as the type of load expected – should be known when selecting the coupling system. The cost-effectiveness of the coupling should also be considered as an additional selection criterion. Apart from the actual purchase price, acquisition costs, assembly/installation efforts, leak-tightness sustainability and long-term corrosion protection should be taken into account when estimating the total cost.

Wherever possible, use a soft-seal system throughout

Soft sealing systems prevent the development of minute leakage paths which may occur due to settling of the connection, temperature changes and vibration. The VOSS Fluid product range allows the use of elastomers throughout, both on the tube ends and on the male connection side of the coupling. When selecting these seals, observe the different seal material properties.

Trust on VOSS Fluid products for all applications

Essentially, it is possible to combine connecting elements made by different manufacturers, but we recommend the exclusive use of components made by one and the same manufacturer. VOSS Fluid products are perfectly matched to each other and thus ensure optimum operation and quality.

Take advantage of our wide application know-how

VOSS Fluid and its authorized trade outlets have widespread know-how on almost every conceivable application. Reap the benefits of our experience and let us advise you individually before you choose a system.

Always follow VOSS assembly and installation instructions

Leaky connections are usually caused by assembly and installation faults. This is why assembly, installation and operating instructions must be strictly observed. VOSS Fluid offers comprehensive training material as well as practical training courses dealing with all tube connection topics. If you wish, we can hold these at your premises and provide valuable tips specially geared to your particular production processes.

Let VOSS Fluid audit your company regularly

You should check at regular intervals whether internal production procedures have changed, e. g. due to the employment of new fitters, or due to worn machinery or other tools. We offer an audit service for inspecting your assemblies and installation on site.

Check your tubing and hose routing

Make sure that your tubing and hoses are routed and installed properly and that supports are evenly spaced. Mechanical arrangements which are too rigid are not able to absorb vibration whereas sloppily supported tubing systems will tend towards vibrating.

Requirements System features	2S	2S plus	ES-4	VOSSForm ^{SQR}	BV-10	VFS 90 (ORFS)	ZAKO
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	DIN EN ISO 8434-1 and SAE J 1453	
Type of seal	metallic	metallic	metallic + soft sealing	metallic + soft sealing	metallic + soft sealing	metallic + soft sealing	metallic + soft sealing
Material	steel/ stainless steel	steel	steel/ stainless steel	steel/ stainless steel	steel	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	6-38	16-114.3
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

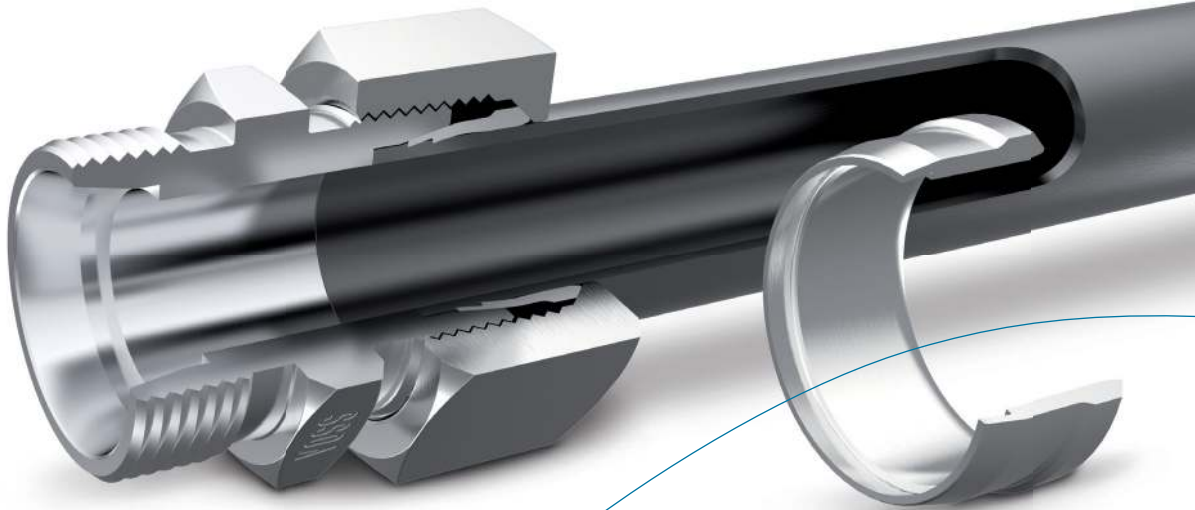
● very good

● good

○ average

2S cutting ring couplings

Product information

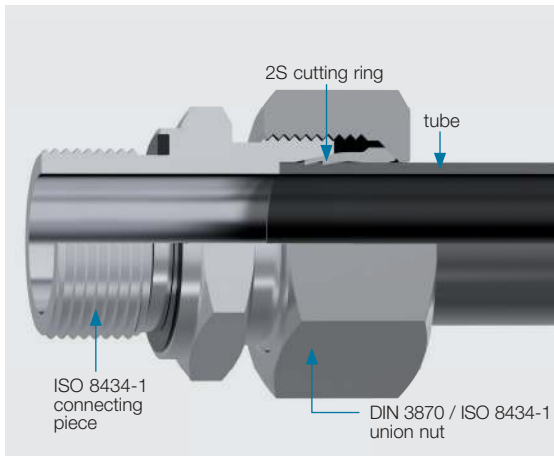


2S cutting ring tube couplings

VOSS 2S cutting ring tube couplings conform to the latest standards with regard to design and dimensions (DIN 2353 or ISO 8434-1).

They are designed for use with metric tubes. All dimensions, such as spanner size across flats, holes and connection dimensions are metric.

VOSS 2S cutting ring tube couplings are characterized by their high functional stability and practical assembly and installation characteristics. The spring effect typical of the 2S cutting ring maintains the pre-tensioning forces for the connection.



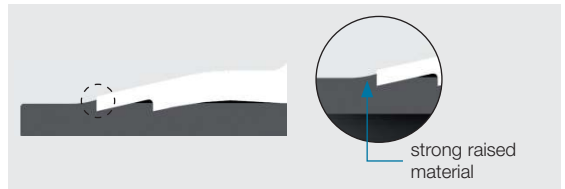
Other advantages of VOSS 2S cutting ring tube couplings are the broad range of types available, world-wide availability and their wide range of potential uses in hydraulic and pneumatic engineering.

Function description

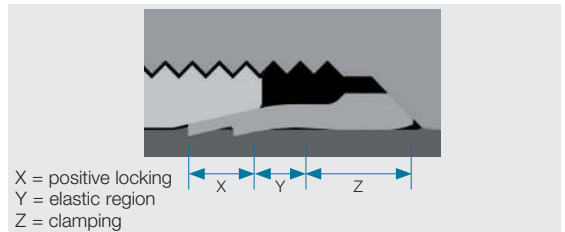
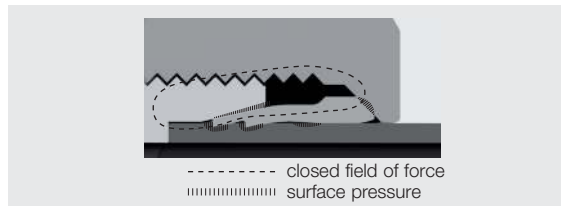
As integrated connection components, tube couplings must fulfil their “hold and seal” purpose at all times. On the screw-in coupling side, a wide range of standardized male threads and related sealing options are available, along with the corresponding hole patterns for flange connections.

Furthermore, even the smallest detail is important for tube couplings. For example, the details of the current VOSS 2S cutting ring have evolved over many years of development work. Its special characteristics are:

- Optimum incision by both cutting edges. The first cutting edge of the 2S cutting ring produces the material protrusion that is decisive for gripping of the tube. The second cutting edge optimizes the overall function and provides additional reliability by distributing the force uniformly over the entire conical section.



- Extreme leak-tightness due to the pre-tensioning forces applied during final assembly. Use of state-of-the-art calculation methods meant that it was possible to determine a function-optimized match between the assembly forces and the surface pressures required to seal the connection.



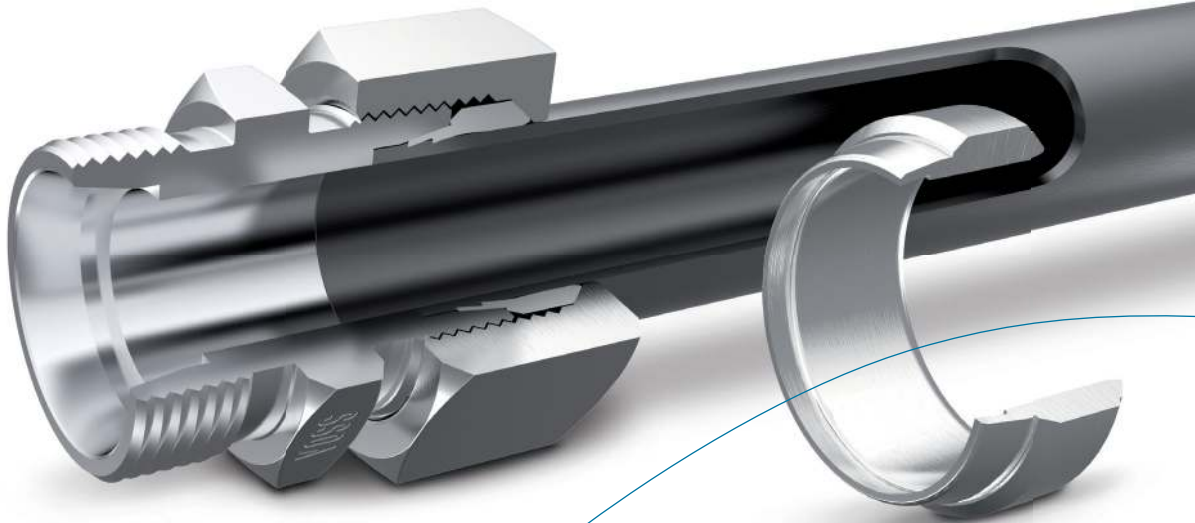
- Elastic behaviour due to the spring effect typical of VOSS cutting rings. This is obtained by the interaction of geometry and material characteristics once assembly is completed. Elastic pre-tensioning compensates the settling phenomena of materials under dynamic loads.

General note

In order for the VOSS 2S cutting ring couplings to fulfill their function, it is extremely important that the Installation instructions and the note in the technical remarks are followed exactly. Incorrect handling will lead to risks with regard to safety and leaking of the connection.

2S *plus* cutting ring couplings

For that extra bit of safety



Product information, 2S plus cutting ring tube couplings

As world-wide system partner for hydraulic coupling technology, VOSS Fluid ensures the highest possible process reliability of your products at all times. Here, not only correct advice on the choice of product and the quality of VOSS products are important, but also correct assembly and installation by users.

Our experience has shown that this is where the greatest optimization potential lies.

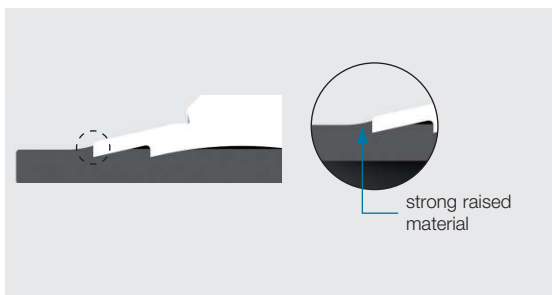
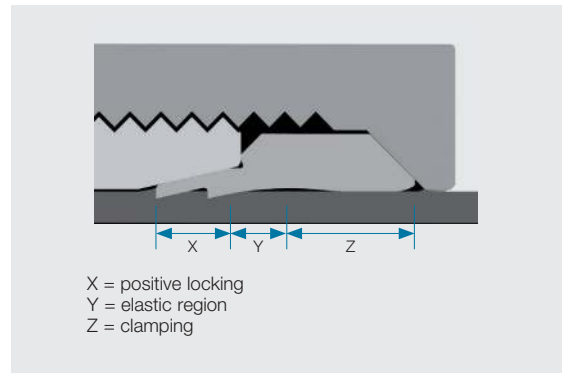
Incorrect assembly and installation automatically lead to leaks in the hydraulic system, not all of which are immediately detected. Faulty assembly and installation can therefore impair leak-tightness of your products in the long term. The new "2S plus" range offers best possible safety thanks to its dual-cutting edge technology, tried and tested millions of times over, paired with the best possible installation properties and high load-bearing strength, thus raising standards in hydraulic connection technology to a new level.

Reliable dual cutting-edge technology

The feed movement when the union nut is tightened causes the first strong cutting edge to cut into the tube, pushing up material in front of the cutting edge. This massive material accumulation ensures firm seating of the cutting ring. The second, trailing cutting edge determines the depth to which the first cutting edge penetrates and also prevents any further cutting into the tube material.

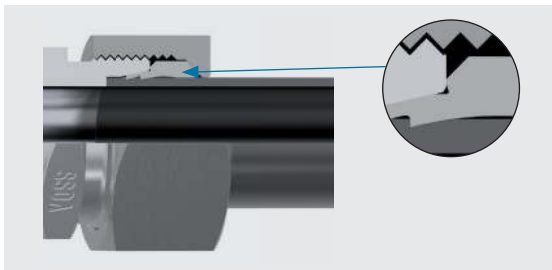
Furthermore, the second cutting edge ensures uniform force distribution over the entire conical surface, as an additional counteracting force is transmitted by the tube in the area of the cut. Together, the two cutting edges provide maximum protection against the cutting ring being twisted off the tube.

Thanks to the special contour of the "2S plus" cutting ring, the preloading forces achieved once assembly is completed can be sustainably maintained. This "spring effect" in the middle section of the cutting ring compensates settling effects of the connection under dynamic loads. The "2S plus" range is therefore also ideally suited for use under conditions where greater vibration and alternating bending loads occur.

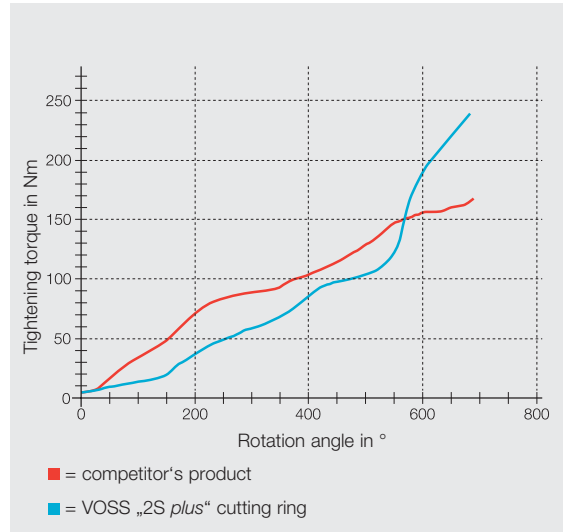


Process reliability, also during assembly

The new block stop significantly increases the assembly's reliability. Over-tightening during assembly, which is the cause of many leaks, is prevented by the special contour of the "2S plus" cutting ring. Whenever an attempt to over-tighten the assembly is made, the tightening torque rapidly increases, giving the user direct feedback.



The results of direct comparative tests between "2S plus" cutting rings and products manufactured by competitors showed significantly sharper force increases for the "2S plus" when over-tightening was simulated – giving an unmistakable signal effect for the user, and providing a reliable way of preventing incorrect assembly.



Repeated disassembly and reassembly is no problem at all. The union nut is simply tightened with the same torque as during original assembly. The assembly procedure for the "2S plus" coupling is identical to that used for the "2S" cutting ring couplings, providing additional benefit for experienced users.

Maximum load-bearing capability

The sturdy geometry surrounding the block stop additionally protects the "2S plus" cutting ring against deformation and ensures positive force transmission throughout the entire system.

Apart from achieving matching high surface pressures of the metallic sealing surfaces, this also offers another benefit:

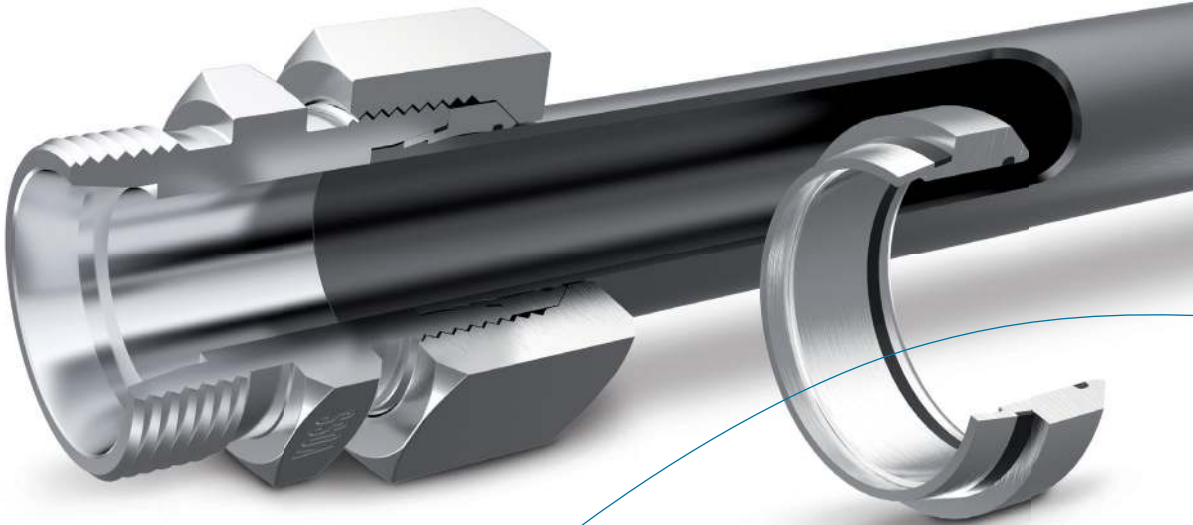
The "2S plus" cutting ring can be used for even the most extreme system pressures, up to 500 bar in the light "L" series and up to 800 bar in the heavy "S" series – and that at four-fold safety levels!

Flexible application options

Selective influencing of material properties during production not only makes "2S plus" cutting rings suitable for use with metric steel tubes, but also for applications with tubes made of stainless steel.

ES-4 cutting ring couplings

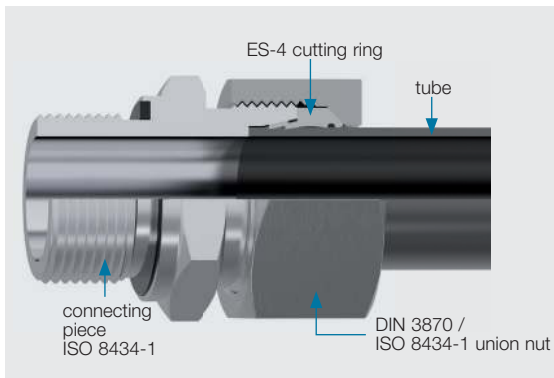
The soft-seal connection with 4-fold benefits



Product information, ES-4 tube couplings

VOSS ES-4: soft seal couplings in accordance with DIN / ISO and with 4-fold benefits:

1. Design based on the tried and tested VOSS 2S cutting ring.
2. Additional precision sealing using soft sealing elements made of FPM/FKM.
3. Reliable leak-tightness thanks to gap-free chambering of the soft seals.
4. Guided assembly up to the tightening torque limit.



With "ES-4", VOSS engineers have developed a soft-seal coupling that not only offers additional reliability, but is also much more economical.

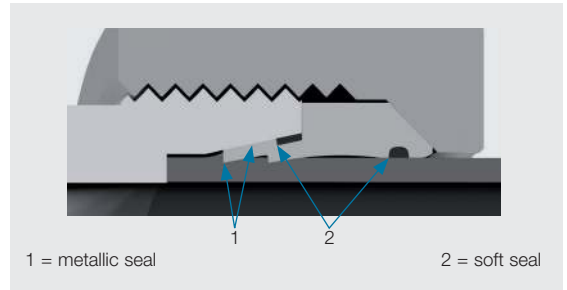
As regards the tube connection side, ES-4 couplings cover the application range between the proven 2S cutting ring coupling for standard applications and 10° flared couplings for heavy loads and high stresses.

Leak prevention

The special moulded seal in the groove on the cutting ring taper and the additional O-ring between the cutting ring and the tube eliminate leaks which might otherwise occur due to slackening of the metallic seal, e. g. due to creep characteristics.

Dynamic loads

If the medium succeeds in passing the metallic sealing zone when there is an alternating pressure load, it is stopped by the soft seals located behind the metal seal. The arrangement of the elastomer seals behind the metallic sealing zone means that the alternating pressures can only act on the soft seal after being considerably damped. This quasi-static load, which is lower than the operating pressure, ensures excellent long-term stability of the elastomers.



Static loads

Assuming that a leak develops in the metallic sealing zone while the assembly is exposed to static pressure loads, the full operating pressure would build up and act on the front of the soft seal – however with a considerable time delay. In such cases, complete enclosure of the soft-seal elements without any gaps ensures reliable sealing.

VOSS 2S ring as the basis

The basis for the soft seal coupling is the proven VOSS tube couplings conforming to DIN 2353 / ISO 8434-1. In this design, the 2S cutting ring is supplemented by soft seals fitted on the secondary side.

The reliable functional properties of 2S cutting rings remain totally unaffected:

- In the final assembled state, loading by bending moments is counteracted adequately by support from the broad contact area and by the uninterrupted force transfer.
- In addition, the first, strong cutting edge and the additional second cutting edge ensure a secure hold i. e. for tear-out protection in the case of sudden pressure increases.

Additional precision seal with defined seal chambers.

The precision seals prevent the familiar sweating effects of purely metallic seals:

- The special moulded seal of the ES-4 cutting ring, which is set into a groove in the cutting ring taper, seals off any possible leakage path between the cutting ring and the connecting piece.
- An additional O-ring prevents leakage between the cutting ring and the tube.

As a result, both soft seals are located behind the tried and tested metallic seal. With this arrangement, dynamic and static loads are intercepted in the primary zones, i. e. at the metallic sealing points, and only act on the soft seals in a virtually static manner.

Another advantage is that the soft seals are contained in stable, gap-free retention spaces once the cutting rings have been fitted. This prevents extrusion of the soft seals even when exposed to full system pressure.

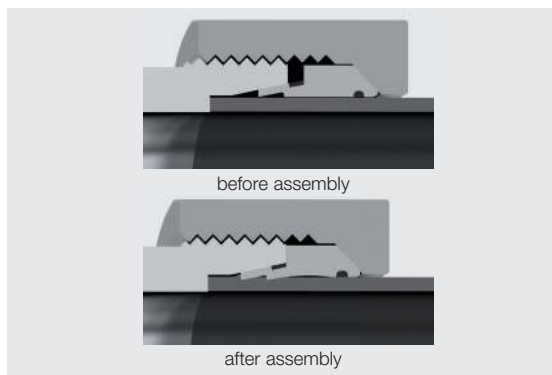
Safety through block installation

The strong, gap-free enclosure of the fine seal is obtained by a block installation of the ES-4 cutting ring. This is achieved by pressing the moulded seal more strongly onto the coupling taper and by the gap-free radial contact of the cutting ring to the outside tube surface in the area around the O-ring seal. For this purpose, the cutting ring geometry is designed in such a way that maximum possible elasticity is achieved despite the block effect.

Block installation also ensures that the depth of incision is limited, thus counteracting tube constriction when joining thin-walled tubes

It also makes over-tightening of the connection much more difficult.

The same assembly forces are required for block installation as for 2S cutting rings. Also, the same procedure for checking correct cutting ring incision, as required by the standard, can be applied here, and the fitter can use the same working methods and tools.



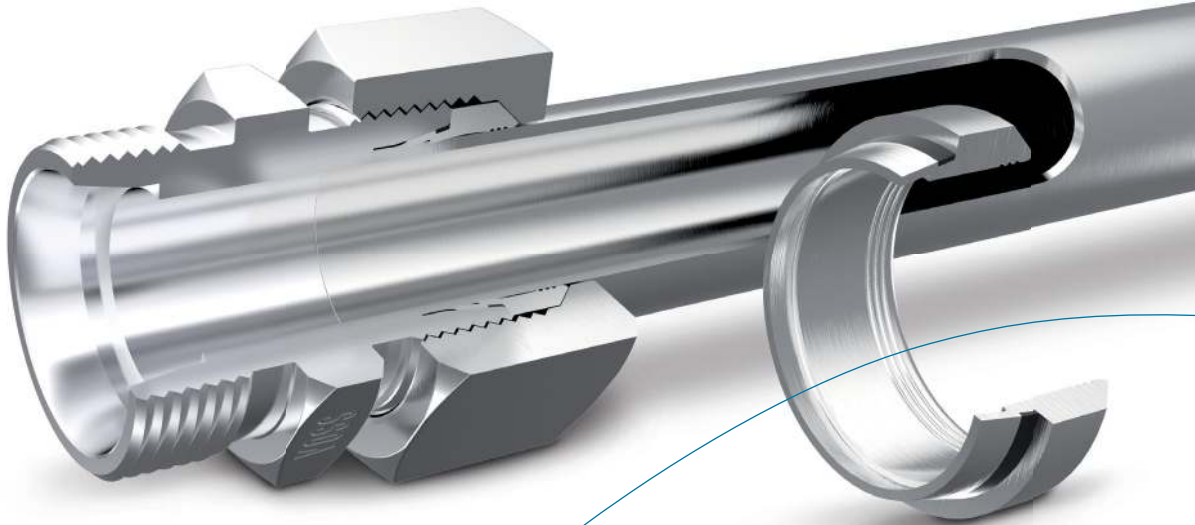
The economic advantages:

ES-4 couplings offer not only a high degree of security against leaks, but additional economic benefits as well:

- Cost and time-intensive corrective measures are no longer required. Production failures are avoided.
- Dry connections help improve the image of the final product, giving final customers advantages over their competitors.
- With the introduction of the ES-4 couplings, VOSS offers a consistent soft seal system. The user can reduce the number of suppliers considerably and thus minimize the number of orders required.
- As ES-4 couplings consist of DIN/ISO connecting pieces and DIN/ISO nuts, the user does not need to establish and maintain a stock of special parts.
- As the user needs to change neither assembly procedures nor tools, additional costs for training and tools are avoided.

Conclusion: In view of the advantages offered by ES-4 couplings regarding greatest possible leak protection, they are an interesting economical alternative from the cost-benefit aspect.

2SVA / ES-4VA cutting ring couplings



VOSS offers both

2SVA 2-cutting-edge rings and ES-4VA stainless-steel soft-sealing cutting rings.

The standard cutting ring with 2 cutting edges for reliable connection of your piping.

The first cutting edge produces a strong raised material section, ensuring that the tube is held securely.

The following, second cutting edge provides additional safety to deal with higher vibration and alternating bending loads. The fact that this cuts into the tube later balances out the assembly forces.

The elastic behaviour of the ring maintains the pre-tension applied by the assembly forces and prevents leaks which may develop due to settling effects or critical pressure peaks.

ES-4VA soft-sealing cutting rings for maximum safety against leaks in the high-precision sector.

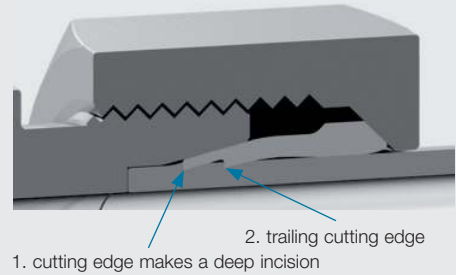
Especially for applications with highly sensitive liquids, 100-percent precision sealing is imperative for protection of the environment and for economical process design.

The four known advantages of the ES-4 cutting rings for steel also apply to ES-4VA cutting rings.

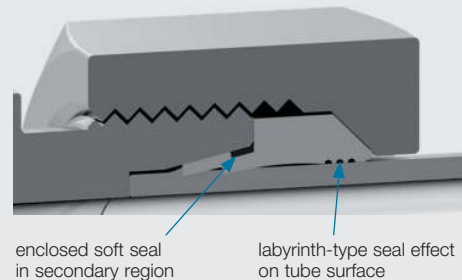
1. Based on tried and tested VOSS 2S cutting rings.
2. Additional precision seal in the secondary area – a soft seal made of FPM / FKM between the cutting ring and the connecting piece creating a labyrinth sealing effect between the cutting ring and the tube.
3. Hermetic encapsulation of the soft seal to prevent it being pressed out when subjected to pressure-change loading, ensuring maximum elastomer service life.
4. Safe assembly thanks to the mechanical stop; over-tightening or under-tightening is practically impossible.

Both cutting rings types can be fitted using standard VOSS pre-assembly devices.

2SVA cutting ring

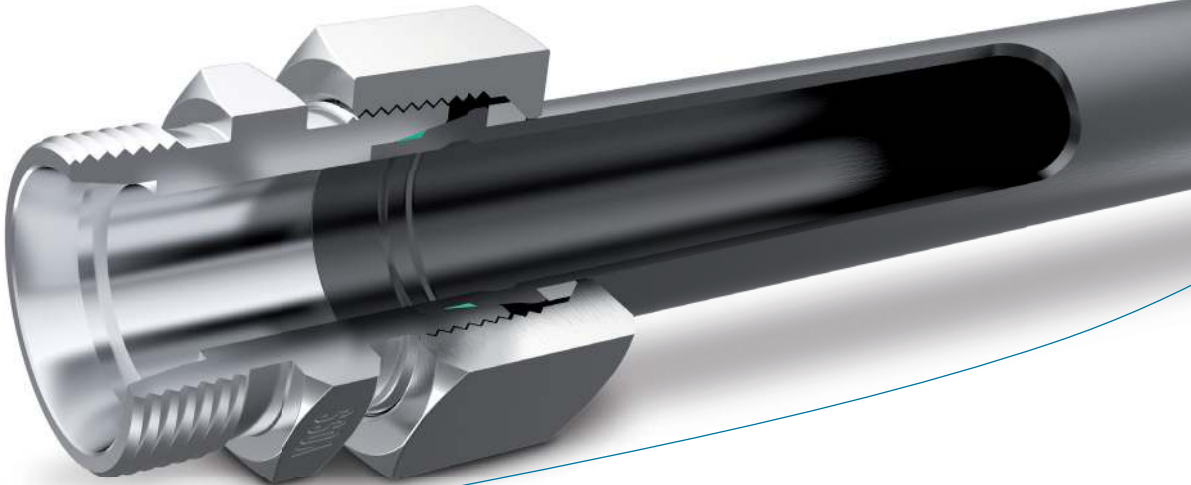


ES-4VA cutting ring



VOSSForm^{SQR} / VOSSForm^{SQR}VA tube couplings

- Safety
- Quality
- Reliability



Product information VOSSForm^{SQR} tube couplings

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

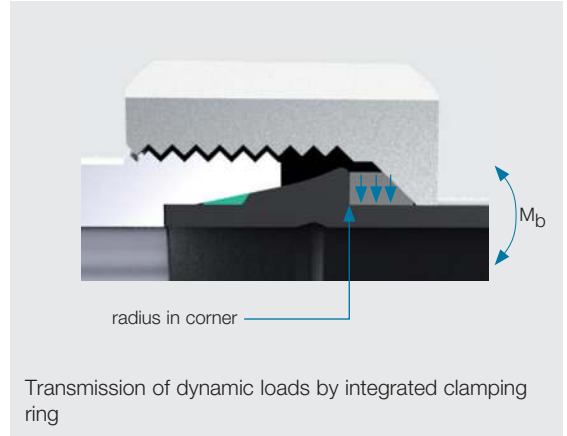
- Safety, as the most important aspect.
- Quality, without which permanent leak-tightness is not possible.
- Reliability, only an economical coupling achieves market success.

The VOSSForm^{SQR} tube coupling system fulfils these requirements with its innovative design, based on VOSS's proven design principles.

In the VOSSForm100 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.

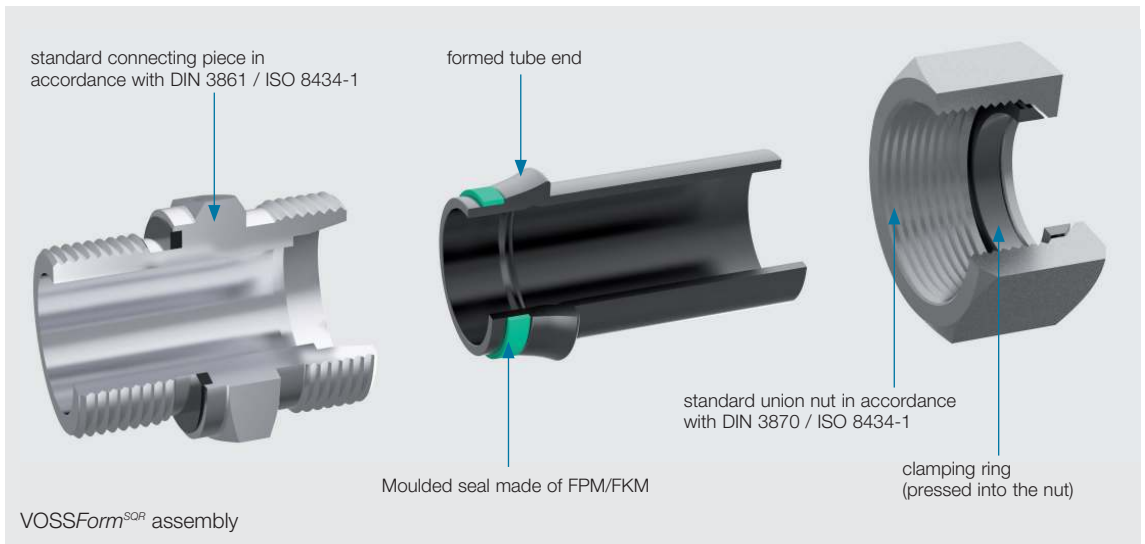
Maximum load-bearing capacity and safety

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^{SQR} 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.



Safe assembly thanks to sure stop

Safe assemblies mean secure connections. With the VOSSForm^{SQR} 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.



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.

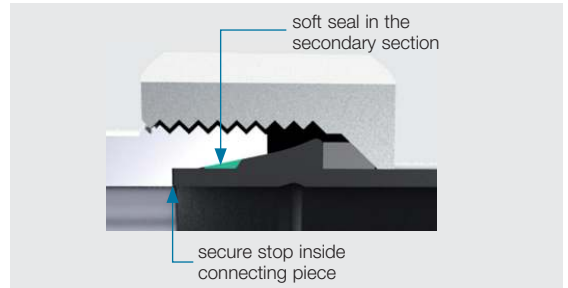
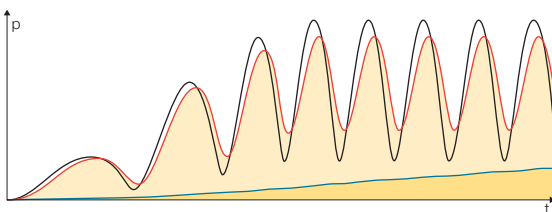
Cycle times between 7 and 15 seconds decrease assembly times, especially in series production.

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



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^{SOR} tube couplings ideal for series production.

Complete product range

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

VOSSForm^{SORVA}

The VOSSForm^{SORVA} 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^{SOR} for normal steel applications also apply here.

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

High performance paired with simple connection assembly and installation makes VOSSForm^{SOR} a universal connection for series production.

VOSSForm 100 tube forming machine

The VOSSForm 100 forming machine guarantees time-saving, reliable production of the VOSSForm^{SQR} 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

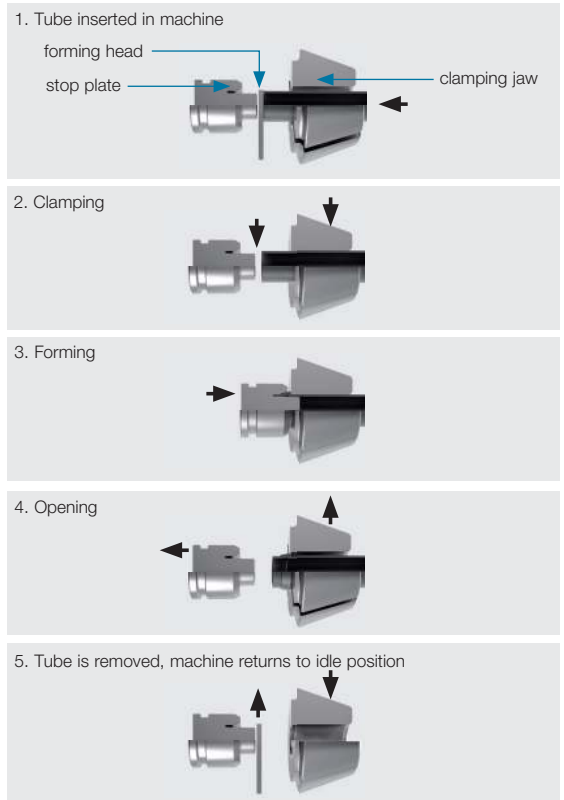
Forming is started by pushing the tube against the stop plate in the forming machine. The process is triggered by pressing the Start button (1.).

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^{SQR} 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.).

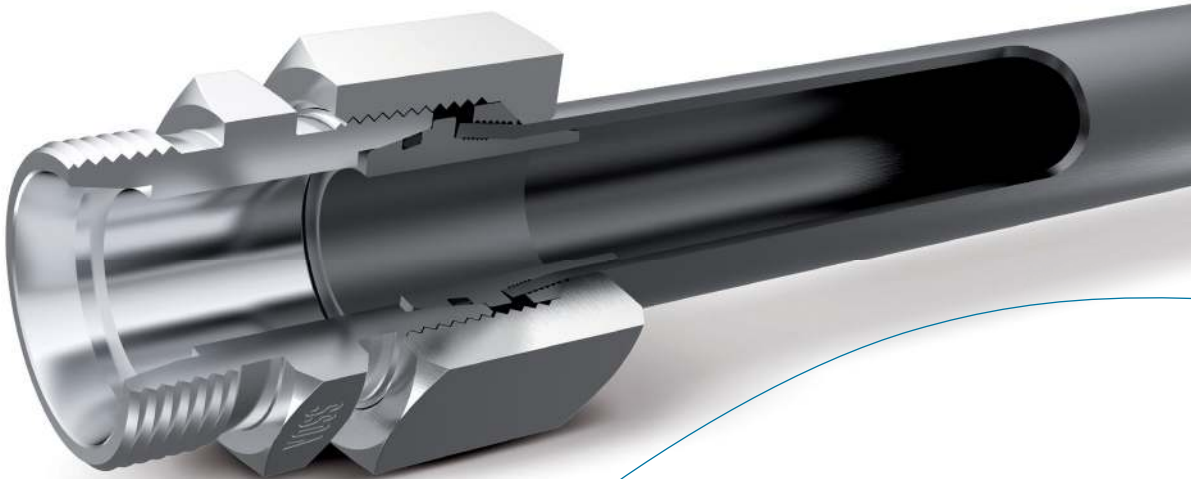


Forming machine details

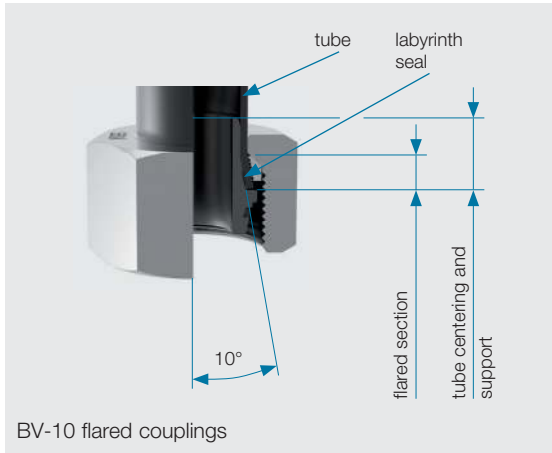


BV-10 flared couplings

For extreme load conditions



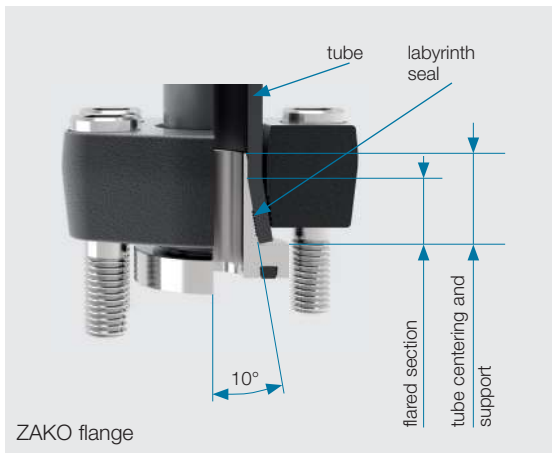
Product information, 10° flared coupling system



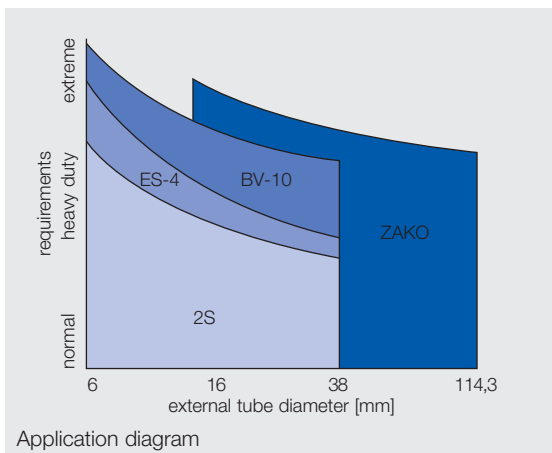
The VOSS 10° flared coupling system complements the tried and tested VOSS cutting ring programme for heavy-duty and extreme load applications (see application diagram). BV-10 flared couplings are the ideal solution for applications exceeding the capacity of cutting ring couplings, since the 10° flared coupling systems have sustained ability to cope with alternating bending stresses, sudden pressure increases, pressure peaks, vibrations and temperature fluctuation.

At the tube end, this system – as opposed to standard systems – applies a flare angle of 10°.

The connection end toward the device – either directly or via a connecting piece – is designed to fit off-the-shelf or standardized connections. The combination of a flared cone and clamping ring or a ZAKO ring and flange provides excellent hold, ensuring maximum operational safety even under extreme loads.



Both the BV-10 coupling and the ZAKO flange system are based on the 10° flared coupling principle.



BV-10 flared couplings

Users are offered a complete range of couplings comprising both a light-weight and a heavy-duty series. The BV-10 flared coupling is based on the use of DIN/ISO coupling pieces with 24° cones, making it easily interchangeable with cutting ring and weld nipple systems.

As shown in the diagrams below, the tube clamp – in conjunction with the 10° flared cone of BV-10 flared couplings – provides the pre-loading required for a secure connection to the tube. The sealing effect on the connecting piece is ensured by the time-proven DKO head of the flared cone with a metal sealing effect and by a completely enclosed soft-seal packing.

On the tube connection side, the sealing effect is achieved by surface pressure on the flared section and by the labyrinth seal effect of the small “teeth” on the cone surface. The clamping ring presses on a large area of the tube end and the flared cone, ensuring extremely high holding forces. As a result, the system remains leak-tight even when exposed to vibrations or alternating bending moments.

The pressure ratings of VOSS BV-10 flared couplings correspond to those of 24° taper couplings or 24° cutting-ring couplings.

Advantages of the 10° flared coupling system

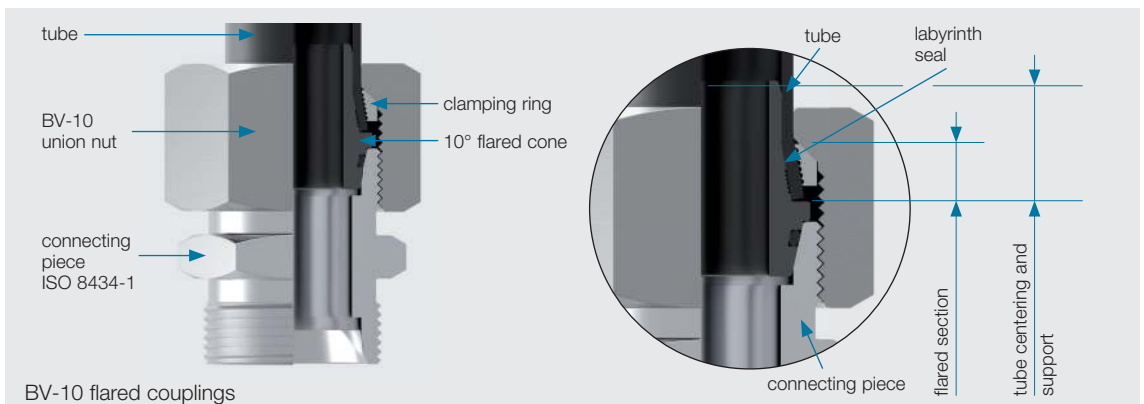
Hydraulic engineers will appreciate the following characteristics of BV-10 tube couplings:

- Particularly suitable for extreme loads and stresses.
- The 10° flared cone principle ensures that tubing is held without notching and incision effects.
- Suitable for use with standard coupling hole diameters and connecting pieces.
- Easy assembly, even with thick-walled tubes.
- Elimination of assembly errors, as the flared cone ring has to be pre-assembled in a special assembly tool.
- Suitable for stainless-steel tubes with tolerances as specified in DIN 10305-1.
- Complete range of couplings in the L and S series.

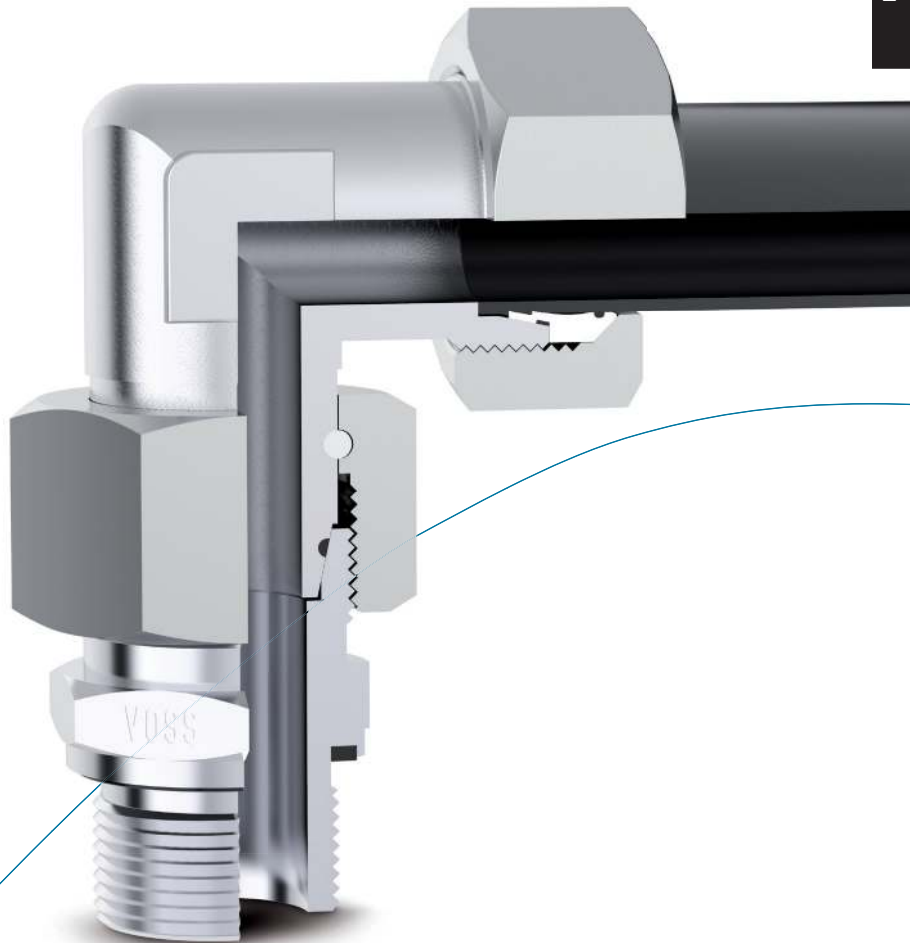
Note on safety:

Widely differing operating conditions often subject tube connections to loads with unforeseeable parameters. To ensure safe operation, please observe the following:

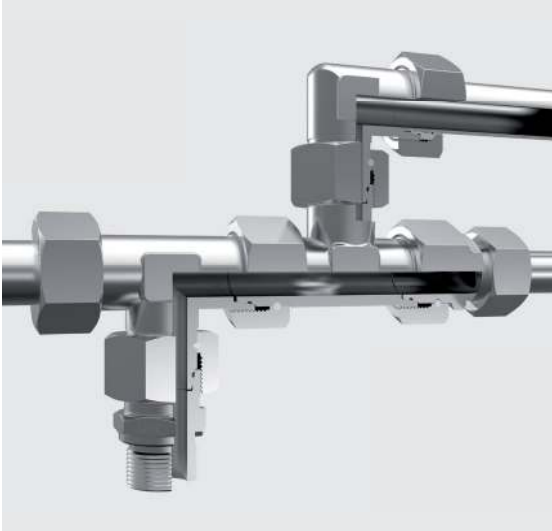
- Always take the tube wall thickness into consideration as well as the external diameter of the tube.
- VOSS 10° flared couplings may only be pre-assembled with VOSS pre-assembly machines especially designed for this purpose.
- Always observe the assembly instructions of the device being used!



24° taper couplings / welding couplings



Product information 24° taper couplings



The 24° taper coupling is a logical further development to provide an adjustable coupling with a tube socket and pre-assembled cutting ring. The taper on the coupling body achieves a particularly reliable and permanently stable coupling connection.

The gripping function is achieved by a special union nut with a wire pin located in a groove. In the assembled state, the interlocked union nut ensures a coupling that reliably stops the tube from being torn out.

Sealing is provided by an embedded O-ring. The result is a perfect precision seal.

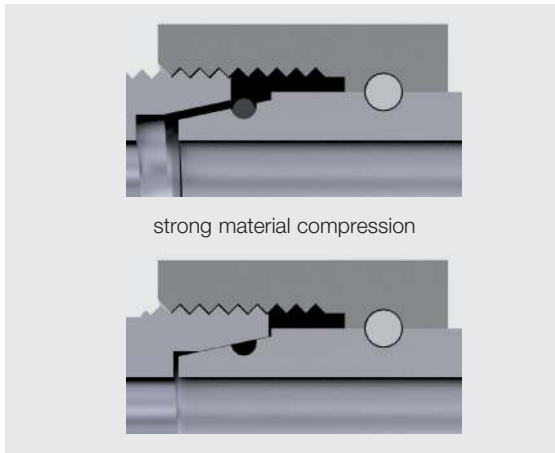
The broad range of different designs allows the production of all common combinations of couplings with adjustable directions. The connection dimensions conform exactly to the DIN 2353 / ISO 8434-1 standards. This allows interchangeability with conventional adjustable spigot versions.

Special features:

- VOSS taper couplings provide improved leak-tightness and precision sealing by means of the precisely enclosed O-ring seal.
- They achieve long-term leak-tightness even under extreme operating conditions, such as sudden pressure increases, alternating bending loads and vibrations.
- VOSS taper couplings can be assembled easily and reliably. The optimum final function is achieved with a short tightening travel and a practical final tightening torque.
- Repeated separation and re-assembly can be carried out frequently and without any difficulty.

General Note

In order for the taper couplings to fulfil their function, it is of utmost importance to follow the installation instructions and the notes in the technical remarks exactly.



Distance adapters with sealing cone and O-rings

Distance adapters (spacers) for bore shapes W DIN 3861 / ISO 8434-1 are mainly used for extending couplings that have been altered.

Furthermore, they can be used to replace existing cutting-ring couplings without any great effort, e. g. due to maintenance work. This means that existing tubing can remain in place.

Special features:

- The VOSS taper coupling provides improved leak-tightness and precision sealing by means of the precisely enclosed O-ring seal.
- It achieves long-term leak-tightness even under extreme operating conditions, such as sudden pressure increases, alternating bending loads and vibrations.
- VOSS taper couplings can be assembled easily and reliably. The optimum final function is achieved with a short tightening travel and a practical final tightening torque.
- Repeated disassembly and reassembly poses no problem.



Distance adapter with sealing cone and O-rings



Distance adapter

Product information, welding couplings



VOSS welding couplings and weld nipples supplement the product range of conventional cutting ring, tube forming and flared coupling systems.

Welding couplings are increasingly becoming a special niche solution owing to their limited usability and high costs, and the pre-treatment of the tube, welding processes, specialized qualifications, post-treatment and inspection involved.

VOSS weld nipples with a 24° taper and O-ring can be combined with all tube couplings conforming to DIN 2353 / ISO 8434-1 and the corresponding coupling pieces.



Customer designed products – individualized customer solutions

As a competent system partner offering a wide range of standardized and off-the-shelf components, VOSS Fluid can offer individual special solutions and supply parts produced to drawings according to the customer's specifications.

Our special products range from couplings for use as length adapters, chokes, diameter adapters or special designs, right up to and including non-return valves with specific opening pressures.

Our experience, creativity and cutting-edge production technology can be used to develop individual solutions which will win your approval and guarantee your success.



