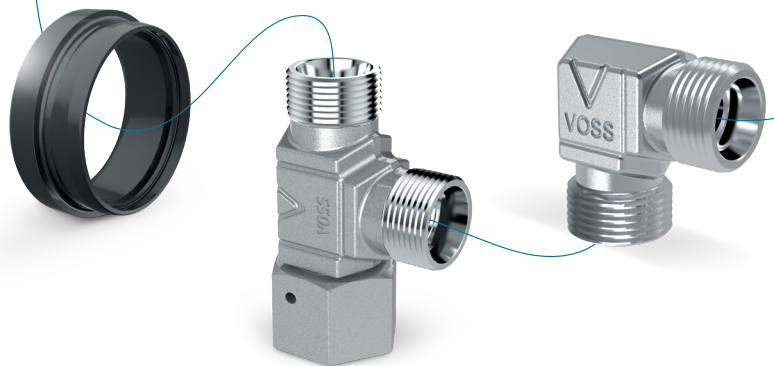


# VOSS

## Tube coupling technology for gas supply catalog

- Connecting pieces
- Pre-assembly devices
- Tools and auxiliaries



## VOSS Fluid GmbH sales organisation

### Germany

VOSS Fluid GmbH  
P.O. Box 15 40  
51679 Wipperfürth  
Lüdenscheider Straße 52–54  
51688 Wipperfürth  
Tel. +49 2267 63-0  
Fax +49 2267 63-5621  
+49 2267 63-5622  
+49 2267 63-5623  
fluid@voss.net  
www.voss.net

### Brazil

VOSS Automotive Ltda.  
Av. Alvares Cabral, 1087  
CEP 09980-160  
Diadema – São Paulo  
Tel. +55 11 40539500  
Fax +55 11 40539524  
info@br.voss.net  
www.voss.com.br

### China

Tel. +86 510 66902370  
fluidchina@voss.net

### France

VOSS Distribution S.a.r.l.  
57 Route de Crécy  
28500 Vernouillet  
Tel. +33 237 380190  
Fax +33 237 468914  
info@fr.voss.net

### Italy

VOSS Fluid S.r.l.  
Via A. Stoppani, 13  
23875, Osnago (LC)  
Tel. +39 039 58445  
Fax +39 039 9520010  
info@it.voss.net

### Poland

Tel. +48 515 312750  
fluid.pl@voss.net

### Spain

VOSS S.A.  
Paseo del Comercio, 90  
Apartado Correos, 1014  
08203 Sabadell  
Tel. +34 93 7106262  
Fax +34 93 7116357  
info@es.voss.net

### USA

VOSS Automotive, Inc.  
4640 Hillegas Road  
Fort Wayne, IN 46818  
Tel. +1 260 3732277  
Fax +1 260 3732299  
info@us.voss.net  
www.vossusa.com

### Dealers world-wide

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

To ensure that VOSS products perform reliably, it is essential to follow the relevant operating and assembly instructions and to adhere to the latest standards and regulations for general mechanical engineering. Make sure to use up-to-date versions at all times.

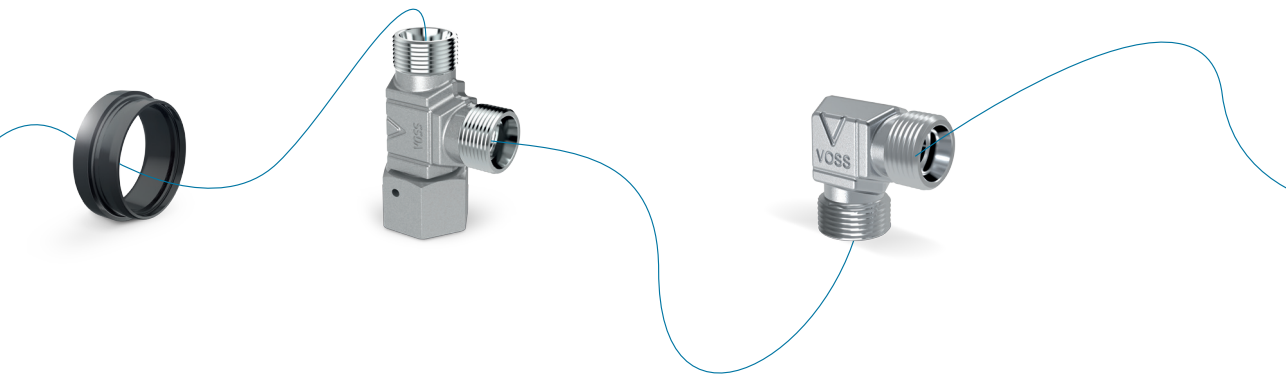
Subject to errors, including printing errors, and technical modifications.

This catalog edition supersedes all previously published technical documents, catalogs, assembly instructions etc. All preceding documents therefore become invalid with immediate effect.

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Assembly instructions	5
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Hydraulic coupling technology Designation directory	8



## General information

passionately  
connected.



## 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, gas, 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 and coupling technology

**A full product range plus top quality: this is the principle VOSS follows to produce one of the world's most comprehensive product ranges for tube coupling systems. The entire product spectrum is available as a catalogue.**

The VOSS programme includes cutting ring, soft seal and flared connecting systems, tube forming systems, flange connecting systems and a wide range of accessories. VOSS puts special emphasis on the development of customized system solutions covering the entire task range – from initial planning, engineering production, assembly and installation, right up to special logistics services.

VOSS Fluid also offers convincing value-added services and improvement proposals that take purchasing costs, assembly and installation effort, durability of leak-tightness and long-term corrosion protection into account.

As a standard feature, all products in the extensive product range have optimum corrosion protection, provided by a top-quality VOSS coat surface finish containing no hexavalent chromium. Extensive salt-spray tests conducted in accordance with DIN EN ISO 9227 have shown that corrosion resistance is retained even after 1,000 hours of practical conditions, i.e. after handling and assembly.

VOSS Fluid's uncompromising quality policy and application-specific quality objectives, well documented in all certificates and approvals required by relevant trade associations and professional bodies, have ensured the company a top place in all its established markets.

With a wide range of system stocks all around the world and a global network of authorized trade dealers, VOSS ensures maximum product availability and highly economical delivery systems. These range from KANBAN full service right up to full optimization of the customer's supply chain.

VOSS Fluid also offers a wide range of special services, including regular training sessions and application-related publications. The internal and external logistics of the entire VOSS corporate group bring customers considerable cost advantages, allowing "just-in-time" production without having to maintain large stocks of their own.





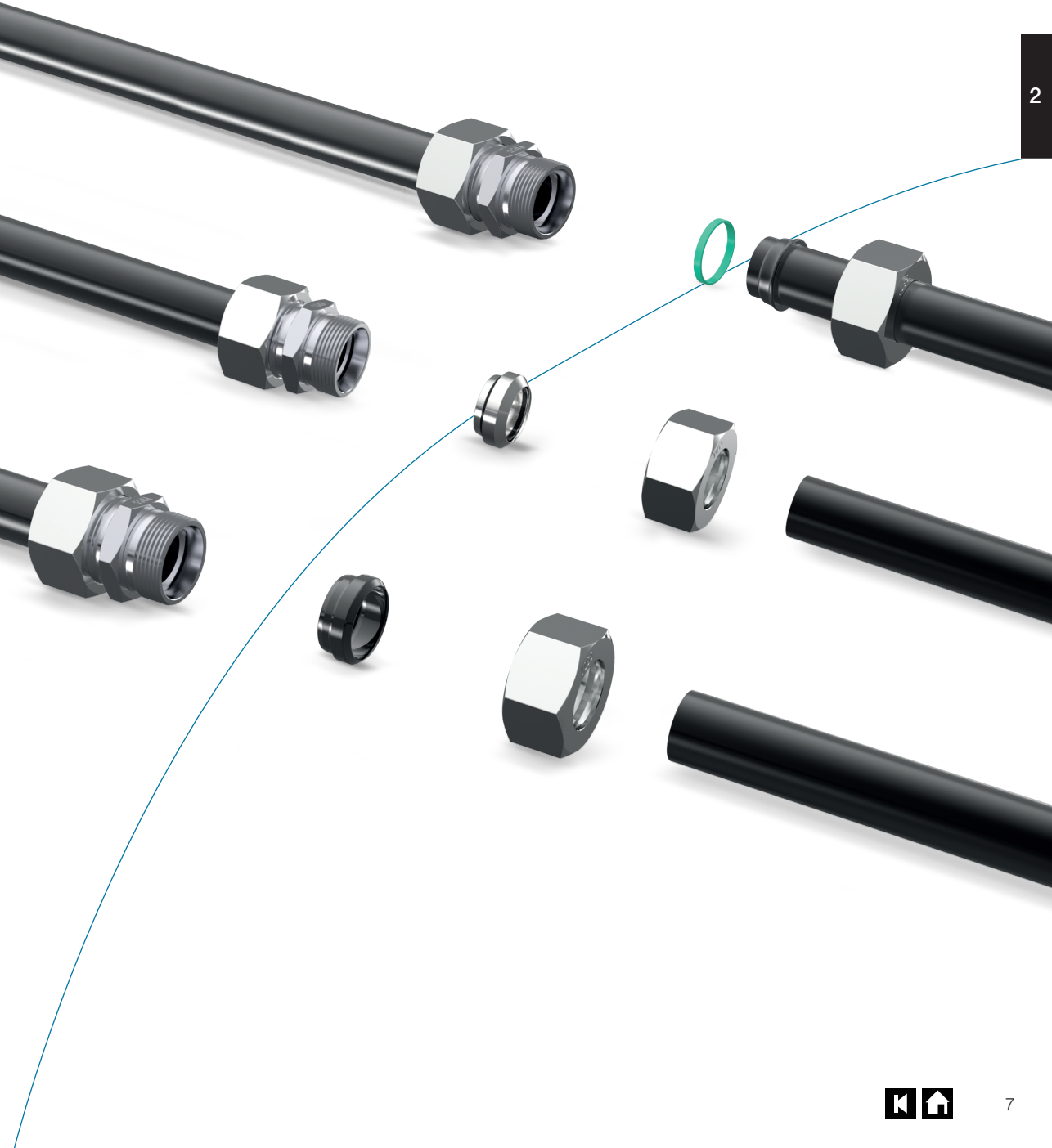
## VOSS corporate environmental policy

- 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.





## Overview of 24° tube connecting systems



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## VOSS Ring<sup>M</sup> DVGW type examination certificate



**CERT**

### DVGW type examination certificate

### DVGW-Baumusterprüfzertifikat

**DG-4502CR0148**

Registration Number  
Registriernummer

<b>Field of Application</b> <i>Anwendungsbereich</i>	products of gas supply <i>Produkte der Gasversorgung</i>
<b>Owner of Certificate</b> <i>Zertifikatinhaber</i>	VOSS Fluid GmbH Lüdenscheider Straße 52-54, D-51688 Wipperfürth
<b>Distributor</b> <i>Vertreiber</i>	VOSS Fluid GmbH Lüdenscheider Straße 52-54, D-51688 Wipperfürth
<b>Product Category</b> <i>Produktart</i>	pipe equipment and fittings: separable unthreaded pipe connection for metal pipes (4502)
<b>Product Description</b> <i>Produktbezeichnung</i>	soluble connection for steel pipes according to DIN EN 10305-1
<b>Model</b> <i>Modell</i>	VOSSRing M
<b>Test Reports</b> <i>Prüfberichte</i>	type testing: B16/05/2155 from 11.05.2016 (DBI)
<b>Test Basis</b> <i>Prüfgrundlagen</i>	DIN 3387-1 (01.11.2008)

**Date of Expiry / File No.** 11.05.2021 / 15-0514-GNE  
**Ablaufdatum / Aktenzeichen**

21.12.2016 Rie A-1/2

Date, Issued by, Sheet, Head of Certification Body  
Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle

DVGW CERT GmbH is an accredited body by DAkkS according to DIN EN ISO/IEC 17065:2013 for certification of products for energy and water supply industry.

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*J. Schmidt*



DVGW CERT GmbH

Zertifizierungsstelle

Josef-Wirmer-Str. 1-3

53123 Bonn

Tel. +49 228 91 88 - 888

Fax +49 228 91 88 - 993

www.dvgw-cert.com

info@dvgw-cert.com

<b>Gas Category</b>	<b>Remarks</b>
<b>Gasart</b>	<b>Bemerkungen</b>
fuel gases according to G260	

<b>Type</b>	<b>Technical Data</b>	<b>Remarks</b>
<b>Typ</b>	<b>Technische Daten</b>	<b>Bemerkungen</b>
...L; ...S	pressure rating: MOP 250 diameter of the pipe: 6 mm	
...L; ...S	pressure rating: MOP 250 diameter of the pipe: 8 mm	
...L; ...S	pressure rating: MOP 250 diameter of the pipe: 10 mm	
...L; ...S	pressure rating: MOP 250 diameter of the pipe: 12 mm	
...S	pressure rating: MOP 250 diameter of the pipe: 14 mm	
...L	pressure rating: MOP 250 diameter of the pipe: 15 mm	
...S	pressure rating: MOP 250 diameter of the pipe: 15 mm	
...L	pressure rating: MOP 250 diameter of the pipe: 18 mm	
...S	pressure rating: MOP 250 diameter of the pipe: 20 mm	
...L	pressure rating: MOP 250 diameter of the pipe: 22 mm	
...S	pressure rating: MOP 250 diameter of the pipe: 25 mm	
...L	pressure rating: MOP 250 diameter of the pipe: 28 mm	
...S	pressure rating: MOP 250 diameter of the pipe: 30 mm	
...L	pressure rating: MOP 250 diameter of the pipe: 35 mm	
...S	pressure rating: MOP 250 diameter of the pipe: 38 mm	
...L	pressure rating: MOP 160 diameter of the pipe: 42 mm	

<b>Type Variation</b>	<b>Explanations</b>
<b>Ausführungsvariante</b>	<b>Erläuterungen</b>
...G	straight screw connection
...W	angle-screw connection
...T	T-screw connection
...K	cross-screw connection
...SV	straight-bulkhead screw connection
...WSV	angle-bulkhead screw connection
...ESV	welding-bulkhead screw connection
...GR	straight reduced screw connection
...KOR	reducing piece
...TR	T-reduced screw connection
...AS	welding-screw connection
...EVW	adjustable angle-screw connection
...EVT	adjustable T-screw connection
...EVL	adjustable L-screw connection
...GE	straight ESV (up to MOP 100 with stud form C and A and with stud with male thread NPT)
...WE	angle SV (up to MOP 100 with stud form C)
...LE	L-SV (up to MOP 100 with stud form C)
...TE	T-SV (up to MOP 100 with stud form C)
DKO	24° sealing cone screw connection

#### Hints of Utilization / Remarks

##### **Verwendungshinweise / Bemerkungen**

ambient temperature range: -20...+60 °C

variations: straight screw connectors with crew connections on all sides (MOP 250 bar resp.. MOP 160 bar), on one side also stud form C or stud form A or stud with male thread NPT or 24° sealing cone screw connection DKO

The connections with stud form A are not allowed in gas installations according to DVGW-TRGI 2008.



## ES-4 DVGW type examination certificate



### DVGW-Baumusterprüfzertifikat DVGW type examination certificate

**DG-4502CO0052**  
Registriernummer  
registration number

<b>Anwendungsbereich</b> <i>field of application</i>	Produkte der Gasversorgung <i>products of gas supply</i>
<b>Zertifikatinhaber</b> <i>owner of certificate</i>	VOSS Fluid GmbH Lüdenscheider Straße 52-54, D-51688 Wipperfürth
<b>Vertreiber</b> <i>distributor</i>	VOSS Fluid GmbH Lüdenscheider Straße 52-54, D-51688 Wipperfürth
<b>Produktart</b> <i>product category</i>	Rohrleitungsteile und Zubehör: Lösbare Rohrverbindung für Metallrohre (4502)
<b>Produktbezeichnung</b> <i>product description</i>	Schneidringverschraubung für Präzisionsstahlrohre nach DIN EN 10305-1
<b>Modell</b> <i>model</i>	ES-4...
<b>Prüfberichte</b> <i>test reports</i>	Baumusterprüfung: B13/03/1602 vom 07.03.2013 (DBI)
<b>Prüfgrundlagen</b> <i>test basis</i>	DIN 3387-1 (01.11.2008)

**Ablaufdatum / AZ**      07.03.2018 / 13-0010-GNE  
*date of expiry / file no.*

28.05.2013 Rie A-1/2 *i.v. G. Klein*  
Datum, Bearbeiter, Blatt, Leiter der Zertifizierungsstelle  
*date, issued by, sheet, head of certification body*

DVGW CERT GmbH ist von der DAkkS nach DIN EN 45011:1998  
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DVGW CERT GmbH  
Zertifizierungsstelle  
Josef-Wimmer-Str. 1-3  
53123 Bonn  
Tel. +49 228 91 88 - 888  
Fax +49 228 91 88 - 993  
www.dvgw-cert.com  
info@dvgw-cert.com

<b>Typ type</b>	<b>Technische Daten technical data</b>	<b>Bemerkungen remarks</b>
...L; ...S	Rohranschlussdurchmesser: 6 mm	Druckstufe: MOP 250/16
...L; ...S	Rohranschlussdurchmesser: 8 mm	Druckstufe: MOP 250/16
...L; ...S	Rohranschlussdurchmesser: 10 mm	Druckstufe: MOP 250/16
...L; ...S	Rohranschlussdurchmesser: 12 mm	Druckstufe: MOP 250/16
...S	Rohranschlussdurchmesser: 14 mm	Druckstufe: MOP 250/16
...L	Rohranschlussdurchmesser: 15 mm	Druckstufe: MOP 250/16
...S	Rohranschlussdurchmesser: 16 mm	Druckstufe: MOP 250/16
...L	Rohranschlussdurchmesser: 18 mm	Druckstufe: MOP 250/16
...S	Rohranschlussdurchmesser: 20 mm	Druckstufe: MOP 250/16
...L	Rohranschlussdurchmesser: 22 mm	Druckstufe: MOP 160/16
...S	Rohranschlussdurchmesser: 25 mm	Druckstufe: MOP 250/16
...L	Rohranschlussdurchmesser: 28 mm	Druckstufe: MOP 160/16
...S	Rohranschlussdurchmesser: 30 mm	Druckstufe: MOP 250/16
...L	Rohranschlussdurchmesser: 35 mm	Druckstufe: MOP 160/16
...S	Rohranschlussdurchmesser: 38 mm	Druckstufe: MOP 250/16
...L	Rohranschlussdurchmesser: 42 mm	Druckstufe: MOP 160/16

<b>Ausführungsvariante type variation</b>	<b>Erläuterungen explanations</b>
G	Gerade Verschraubung
W	Winkel-Verschraubung
T	T-Verschraubung
K	Kreuzverschraubung
SV	Gerade Schottverschraubung
WSV	Winkel-Schottverschraubung
ESV	Einschweiß-Schottverschraubung
GR	Gerade Reduzierschraubung
KOR	Reduziereinsatz
TR	T-Reduzierschraubung
AS	Anschweißverschraubung
EVW	Einstellbare Winkel-Verschraubung
EVT	Einstellbare T-Verschraubung
EVL	Einstellbare L-Verschraubung
GE	Gerade ESV (bis MOP 100 mit Einschraubzapfen Form C, MOP 16 bar Form C mit AG nach DIN EN 10226-1)
WE	Winkel-ESV (bis MOP 100 mit Einschraubzapfen Form C, MOP 16 bar Form C mit AG nach DIN EN 10226-1)
LE	L-ESV (bis MOP 100 mit Einschraubzapfen Form C, MOP 16 bar Form C mit AG nach DIN EN 10226-1)
TE	T-ESV (bis MOP 100 mit Einschraubzapfen Form C, MOP 16 bar Form C mit AG nach DIN EN 10226-1)

#### **Verwendungshinweise / Bemerkungen**

##### **hints of utilization / remarks**

Gasart: Brenngase nach G260

Umgebungstemperaturbereich: -20...+60 °C

Ausführungen: gerade Verschraubung mit allseitiger Klemmringverschraubung (MOP 250 bar bzw. MOP 160 bar), einerseits auch Einschraubzapfen Form C





## VOSS Form<sup>SQR</sup> DVGW type examination certificate



### DVGW-Baumusterprüfzertifikat DVGW type examination certificate

**DG-4502CO050**  
Registriernummer  
registration number

<b>Anwendungsbereich</b> <i>field of application</i>	Produkte der Gasversorgung <i>products of gas supply</i>
<b>Zertifikatinhaber</b> <i>owner of certificate</i>	VOSS Fluid GmbH Lüdenscheider Straße 52-54, D-51688 Wipperfürth
<b>Vertreiber</b> <i>distributor</i>	VOSS Fluid GmbH Lüdenscheider Straße 52-54, D-51688 Wipperfürth
<b>Produktart</b> <i>product category</i>	Rohrleitungsteile und Zubehör: Lösbare Rohrverbindung für Metallrohre (4502)
<b>Produktbezeichnung</b> <i>product description</i>	Lösbare Rohrverbindung mit Verbindungsstückkörper nach DIN 2353 bzw. DIN EN ISO 8434-1 für Metallrohre nach DIN EN 10305-1
<b>Modell</b> <i>model</i>	VOSSFormSQR
<b>Prüfberichte</b> <i>test reports</i>	Baumusterprüfung: B13/03/1602 vom 07.03.2013 (DBI)
<b>Prüfgrundlagen</b> <i>test basis</i>	DIN 3387-1 (01.11.2008)

**Ablaufdatum / AZ** 07.03.2018 / 13-0010-GNE  
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Ausführungsvariante type variation	Erläuterungen explanations
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LE	L-ESV (bis MOP 100 mit Einschraubzapfen Form C, MOP 16 bar Form C mit AG nach DIN EN 10226-1)
TE	T-ESV (bis MOP 100 mit Einschraubzapfen Form C, MOP 16 bar Form C mit AG nach DIN EN 10226-1)

#### Verwendungshinweise / Bemerkungen

##### hints of utilization / remarks

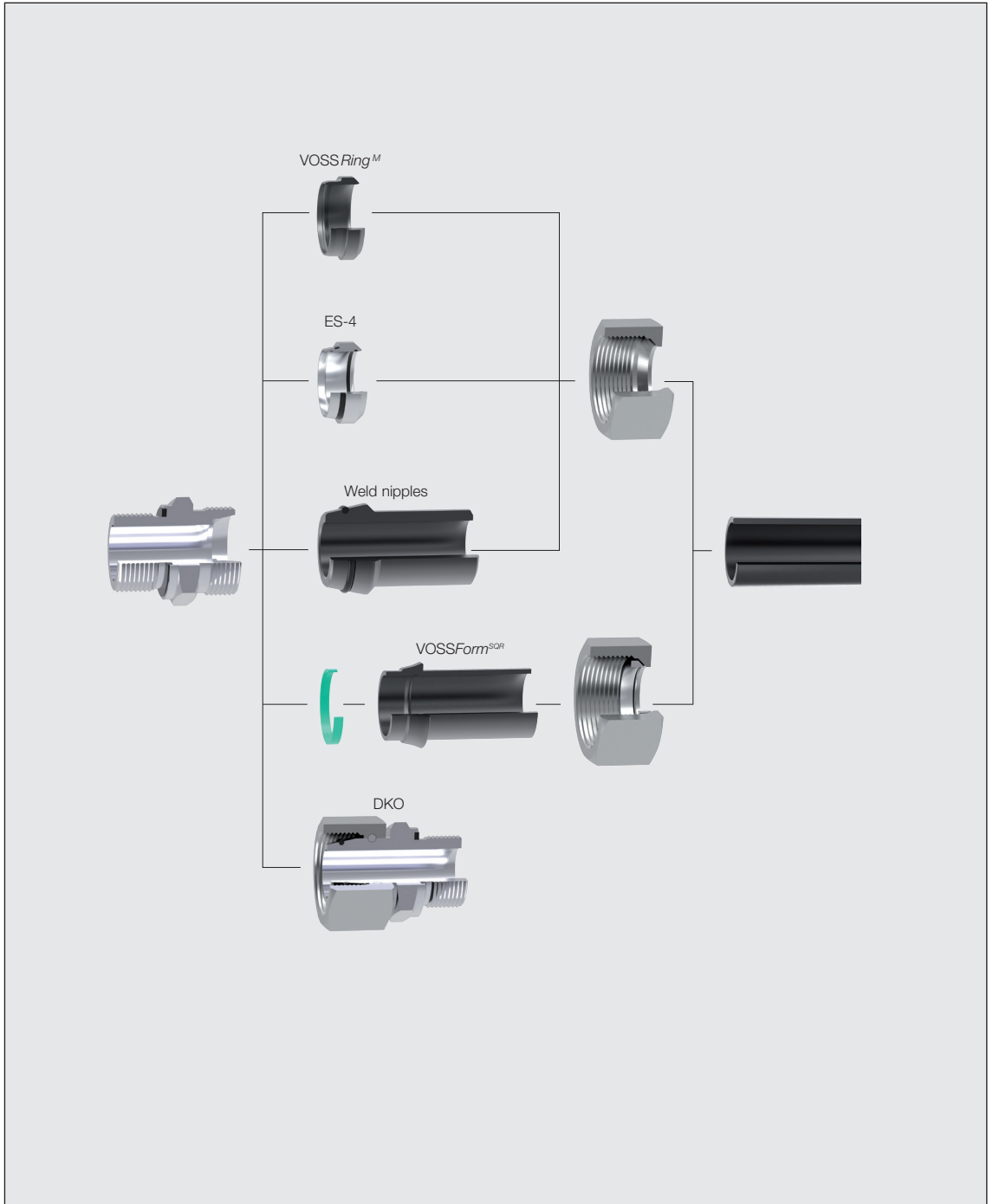
Gasart: Brenngase nach G260

Umgebungstemperaturbereich: -20...+60 °C

Ausführungen: gerade Verschraubung mit allseitiger Klemmringverschraubung (MOP 250 bar bzw. MOP 160 bar), einerseits auch Einschraubzapfen Form C

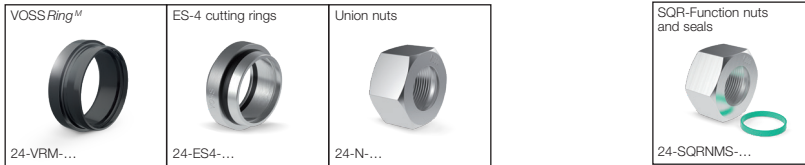
DVGW

The right connections for your gas application at a glance

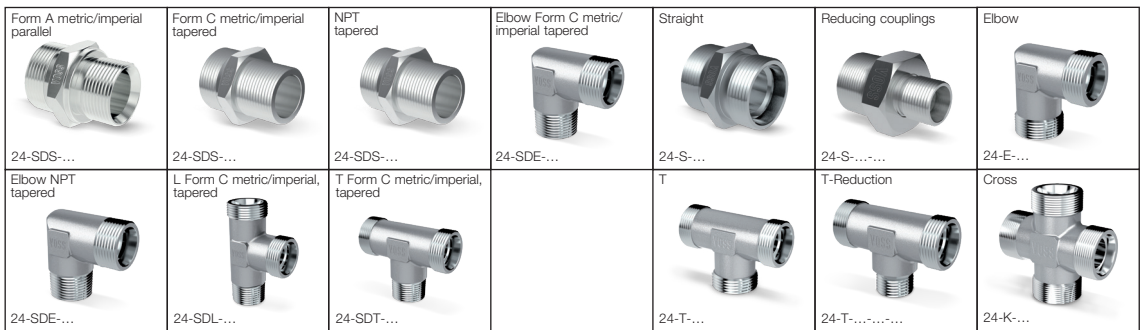


# VOSS connecting range with DVGW type examination certificate

## Connection components

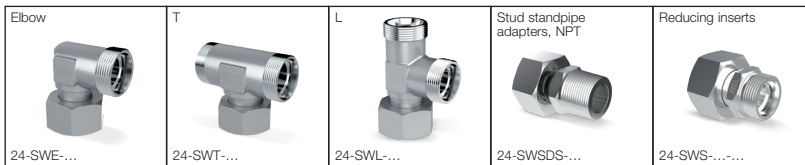


## Male stud connections



## Connecting adapters

## Adjustable connections with tube socket



## 24° Taper couplings





Other items on request.





## Welding connections

<p>Straight welding bosses</p>  <p>24-WDS-...</p>	<p>Welding bulkhead couplings</p>  <p>24-WDBHS-...</p>	<p>Welding nipples with O-Ring seals</p>  <p>24-WDNPSO-...</p>
------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------

## Bulkhead connections

<p>Straight</p>  <p>24-BHSLN-...</p>	<p>Elbow</p>  <p>24-BHELN-...</p>
-----------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------

## Component parts and accessories for couplings

<p>Blanking plugs</p>  <p>24-PLOC-...</p>	<p>Tube blanking screws</p>  <p>24-TBS-...</p>	<p>Reinforcing sleeves</p>  <p>24-RS-...</p>	<p>Sealing rings for threaded studs Form A</p>  <p>GP-SR-...</p>
----------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------



## 24° connecting range 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.

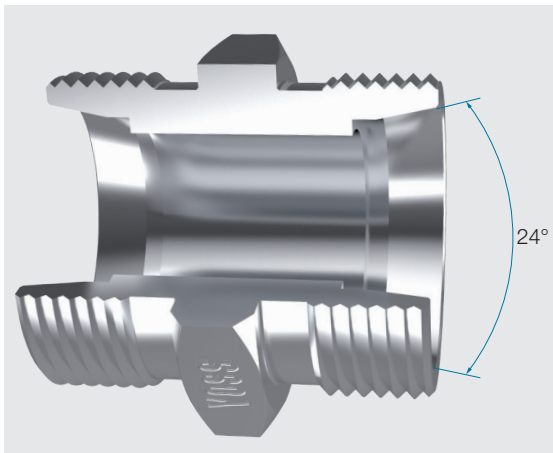
### Product details

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

For the tube connection end, various coupling systems can be adapted to suit the 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.

Seal types conforming to international standards can be supplied for the screw connections.



## The main advantages of 24° connecting system

- 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.
- 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.
- 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

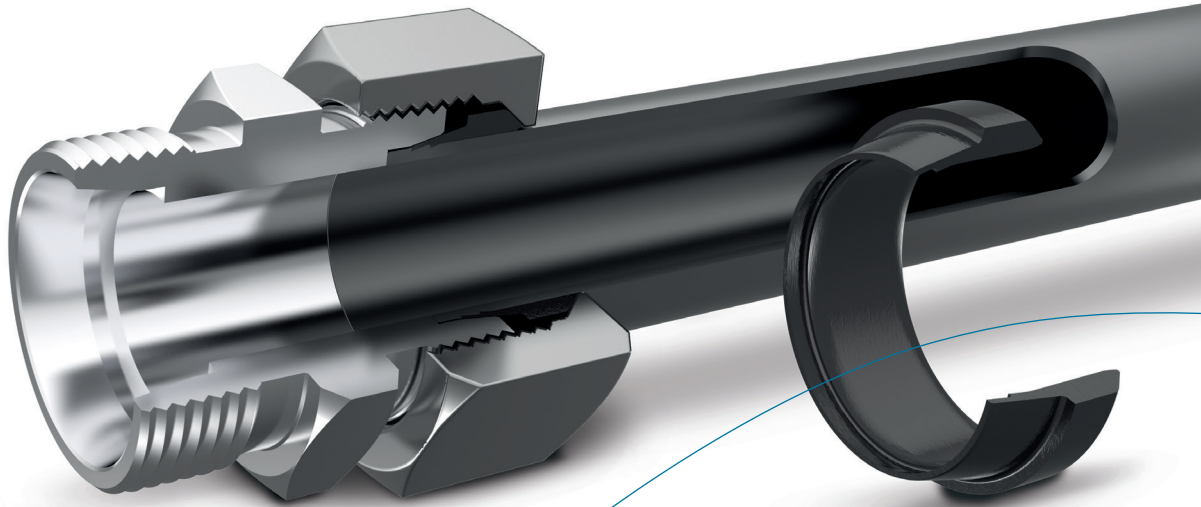
You should check at regular intervals whether internal production procedures have changed, e. g. due to the employment of new fitters, or due to worn machinery or other tools. We offer an audit service for inspecting your assemblies and installation on site.

### 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.

## VOSS Ring<sup>M</sup> cutting ring system

A reliable way to control high pressures



## Perfection in every detail

### A unique form of superiority

Our development engineers have rethought and optimized every angle and the entire shape of the VOSSRing<sup>M</sup> in their pursuit of perfection. The improved cutting geometry ensures maximum leak-tightness. Geometrical reinforcement in all areas exposed to pressure enhance the stability and pressure resistance, while the patented block limit stop makes correct pre-assembly easier.

Improved cutting geometry  
for optimal tube indentation

## Simple pre-assembly

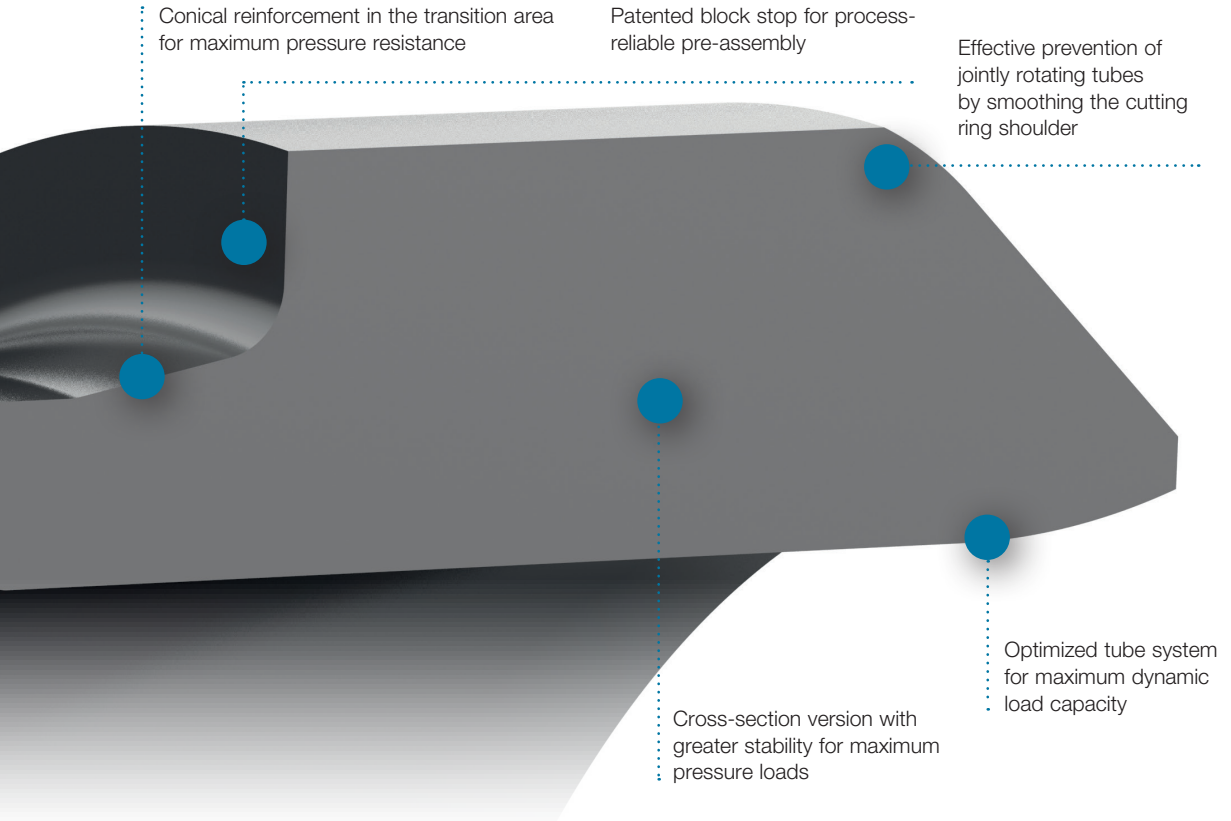
### Feedback through “intelligent” material

Both machine and manual assembly studs are available for pre-assembly of the VOSSRingM cutting ring system. Both are made from non-wearing high-performance steel and offer a tool service life that is 20 times longer. We prevent the cone contour from widening with a specially developed material. That does away with the need for regular functionality tests. Upon reaching the application limit, the stud breaks, thereby effectively preventing assembly errors due to tool wear.

### The advantages:

- Machine and manual assembly studs made from high-performance steel
- Tool service life up to 20 times longer
- Processes free of error without regular functional inspections





## High-tech materials

### Special material with unique hardness

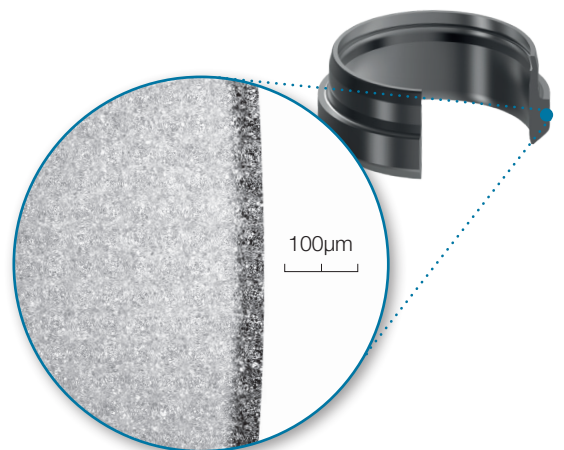
VOSS specific special material: We use our specially developed material with very close tolerances in the alloy components for our cutting rings. This ensures a high strength of the extremely homogeneous, fine-grained structure with high toughness and insensitivity to breakage.

### Optimized hardening process:

Our refined hardening process creates a very thin and extremely hard edge layer. This ensures a precise and optimum indentation in steel and stainless steel tubes.

### The advantages:

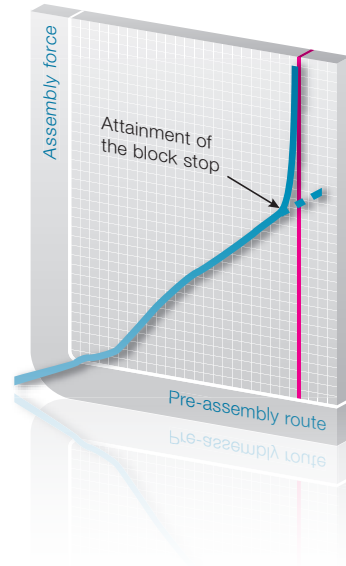
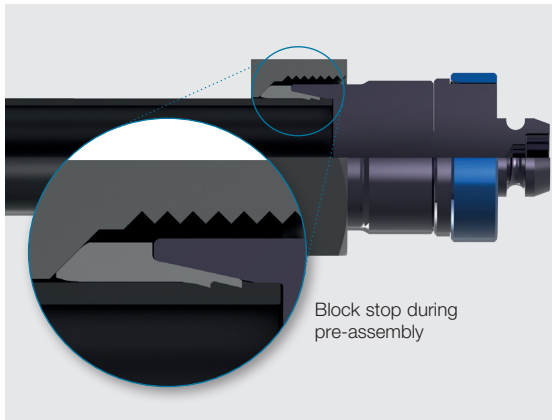
- High strength for optimum tube indentation
- High dynamic load-bearing capacity
- Low spring recovery after assembly
- Suitable for use in steel and stainless steel tube



## Precise pre-assemblies thanks to patented limit stop concept

As early as the design stage of the pre-assembly stud, we have ensured that errors during assembly are prevented as extensively as possible. This results in a permanently leakproof tube connection at the end. The integral stop function means that the pre-assembly stud comes into contact with the cutting ring with a definite locating surface at the end point of the pre-assembly. The design allows the pre-assembly to be observed precisely and finished at the optimum point – effectively preventing excess assembly.

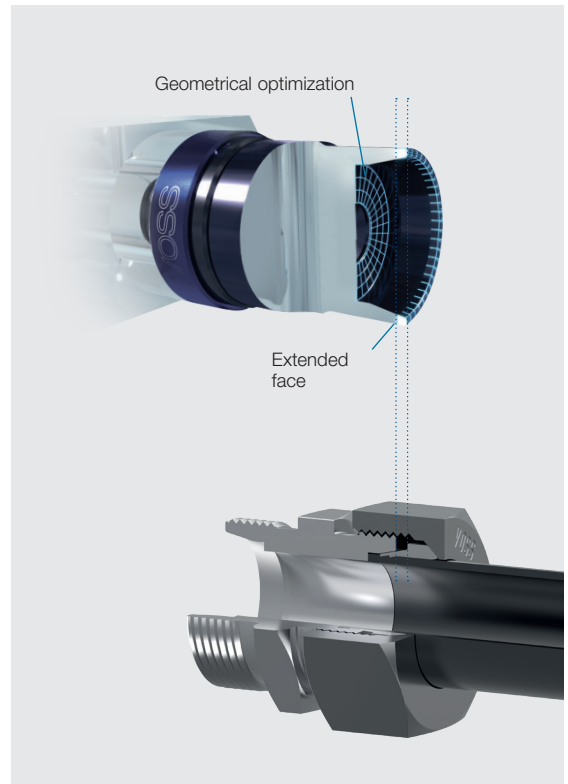
- Clearly discernible increase in force when using the manual assembly stud
- Pre-assembly devices automatically stop when reaching this block stop



## Process-reliable final assembly thanks to extended tools

The extended face of the tool allows an additional clearance to be defined, enabling subsequent cutting of the cutting ring during the later final assembly and providing space for process-reliable repeat assemblies.

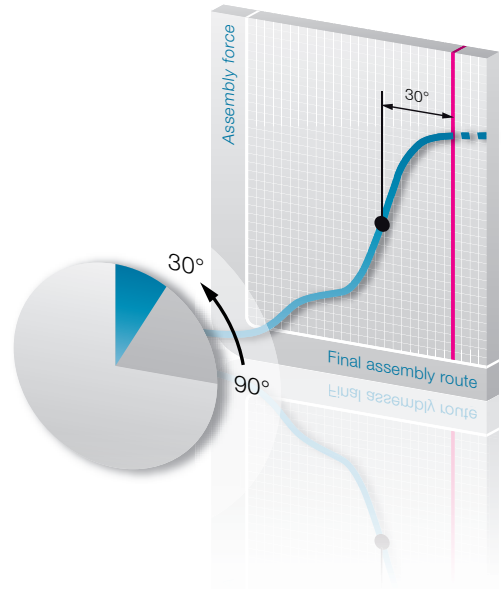
- Optimum indentation and fit thanks to additional clearance for subsequent cutting
- Problem-free and standardized repeat assembly capability
- Protection against over-tightening thanks to patented stop concept



## Reduced final assembly route thanks to geometrical optimization

The quality of the VOSS *Ring*<sup>M</sup> cutting ring system is also clear in the efficient final assembly. Geometrical optimization in the tube stop area provides a range of benefits for the fitter:

- Reduced final assembly route from 90° to 30°
- Significantly lower workload
- Simplified final assembly in restricted installation situations



## A system for optimum connection

We have perfectly coordinated all components to one another for the full functional scope of the VOSS *Ring*<sup>M</sup> cutting ring system. The complete system gives you all the advantages:

- ✓ Limit stop function during pre-assembly
- ✓ Short final assembly route
- ✓ Less effort
- ✓ Protection against over-tightening
- ✓ Reproducible repeat assemblies





## The new VOSSRing<sup>M</sup> cutting ring system

Our new VOSSRing<sup>M</sup> cutting ring system offers you all the advantages familiar from previous 24° cutting ring systems while improving these to a new level of quality and reliability. Special focus was placed during development on an easily and process-reliable assembly, dependable safety against leaks and the use of extremely durable materials. The result is an all-together reliable cutting ring system from VOSS, in both assembly and application.

### The most important features at a glance

- Maximum leak-tightness ...  
thanks to optimum tube indentation
- HMaximum pressure resistance ...  
thanks to geometrical reinforcements
- Very good dynamic loadability ...  
thanks to specified cutting ring material by VOSS
- Greater process reliability in assembly ...  
thanks to patented stop concept
- Reduced workload ...  
thanks to reduced tightening routes
- Reduced effect of incorrect assemblies ...  
thanks to non-wearing tools
- Maximum corrosion protection ...  
thanks to VOSScoat – BLACK

## VOSScoat – now also in “BLACK”

Since as early as 2007, VOSS has been setting standards with VOSScoat, the zinc-nickel based surface, and the same is true for the VOSSRing<sup>M</sup> cutting ring system. To prevent mix-ups and make the assembly process more reliable, the new VOSSRing<sup>M</sup> is provided with a black coating. Unmistakable design – same quality – equal advantages – easy handling.

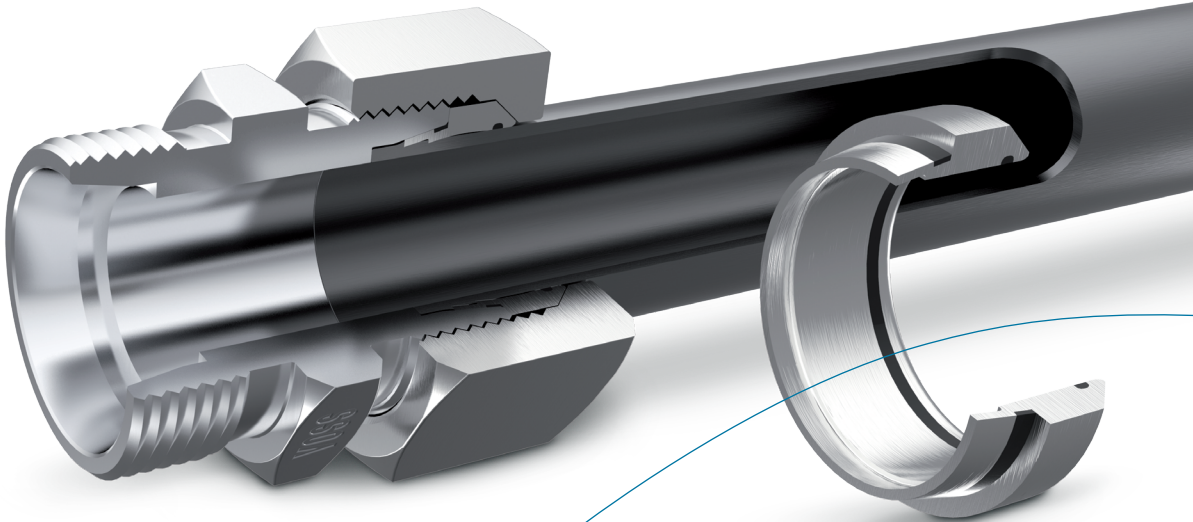
### VOSScoat guarantees a very long service life

- 1000 hours corrosion resistance in salt spray tests under practical conditions
- More than 2000 hours corrosion resistance in salt spray tests under laboratory conditions when not installed
- Much higher resistance to damage affecting the base coat
- Sustainable production in the company’s state-of-the-art electroplating plant



## ES-4 cutting ring system

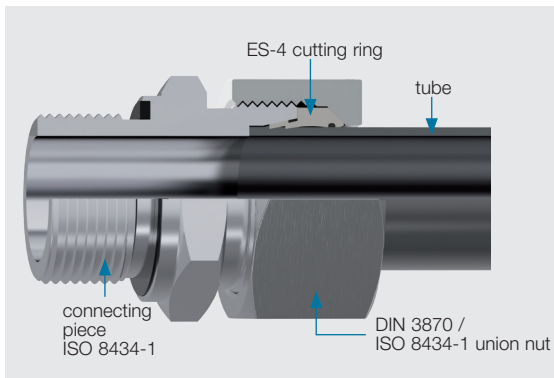
The soft-seal connection with 4-fold benefits



## 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 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.

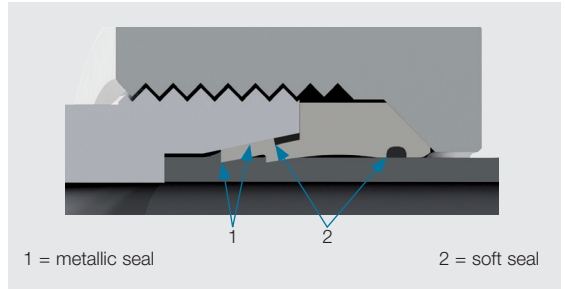
As regards the tube connection side, ES-4 couplings cover the application range between the proven cutting ring coupling for standard applications and 10° flared couplings for heavy loads and high stresses.

### 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 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 cutting ring is supplemented by soft seals fitted on the secondary side.

The reliable functional properties of 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.

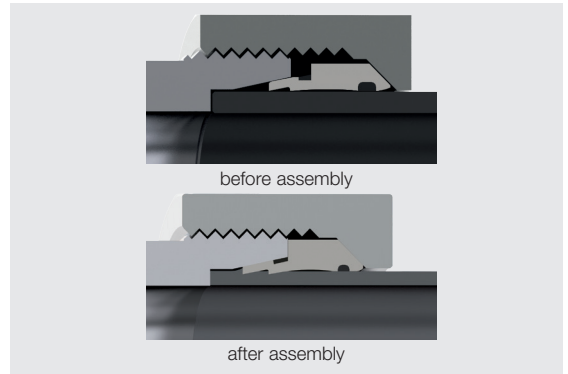
## Safety through block installation

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 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:

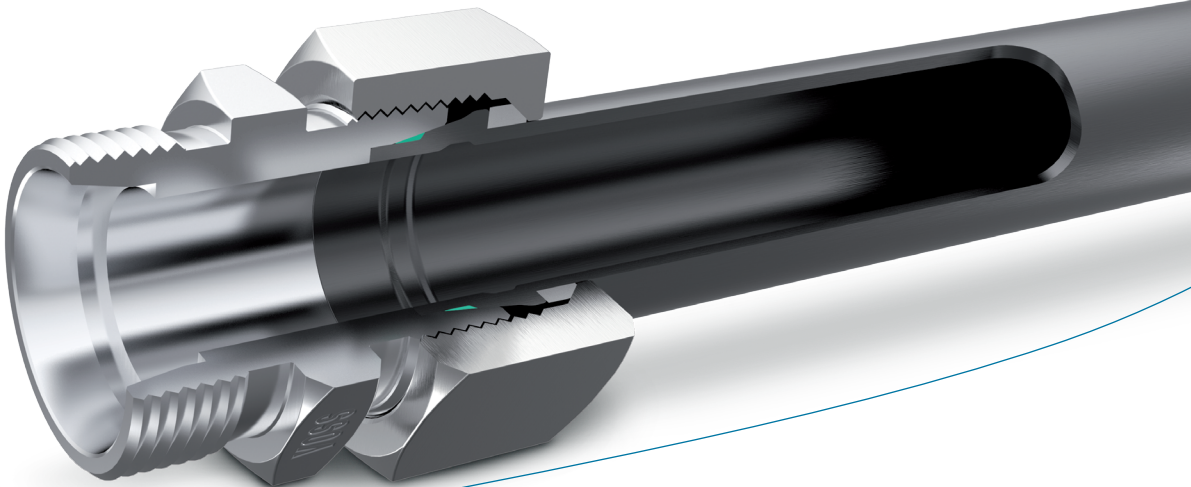
- Cost and time-intensive corrective measures are no longer required. Production failures are avoided.
- Dry connections help improve the image of the final product, giving final customers advantages over their competitors.
- With the introduction of the ES-4 couplings, VOSS offers a consistent soft 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.



## VOSSForm<sup>SQR</sup> tube forming system

- Safety
- Quality
- Reliability





## Product information VOSSForm<sup>SQR</sup> tube forming system

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

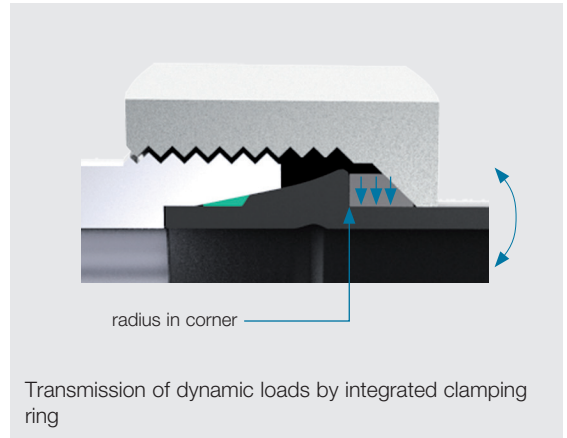
- Safety, as the most important aspect.
- Quality, without which permanent leak-tightness is not possible.
- Reliability, only an economical coupling achieves market success.

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

In the 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.

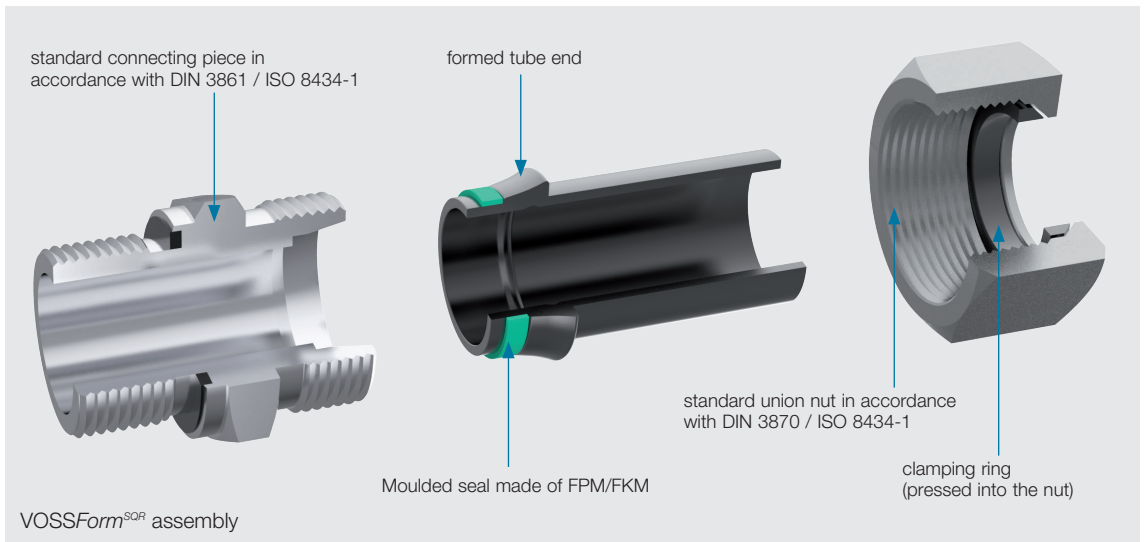
### Maximum load-bearing capacity and safety

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<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.



### 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.



## 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.

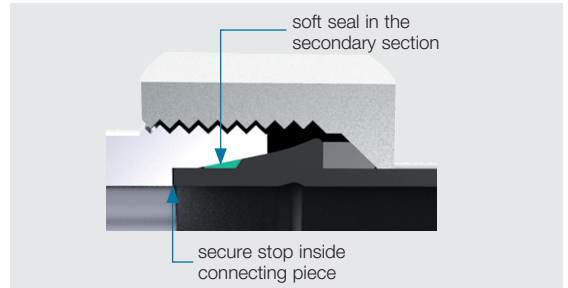
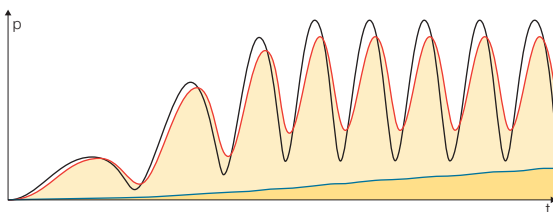
Cycle times between 7 and 15 seconds decrease assembly times, especially in series production.

## 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<sup>SOR</sup> tube couplings ideal for series production.

## Complete product range

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

## VOSSForm<sup>SORVA</sup>

The VOSSForm<sup>SORVA</sup> 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>SOR</sup> 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<sup>SOR</sup> a universal connection for series production.

# VOSSForm 100 tube forming machine

The VOSSForm 100 forming machine guarantees time-saving, reliable production of the VOSSForm<sup>SQR</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

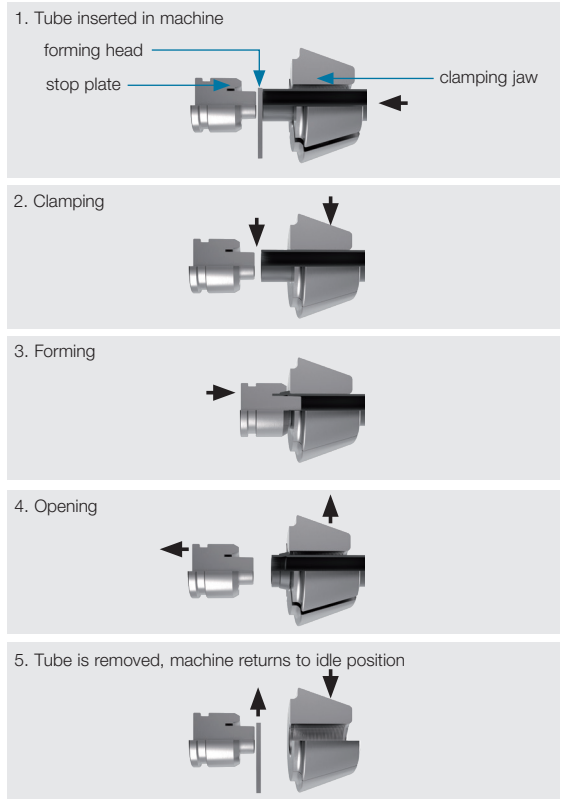
Forming is started by pushing the tube against the stop plate in the forming machine. The process is triggered by pressing the Start button (1.).

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>SQR</sup> contour (3.).

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

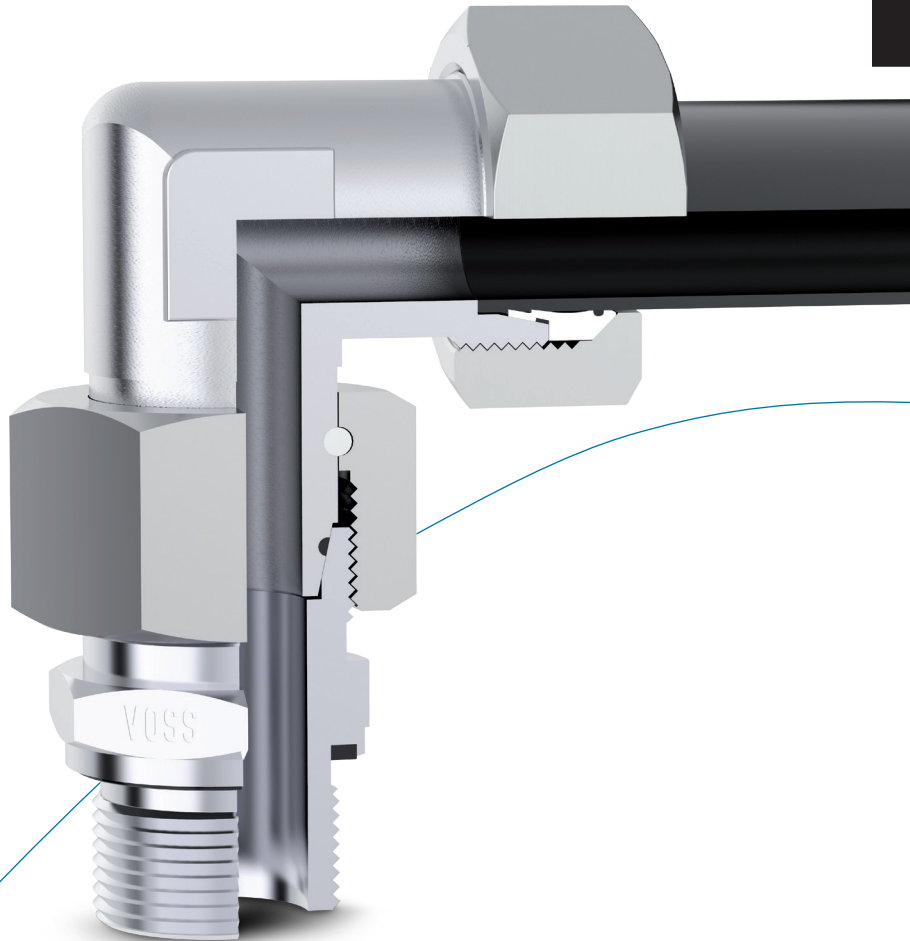
Removal of the tube is monitored. This allows the machine to automatically return to the idle position, and the next tube forming sequence can be started without manual reset (5.).



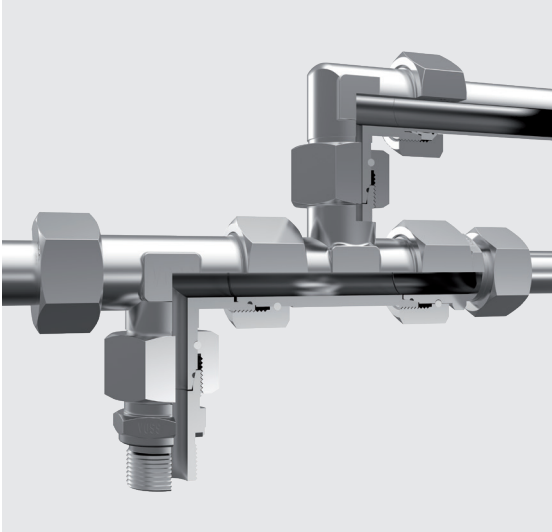
## Forming machine details



## 24° taper 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.

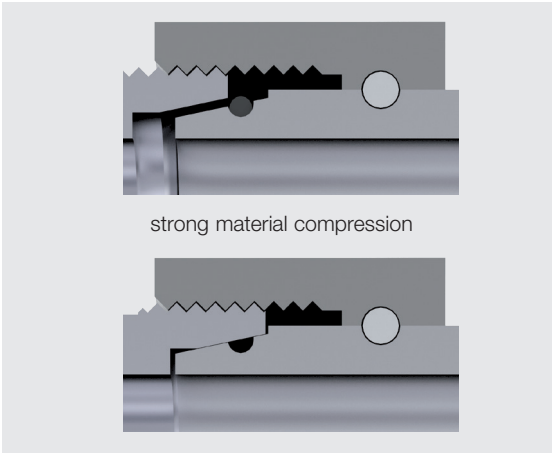
The broad range of different designs allows the production of all common combinations of couplings with adjustable directions. The connection dimensions conform exactly to the DIN 2353 / ISO 8434-1 standards. This allows interchangeability with conventional adjustable spigot versions.

### 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.





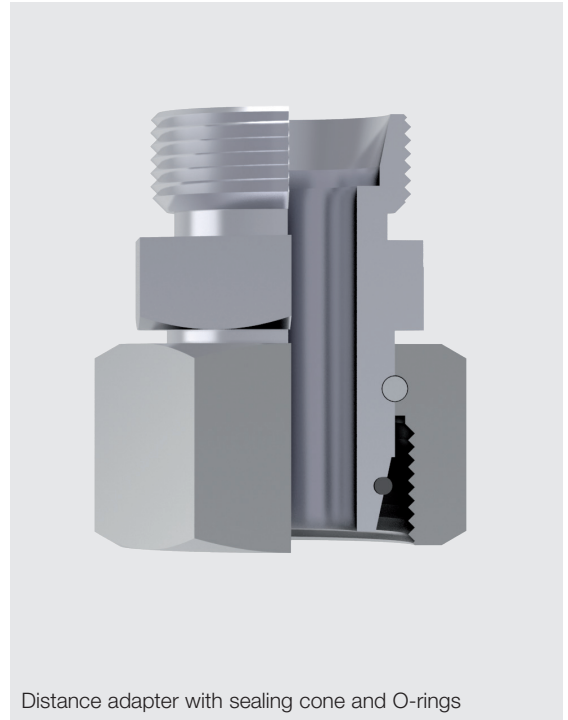
## Distance adapters with sealing cone and O-rings

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

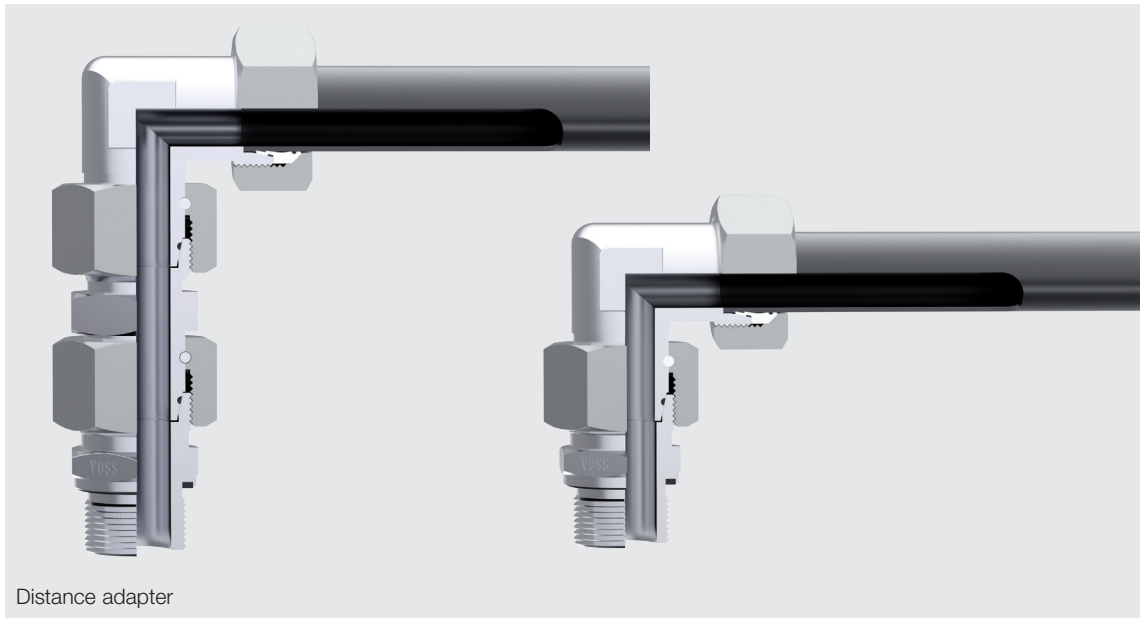
Furthermore, they can be used to replace existing cutting-ring couplings without any great effort, e. g. due to maintenance work. This means that existing tubing can remain in place.

### 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.



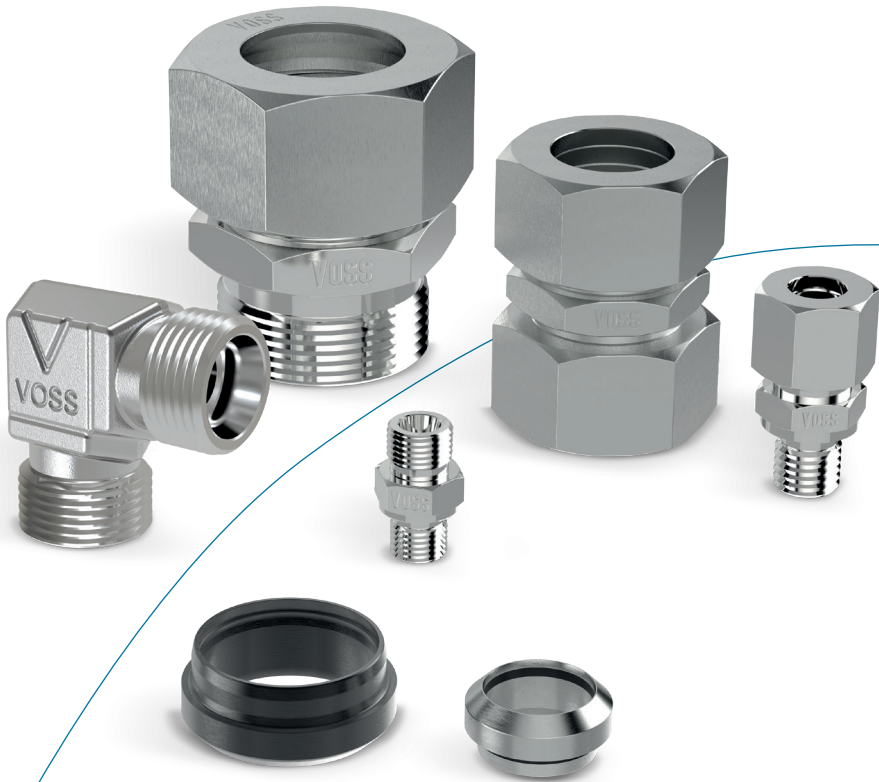
Distance adapter with sealing cone and O-rings



Distance adapter



Tube connection parts, 24° connecting piece range and individual parts / accessories



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Bulkhead connectors




















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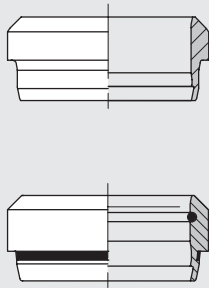
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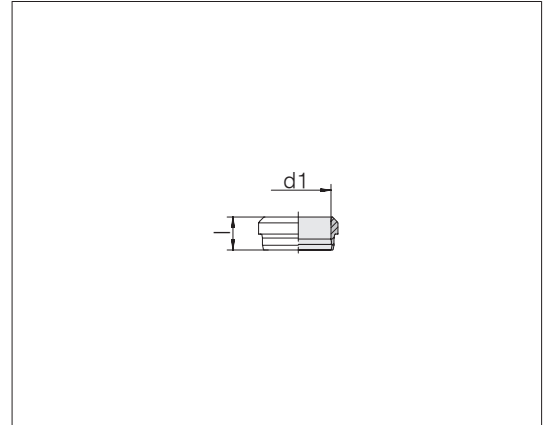
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# Cutting rings





## VOSSRing<sup>M</sup> cutting rings



3

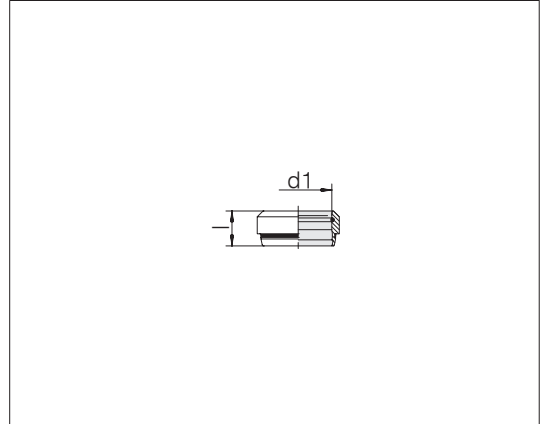
Series	Tube OD	d1	l	Order-No.	Designation
L/S	6		9.2	0019002100	24-VRM-L/S6
L/S	8		9.2	0019052100	24-VRM-L/S8
L/S	10		10	0019102100	24-VRM-L/S10
L/S	12		10	0019152100	24-VRM-L/S12
L	15		10.2	0019202100	24-VRM-L15
L	18		10.5	0019252100	24-VRM-L18
L	22		11.2	0019302100	24-VRM-L22
L	28		11.2	0019352100	24-VRM-L28
L	35		13.4	0019402100	24-VRM-L35
L	42		13.4	0019452100	24-VRM-L42
S	14		10.2	0019702100	24-VRM-S14
S	16		10.2	0019752100	24-VRM-S16
S	20		13	0019802100	24-VRM-S20
S	25		13	0019852100	24-VRM-S25
S	30		13.6	0019902100	24-VRM-S30
S	38		13.5	0019952100	24-VRM-S38

Cutting-rings for tube OD  
6 - 12 mm are identical for  
series L + S .

PSR06LX  
ISO 8434-1-CR-L6-St

## ES-4 cutting rings

Standard material of moulded seals and O-rings is FKM

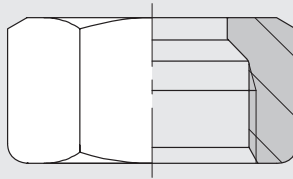


Series	l	Order-No.	Designation
Tube OD			
d1			
L/S 6	8.8	0011002039	24-ES4-L/S6
L/S 8	8.8	0011052039	24-ES4-L/S8
L/S 10	9.8	0011102039	24-ES4-L/S10
L/S 12	9.8	0011152039	24-ES4-L/S12
L 15	10.2	0011202039	24-ES4-L15
L 18	10.2	0011252039	24-ES4-L18
L 22	11.5	0011302039	24-ES4-L22
L 28	11.5	0011352039	24-ES4-L28
L 35	13.5	0011402039	24-ES4-L35
L 42	13.5	0011452039	24-ES4-L42
S 14	10.2	0011702039	24-ES4-S14
S 16	10.2	0011752039	24-ES4-S16
S 20	12.5	0011802039	24-ES4-S20
S 25	12.5	0011852039	24-ES4-S25
S 30	13.5	0011902039	24-ES4-S30
S 38	13.5	0011952039	24-ES4-S38

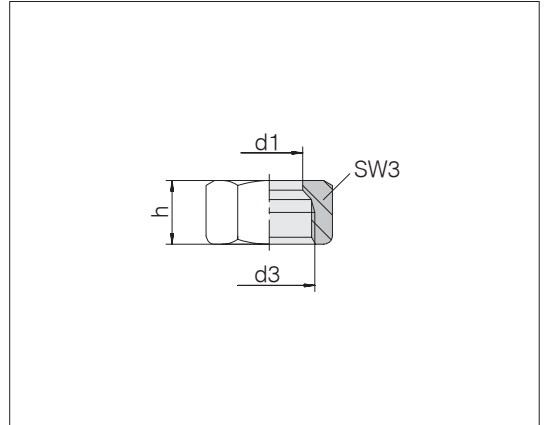
Cutting-rings for tube OD  
6 - 12 mm are identical for  
series L + S .

Example for comp. :  
ISO 8434-1-CR-L6-St

## DIN union nuts



# Union nuts



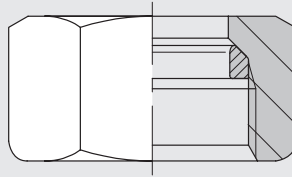
Series	d3	SW3	h	Order-No.	Designation
Tube OD d1					
L 6	M 12 x 1.5	14	14.5	0004002100	24-N-L6
L 8	M 14 x 1.5	17	15.5	0004052100	24-N-L8
L 10	M 16 x 1.5	19	15.5	0004102100	24-N-L10
L 12	M 18 x 1.5	22	15.5	0004152100	24-N-L12
L 15	M 22 x 1.5	27	17	0004202100	24-N-L15
L 18	M 26 x 1.5	32	18	0004252100	24-N-L18
L 22	M 30 x 2	36	20	0004302100	24-N-L22
L 28	M 36 x 2	41	21	0004352100	24-N-L28
L 35	M 45 x 2	50	24	0004402100	24-N-L35
L 42	M 52 x 2	60	24	0004452100	24-N-L42
S 6	M 14 x 1.5	17	16.5	0004502100	24-N-S6
S 8	M 16 x 1.5	19	16.5	0004552100	24-N-S8
S 10	M 18 x 1.5	22	17.5	0004602100	24-N-S10
S 12	M 20 x 1.5	24	17.5	0004652100	24-N-S12
S 14	M 22 x 1.5	27	20.5	0004702100	24-N-S14
S 16	M 24 x 1.5	30	20.5	0004752100	24-N-S16
S 20	M 30 x 2	36	24	0004802100	24-N-S20
S 25	M 36 x 2	46	27	0004852100	24-N-S25
S 30	M 42 x 2	50	29	0004902100	24-N-S30
S 38	M 52 x 2	60	32.5	0004952100	24-N-S38

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

M06LX  
ISO 8434-1-N-L6-St



## VOSSForm<sup>SQR</sup> function nuts



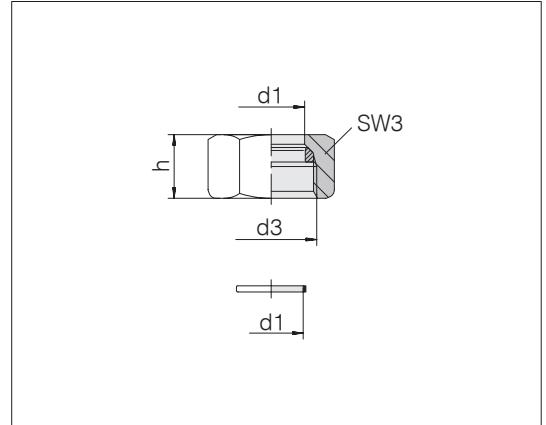


## VOSSForm<sup>SQR</sup>

Steel / stainless-steel set comprising

- SQR-function nuts
- moulded seals

Standard moulded-seal material is FKM

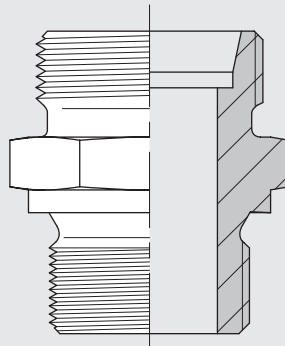


Series	d3	SW3	h	kg/100 ca.	Order-No.	Designation
Tube OD						
d1						
L 6	M 12 x 1.5	14	14.5	1.1	0015502167	24-SQRNMS-L6-PU300
L 8	M 14 x 1.5	17	14.5	1.7	0015512167	24-SQRNMS-L8-PU250
L 10	M 16 x 1.5	19	15.5	2.0	0015522167	24-SQRNMS-L10-PU150
L 12	M 18 x 1.5	22	15.5	2.8	0015532167	24-SQRNMS-L12-PU100
L 15	M 22 x 1.5	27	17	4.7	0015542167	24-SQRNMS-L15-PU60
L 18	M 26 x 1.5	32	18	6.9	0015552167	24-SQRNMS-L18-PU45
L 22	M 30 x 2	36	20	8.9	0015562167	24-SQRNMS-L22-PU30
L 28	M 36 x 2	41	21	9.4	0015572167	24-SQRNMS-L28-PU25
L 35	M 45 x 2	50	24	15.0	0015582167	24-SQRNMS-L35-PU15
L 42	M 52 x 2	60	24	23.0	0015592167	24-SQRNMS-L42-PU10
S 6	M 14 x 1.5	17	16.5	2.0	0015602167	24-SQRNMS-S6-PU200
S 8	M 16 x 1.5	19	16.5	2.3	0015612167	24-SQRNMS-S8-PU150
S 10	M 18 x 1.5	22	17.5	3.5	0015622167	24-SQRNMS-S10-PU100
S 12	M 20 x 1.5	24	17.5	3.9	0015632167	24-SQRNMS-S12-PU90
S 14	M 22 x 1.5	27	20.5	5.8	0015642167	24-SQRNMS-S14-PU60
S 16	M 24 x 1.5	30	20.5	7.1	0015652167	24-SQRNMS-S16-PU50
S 20	M 30 x 2	36	24	11.3	0015662167	24-SQRNMS-S20-PU25
S 25	M 36 x 2	46	27	21.2	0015672167	24-SQRNMS-S25-PU15
S 30	M 42 x 2	50	29	23.3	0015682167	24-SQRNMS-S30-PU10
S 38	M 52 x 2	60	32.5	34.4	0015692167	24-SQRNMS-S38-PU6

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

In the designation the suffix PU100 describes the minimum order quantity of 100 items.

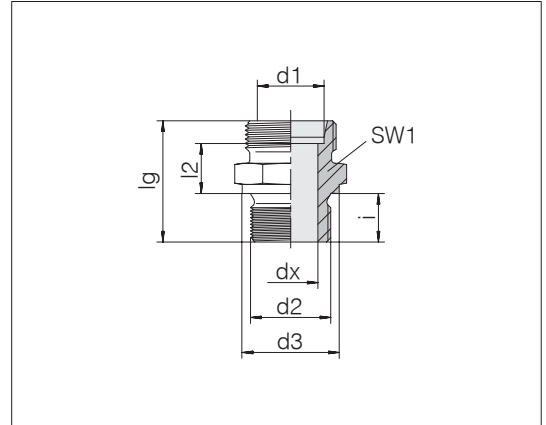
## Stud connectors



# Straight stud connectors

Male thread: metric fine thread, parallel  
DIN 3852-1 form A

Sealing by seal ring  
e.g. copper seal ring



Series	d2	d3	dx	lg	l2	SW1	i	kg/100 ca.	Order-No.	Designation	
Tube OD d1											
L 6	M 10 x 1	14	4	23.5	8.5	14	8	1.4	0707002000	24-SDS-L6-M10A	•
L 6	M 12 x 1.5	17	4	27	10	17	12	2.4	0785172000	24-SDS-L6-M12A	
L 8	M 10 x 1	14	4	24.5	9.5	17	8	1.9	0707062000	24-SDS-L8-M10A	
L 8	M 12 x 1.5	17	6	29	10	17	12	2.2	0707052000	24-SDS-L8-M12A	•
L 8	M 16 x 1.5	21	6	30.5	11.5	22	12	4.3	0707082000	24-SDS-L8-M16A	
L 8	M 18 x 1.5	23	6	30.5	11.5	24	12	5.2	0707092000	24-SDS-L8-M18A	
L 10	M 14 x 1.5	19	7	30	11	19	12	3.0	0707102000	24-SDS-L10-M14A	•
L 10	M 16 x 1.5	21	7	31.5	12.5	22	12	4.3	0707122000	24-SDS-L10-M16A	
L 10	M 18 x 1.5	23	8	31.5	12.5	24	12	5.0	0707132000	24-SDS-L10-M18A	
L 12	M 12 x 1.5	17	5	31.5	12.5	19	12	3.1	0707192000	24-SDS-L12-M12A	
L 12	M 14 x 1.5	19	7	31.5	12.5	19	12	3.4	0707162000	24-SDS-L12-M14A	
L 12	M 16 x 1.5	21	9	31.5	12.5	22	12	4.0	0707152000	24-SDS-L12-M16A	•
L 12	M 18 x 1.5	23	10	31.5	12.5	24	12	4.7	0707172000	24-SDS-L12-M18A	
L 12	M 22 x 1.5	27	9	35	14	27	14	8.1	0707182000	24-SDS-L12-M22A	
L 15	M 14 x 1.5	19	7	32	13	24	12	4.7	0707242000	24-SDS-L15-M14A	
L 15	M 16 x 1.5	21	9	32.5	13.5	22	12	4.7	0707212000	24-SDS-L15-M16A	
L 15	M 18 x 1.5	23	11	32.5	13.5	24	12	5.2	0707202000	24-SDS-L15-M18A	•
L 15	M 22 x 1.5	27	12	36	15	27	14	7.7	0707222000	24-SDS-L15-M22A	
L 15	M 26 x 1.5	31	12	38	15	32	16	11.7	0799922000	24-SDS-L15-M26A	
L 18	M 18 x 1.5	23	11	32.5	13	27	12	6.3	0707262000	24-SDS-L18-M18A	
L 18	M 22 x 1.5	27	14	36	14.5	27	14	7.6	0707252000	24-SDS-L18-M22A	•
L 18	M 26 x 1.5	31	15	38	14.5	32	16	11.0	0707272000	24-SDS-L18-M26A	
L 22	M 18 x 1.5	23	11	36	16.5	32	12	8.7	0707332000	24-SDS-L22-M18A	
L 22	M 22 x 1.5	27	14	38.5	17	32	14	9.7	0707312000	24-SDS-L22-M22A	
L 22	M 26 x 1.5	31	18	40	16.5	32	16	10.3	0707302000	24-SDS-L22-M26A	•
L 22	M 27 x 2	32	18	45	21.5	32	16	12.9	0707342000	24-SDS-L22-M27A	
L 28	M 22 x 1.5	27	14	39	17.5	41	14	13.5	0707382000	24-SDS-L28-M22A	
L 28	M 26 x 1.5	31	18	43	19.5	41	16	16.1	0707362000	24-SDS-L28-M26A	
L 28	M 33 x 2	39	23	43	17.5	41	18	16.9	0707352000	24-SDS-L28-M33A	•
L 35	M 42 x 2	49	30	48	17.5	50	20	28.4	0707402000	24-SDS-L35-M42A	•

• Standard size

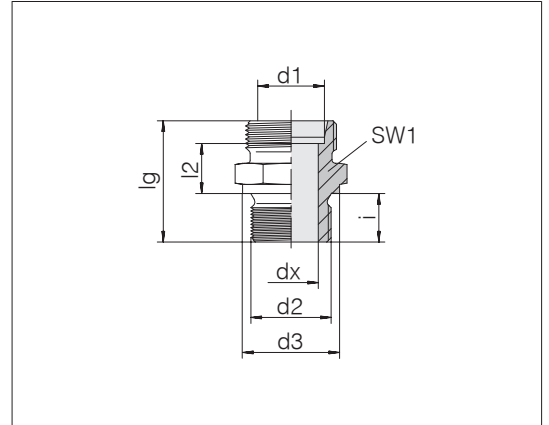
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## Straight stud connectors

Male thread: metric fine thread, parallel  
DIN 3852-1 form A

Sealing by seal ring  
e.g. copper seal ring



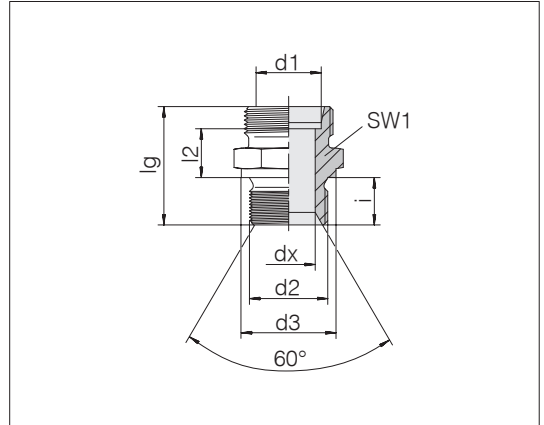
Series	Tube OD	d2	d3	dx	lg	l2	SW1	i	kg/100 ca.	Order-No.	Designation
S	6	M 12 x 1.5	17	4	32	13	17	12	3.0	0707502000	24-SDS-S6-M12A •
S	8	M 14 x 1.5	19	5	34	15	19	12	4.3	0707552000	24-SDS-S8-M14A •
S	12	M 18 x 1.5	23	8	36.5	17	24	12	7.2	0707652000	24-SDS-S12-M18A •
S	16	M 18 x 1.5	23	9	38.5	18	24	12	7.6	0707782000	24-SDS-S16-M18A-ID9

• Standard size

# Straight stud connectors

Male thread: BSPP thread, parallel  
DIN 3852-2 form A

Sealing by seal ring  
e.g. copper seal ring



Series	d2	d3	dx	lg	l2	SW1	i	kg/100 ca.	Order-No.	Designation
Tube OD d1										
L 6	G 1/8 A	14	4	23.5	8.5	14	8	1.4	0708002000	24-SDS-L6-G1/8A-CH60 •
L 6	G 1/4 A	18	4	28	9	19	12	2.5	0708022000	24-SDS-L6-G1/4A-CH60
L 6	G 3/8 A	22	4	30.5	11.5	22	12	4.2	0708032000	24-SDS-L6-G3/8A-CH60
L 8	G 1/8 A	14	4	24.5	9.5	17	8	1.8	0708062000	24-SDS-L8-G1/8A-CH60
L 8	G 1/4 A	18	6	29	10	19	12	2.7	0708052000	24-SDS-L8-G1/4A-CH60 •
L 8	G 3/8 A	22	6	30.5	11.5	22	12	4.2	0708072000	24-SDS-L8-G3/8A-CH60
L 10	G 1/4 A	18	7	30	11	19	12	2.7	0708102000	24-SDS-L10-G1/4A-CH60 •
L 10	G 3/8 A	22	7	31.5	12.5	22	12	4.3	0708122000	24-SDS-L10-G3/8A-CH60
L 10	G 1/2 A	26	7	34	13	27	14	6.8	0708132000	24-SDS-L10-G1/2A-CH60
L 12	G 1/4 A	18	7	31	12	19	12	3.1	0708162000	24-SDS-L12-G1/4A-CH60
L 12	G 3/8 A	22	9	31.5	12.5	22	12	4.6	0708152000	24-SDS-L12-G3/8A-CH60 •
L 12	G 1/2 A	26	9	34	13	27	14	6.7	0708172000	24-SDS-L12-G1/2A-CH60
L 15	G 3/8 A	22	9	32.5	13.5	24	12	5.1	0708212000	24-SDS-L15-G3/8A-CH60
L 15	G 1/2 A	26	11	35	14	27	14	7.7	0708202000	24-SDS-L15-G1/2A-CH60 •
L 15	G 3/4 A	32	12	38	15	32	16	11.2	0708222000	24-SDS-L15-G3/4A-CH60
L 18	G 3/8 A	22	9	33.5	14	27	12	6.6	0708262000	24-SDS-L18-G3/8A-CH60
L 18	G 1/2 A	26	14	36	14.5	27	14	7.1	0708252000	24-SDS-L18-G1/2A-CH60 •
L 18	G 3/4 A	32	15	38	14.5	32	16	10.6	0708272000	24-SDS-L18-G3/4A-CH60
L 22	G 1/2 A	26	14	38	16.5	32	14	8.8	0708312000	24-SDS-L22-G1/2A-CH60
L 22	G 3/4 A	32	18	40	16.5	32	16	10.2	0708302000	24-SDS-L22-G3/4A-CH60 •
L 22	G 1 A	39	19	42	16.5	41	18	16.7	0708322000	24-SDS-L22-G1A-CH60
L 28	G 1/2 A	26	14	39	17.5	41	14	13.2	0708382000	24-SDS-L28-G1/2A-CH60
L 28	G 3/4 A	32	18	43	19.5	41	16	16.2	0708362000	24-SDS-L28-G3/4A-CH60
L 28	G 1 A	39	23	43	17.5	41	18	16.7	0708352000	24-SDS-L28-G1A-CH60 •
L 35	G 1 1/4 A	49	30	48	17.5	50	20	27.2	0708402000	24-SDS-L35-G11/4A-CH60 •
L 42	G 1 1/4 A	49	30	50	19	55	20	33.4	0708462000	24-SDS-L42-G11/4A-CH60
L 42	G 1 1/2 A	55	36	52	19	55	22	34.5	0708452000	24-SDS-L42-G11/2A-CH60 •

• Standard size

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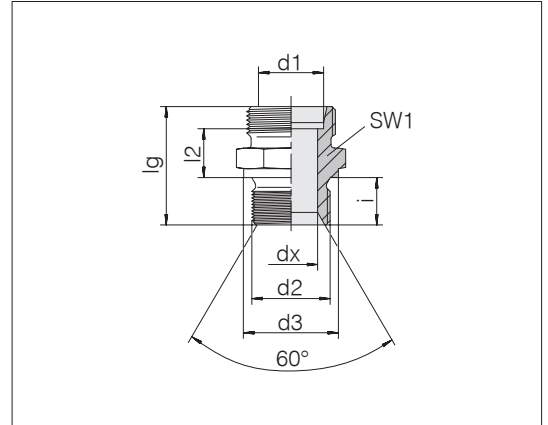




## Straight stud connectors

Male thread: BSPP thread, parallel  
DIN 3852-2 form A

Sealing by seal ring  
e.g. copper seal ring



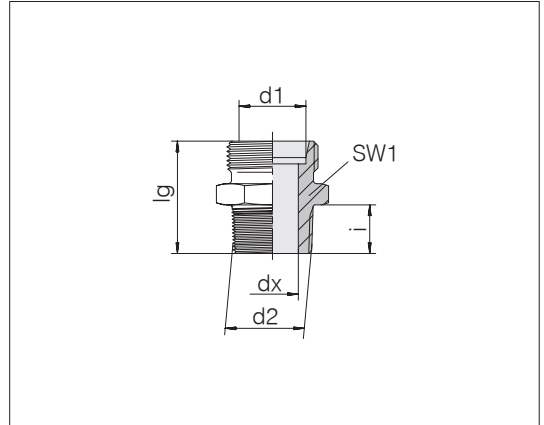
Series	Tube OD	d2	d3	dx	lg	l2	SW1	i	kg/100 ca.	Order-No.	Designation
S	6	G 1/8 A	14	4	27.5	12.5	17	8	2.4	0708512000	24-SDS-S6-G1/8A-ID4/CH60
S	6	G 1/4 A	18	4	32	13	19	12	3.4	0708502000	24-SDS-S6-G1/4A-CH60
S	8	G 1/8 A	14	4	29.5	14.5	17	8	3.0	0708562000	24-SDS-S8-G1/8A-ID4/CH60
S	8	G 1/4 A	18	5	34	15	19	12	4.1	0708552000	24-SDS-S8-G1/4A-CH60
S	8	G 3/8 A	22	5	34.5	15.5	22	12	5.5	0708572000	24-SDS-S8-G3/8A-CH60
S	10	G 1/4 A	18	5	34	14.5	19	12	4.1	0708612000	24-SDS-S10-G1/4A-CH60
S	10	G 3/8 A	22	7	34.5	15	22	12	5.5	0708602000	24-SDS-S10-G3/8A-CH60
S	10	G 1/2 A	26	7	39	17.5	27	14	9.2	0708622000	24-SDS-S10-G1/2A-CH60
S	12	G 1/4 A	18	5	36	16.5	22	12	5.7	0708662000	24-SDS-S12-G1/4A-CH60
S	12	G 3/8 A	22	8	36.5	17	22	12	6.1	0708652000	24-SDS-S12-G3/8A-CH60
S	12	G 1/2 A	26	8	39	17.5	27	14	9.3	0708672000	24-SDS-S12-G1/2A-CH60
S	14	G 1/2 A	26	10	41	19	27	14	9.4	0708702000	24-SDS-S14-G1/2A-CH60
S	16	G 3/8 A	22	9	39	18.5	24	12	7.4	0708762000	24-SDS-S16-G3/8A-CH60
S	16	G 1/2 A	26	12	41	18.5	27	14	9.0	0708752000	24-SDS-S16-G1/2A-CH60
S	16	G 3/4 A	32	12	45	20.5	32	16	14.9	0708772000	24-SDS-S16-G3/4A-CH60
S	16	G 1 A	39	12	49	22.5	41	18	23.1	0708782000	24-SDS-S16-G1A-CH60
S	20	G 1/2 A	26	12	45	20.5	32	14	13.3	0708812000	24-SDS-S20-G1/2A-CH60
S	20	G 3/4 A	32	16	47	20.5	32	16	16.3	0708802000	24-SDS-S20-G3/4A-CH60
S	20	G 1 A	39	16	51	22.5	41	18	24.3	0708822000	24-SDS-S20-G1A-CH60
S	25	G 3/4 A	32	16	51	23	41	16	23.6	0708862000	24-SDS-S25-G3/4A-CH60
S	25	G 1 A	39	20	53	23	41	18	25.7	0708852000	24-SDS-S25-G1A-CH60
S	30	G 3/4 A	32	16	53	23.5	46	16	29.6	0708932000	24-SDS-S30-G3/4A-CH60
S	30	G 1 A	39	20	55	23.5	46	18	31.9	0708912000	24-SDS-S30-G1A-CH60
S	30	G 1 1/4 A	49	25	57	23.5	50	20	40.3	0708902000	24-SDS-S30-G11/4A-CH60
S	38	G 1 A	39	20	60	26	55	18	49.4	0708982000	24-SDS-S38-G1A-CH60
S	38	G 1 1/4 A	49	25	62	26	55	20	53.9	0708962000	24-SDS-S38-G11/4A-CH60
S	38	G 1 1/2 A	55	32	64	26	55	22	55.0	0708952000	24-SDS-S38-G11/2A-CH60

● Standard size

# Straight stud connectors

Male thread: metric fine thread, tapered  
DIN 3852-1 form C

Sealed by tapered thread



Series	d2	dx	lg	SW1	i	kg/100 ca.	Order-No.	Designation	
Tube OD									
d1									
L 6	M 10 x 1 keg	4	22	14	8	1.3	0702002000	24-SDS-L6-M10T	•
L 8	M 10 x 1 keg	4	23	17	8	2.0	0702072000	24-SDS-L8-M10T	
L 8	M 12 x 1.5 keg	6	27	17	12	2.1	0702052000	24-SDS-L8-M12T	•
L 10	M 14 x 1.5 keg	7	28	17	12	2.5	0702102000	24-SDS-L10-M14T	•
L 12	M 16 x 1.5 keg	9	29	19	12	3.2	0702152000	24-SDS-L12-M16T	•
L 15	M 18 x 1.5 keg	11	30	24	12	4.7	0702202000	24-SDS-L15-M18T	•
L 18	M 22 x 1.5 keg	14	33	27	14	6.8	0702252000	24-SDS-L18-M22T	•
L 18	M 24 x 1.5 keg	15	35	27	16	7.7	0702262000	24-SDS-L18-M24T	
S 6	M 12 x 1.5 keg	4	30	17	12	2.8	0702502000	24-SDS-S6-M12T	•
S 8	M 14 x 1.5 keg	5	32	17	12	3.7	0702552000	24-SDS-S8-M14T	•
S 10	M 16 x 1.5 keg	7	32	19	12	4.3	0702602000	24-SDS-S10-M16T	•
S 12	M 18 x 1.5 keg	8	34	22	12	6.0	0702652000	24-SDS-S12-M18T	•
S 14	M 20 x 1.5 keg	10	38	27	14	8.7	0702702000	24-SDS-S14-M20T	•
S 16	M 22 x 1.5 keg	12	38	27	14	9.0	0702752000	24-SDS-S16-M22T	•

• Standard size

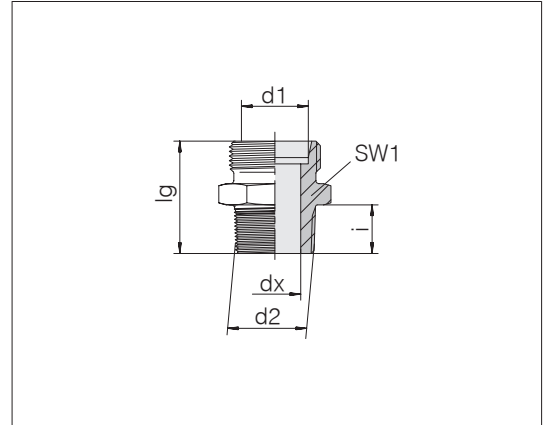
Example for comp. :  
GE06LMX  
DIN 2353-AL6-St



## Straight stud connectors

Male thread: BSPT thread, tapered  
DIN 3852-2 form C

Sealed by tapered thread

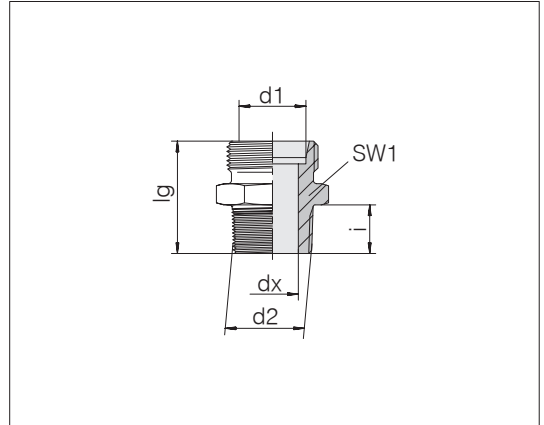


Series	Tube OD	d2	dx	lg	SW1	i	kg/100 ca.	Order-No.	Designation	
L	6	R 1/8	4	22	14	8	1.2	0704002000	24-SDS-L6-R1/8T	•
L	6	R 1/4	4	26	14	12	1.9	0704022000	24-SDS-L6-R1/4T	
L	6	R 3/8	4	28	19	12	3.6	0704032000	24-SDS-L6-R3/8T	
L	8	R 1/8	4	23	14	8	1.5	0704062000	24-SDS-L8-R1/8T	
L	8	R 1/4	6	27	17	12	2.2	0704052000	24-SDS-L8-R1/4T	•
L	8	R 3/8	6	28	19	12	3.4	0704072000	24-SDS-L8-R3/8T	
L	8	R 1/2	6	30	24	14	5.9	0704082000	24-SDS-L8-R1/2T	
L	10	R 1/4	7	28	17	12	2.3	0704102000	24-SDS-L10-R1/4T	•
L	10	R 3/8	8	28	19	12	3.1	0704122000	24-SDS-L10-R3/8T	
L	10	R 1/2	8	31	24	14	5.6	0704132000	24-SDS-L10-R1/2T	
L	12	R 1/4	7	29	19	12	2.8	0704162000	24-SDS-L12-R1/4T	
L	12	R 3/8	9	29	19	12	3.3	0704152000	24-SDS-L12-R3/8T	•
L	12	R 1/2	9	31	24	14	5.5	0704172000	24-SDS-L12-R1/2T	
L	12	R 3/4	9	34	30	16	8.2	0704182000	24-SDS-L12-R3/4T	
L	15	R 1/4	7	30	24	12	4.4	0704232000	24-SDS-L15-R1/4T	
L	15	R 3/8	11	30	24	12	4.4	0704212000	24-SDS-L15-R3/8T	
L	15	R 1/2	11	32	24	14	5.8	0704202000	24-SDS-L15-R1/2T	•
L	18	R 1/2	14	33	27	14	6.4	0704252000	24-SDS-L18-R1/2T	•
L	18	R 3/4	14	35	30	16	10.9	0704272000	24-SDS-L18-R3/4T	
L	22	R 1/2	14	35	32	14	8.1	0704312000	24-SDS-L22-R1/2T	
L	22	R 3/4	18	37	32	16	9.6	0704302000	24-SDS-L22-R3/4T	•
L	28	R 3/4	18	38	41	16	13.9	0704362000	24-SDS-L28-R3/4T	
L	28	R 1	23	40	41	18	15.6	0704352000	24-SDS-L28-R1T	•

# Straight stud connectors

Male thread: BSPT thread, tapered  
DIN 3852-2 form C

Sealed by tapered thread



Series	d2	dx	lg	SW1	i	kg/100 ca.	Order-No.	Designation	
Tube OD d1									
S 6	R 1/4	4	30	17	12	3.0	0704502000	24-SDS-S6-R1/4T	•
S 8	R 1/4	5	32	17	12	3.4	0704552000	24-SDS-S8-R1/4T	•
S 10	R 3/8	7	32	19	12	4.4	0704602000	24-SDS-S10-R3/8T	•
S 12	R 1/4	6	34	22	12	5.4	0704662000	24-SDS-S12-R1/4T	•
S 12	R 3/8	8	34	22	12	5.8	0704652000	24-SDS-S12-R3/8T	•
S 14	R 3/8	8	36	24	12	6.8	0704712000	24-SDS-S14-R3/8T	•
S 14	R 1/2	10	38	27	14	8.9	0704702000	24-SDS-S14-R1/2T	•
S 16	R 3/8	9	36	27	12	7.9	0704762000	24-SDS-S16-R3/8T	•
S 16	R 1/2	12	38	27	14	8.5	0704752000	24-SDS-S16-R1/2T	•
S 20	R 1/2	14	42	32	14	12.2	0704812000	24-SDS-S20-R1/2T	•
S 20	R 3/4	16	44	32	16	14.1	0704802000	24-SDS-S20-R3/4T	•

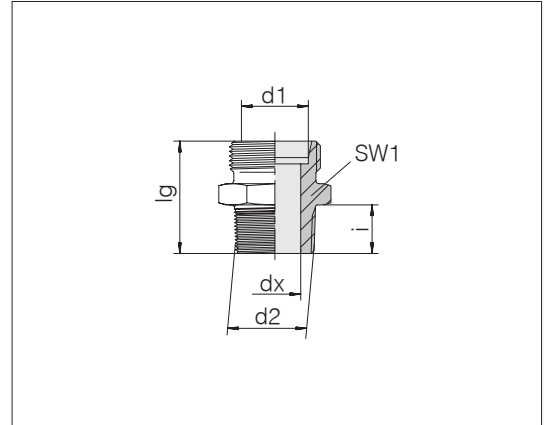
• Standard size



## Straight stud connectors

Male thread: NPT  
ANSI/ASME B 1 - 20.01.2013

Sealed by tapered thread

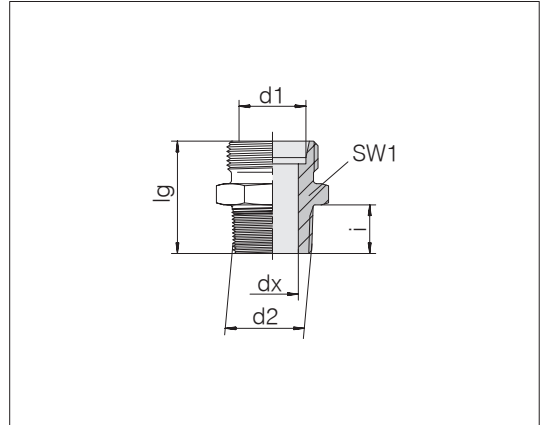


Series	d2	dx	lg	SW1	i	kg/100 ca.	Order-No.	Designation
L 6	1/8 NPT	4	23.9	12	9.9	1.2	0706002000	24-SDS-L6-N1/8T •
L 6	1/4 NPT	4	30	17	15.1	2.6	0706022000	24-SDS-L6-N1/4T
L 8	1/8 NPT	5	24.9	14	9.9	1.5	0706062000	24-SDS-L8-N1/8T
L 8	1/4 NPT	6	30.1	17	15.1	2.5	0706052000	24-SDS-L8-N1/4T •
L 8	3/8 NPT	6	31.2	19	15.2	3.9	0706072000	24-SDS-L8-N3/8T
L 8	1/2 NPT	6	35.8	24	19.8	7.1	0706082000	24-SDS-L8-N1/2T
L 10	1/8 NPT	4	27	17	9.9	2.3	0706112000	24-SDS-L10-N1/8T
L 10	1/4 NPT	7	31.1	17	15.1	2.5	0706102000	24-SDS-L10-N1/4T •
L 10	3/8 NPT	8	32.2	19	15.2	3.7	0706122000	24-SDS-L10-N3/8T
L 10	1/2 NPT	8	37.8	24	19.8	7.2	0706132000	24-SDS-L10-N1/2T
L 12	1/4 NPT	7	32	19	15.1	3.2	0706162000	24-SDS-L12-N1/4T
L 12	3/8 NPT	9	32.2	19	15.2	3.6	0706152000	24-SDS-L12-N3/8T •
L 12	1/2 NPT	10	36.8	24	19.8	6.4	0706172000	24-SDS-L12-N1/2T
L 15	3/8 NPT	9	33.2	24	15.2	5.2	0706212000	24-SDS-L15-N3/8T
L 15	1/2 NPT	11	37.8	24	19.8	6.8	0706202000	24-SDS-L15-N1/2T •
L 18	3/8 NPT	9	34.2	27	15.2	8.0	0706262000	24-SDS-L18-N3/8T
L 18	1/2 NPT	14	38.8	27	19.8	7.2	0706252000	24-SDS-L18-N1/2T •
L 18	3/4 NPT	14	39.1	30	20.1	9.1	0706272000	24-SDS-L18-N3/4T
L 22	1/2 NPT	14	40.8	32	19.8	9.9	0706312000	24-SDS-L22-N1/2T
L 22	3/4 NPT	18	41.1	32	20.1	10.1	0706302000	24-SDS-L22-N3/4T •
L 28	1 NPT	23	47	41	25	17.2	0706352000	24-SDS-L28-N1T •
L 35	1 1/4 NPT	30	50.6	46	25.6	25.6	0706402000	24-SDS-L35-N11/4T •
L 42	1 1/2 NPT	36	53	55	26	35.2	0706452000	24-SDS-L42-N11/2T •

# Straight stud connectors

Male thread: NPT  
ANSI/ASME B 1 - 20.01.2013

Sealed by tapered thread



Series	d2	dx	lg	SW1	i	kg/100 ca.	Order-No.	Designation	
Tube OD d1									
S 6	1/4 NPT	4	33.1	17	15.1	3.3	0706502000	24-SDS-S6-N1/4T	•
S 8	1/4 NPT	5	35.1	17	15.1	3.8	0706552000	24-SDS-S8-N1/4T	•
S 8	3/8 NPT	5	35	19	15.2	4.5	0706572000	24-SDS-S8-N3/8T	
S 10	1/8 NPT	4	30.9	19	9.9	4.0	0706632000	24-SDS-S10-N1/8T	
S 10	1/4 NPT	5	35.1	19	15.1	4.3	0706612000	24-SDS-S10-N1/4T	
S 10	3/8 NPT	7	35.2	19	15.2	4.8	0706602000	24-SDS-S10-N3/8T	•
S 10	1/2 NPT	7	41.8	24	19.8	9.0	0706622000	24-SDS-S10-N1/2T	
S 12	1/4 NPT	5	37.1	22	15.1	5.8	0706662000	24-SDS-S12-N1/4T	
S 12	3/8 NPT	8	37.2	22	15.2	6.2	0706652000	24-SDS-S12-N3/8T	•
S 12	1/2 NPT	8	41.8	24	19.8	9.0	0706672000	24-SDS-S12-N1/2T	
S 14	3/8 NPT	8	39	24	15.2	7.2	0706712000	24-SDS-S14-N3/8T	
S 14	1/2 NPT	10	43.8	27	19.8	9.9	0706702000	24-SDS-S14-N1/2T	•
S 16	3/8 NPT	8	39.2	27	15.2	8.4	0706762000	24-SDS-S16-N3/8T	
S 16	1/2 NPT	12	43.8	27	19.8	9.4	0706752000	24-SDS-S16-N1/2T	•
S 16	3/4 NPT	12	44	30	20.1	13.5	0706772000	24-SDS-S16-N3/4T	
S 20	1/2 NPT	14	47.8	32	19.8	12.7	0706812000	24-SDS-S20-N1/2T	
S 20	3/4 NPT	16	48.1	32	20.1	14.9	0706802000	24-SDS-S20-N3/4T	•
S 20	1 NPT	16	55	36	25	25.0	0706822000	24-SDS-S20-N1T	
S 25	3/4 NPT	18	52.1	41	20.1	22.7	0706862000	24-SDS-S25-N3/4T	
S 25	1 NPT	20	57	41	25	28.1	0706852000	24-SDS-S25-N1T	•
S 30	1 NPT	22	59	46	25	32.2	0706912000	24-SDS-S30-N1T	
S 30	1 1/4 NPT	25	59.6	46	25.6	39.3	0706902000	24-SDS-S30-N1/4T	•
S 38	1 1/2 NPT	32	65	55	26	57.2	0706952000	24-SDS-S38-N1/2T	•

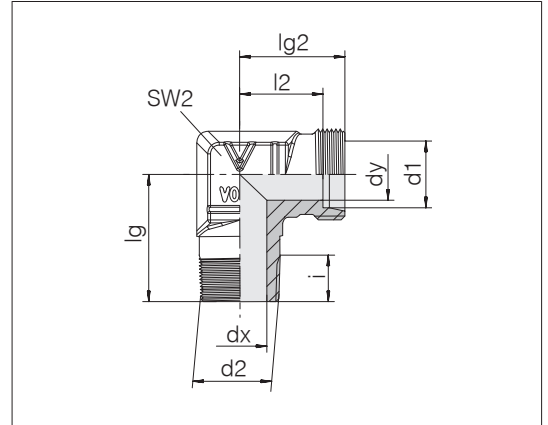
• Standard size



## Elbow stud connector

Male thread: metric fine thread, tapered  
DIN 3852-1 form C

Sealed by tapered thread



Series	d2	dx	dy	lg	lg2	l2	SW2	i	kg/100 ca.	Order-No.	Designation
L 6	M 10 x 1 keg	4	4	20	19	12	12	8	2.9	0714002000	24-SDE-L6-M10T-P •
L 8	M 12 x 1.5 keg	6	6	26	21	14	14	12	4.3	0714052000	24-SDE-L8-M12T-P •
L 10	M 14 x 1.5 keg	7	8	27	22	15	17	12	6.2	0714102000	24-SDE-L10-M14T-P •
L 12	M 16 x 1.5 keg	9	10	28		17	19	12	8.5	714152000	24-SDE-L12-M16T •
L 12	M 18 x 1.5 keg	11	10	32	28	21	19	12	8.2	0714172000	24-SDE-L12-M18T •
L 15	M 18 x 1.5 keg	11	12	32	28	21	19	12	8.3	0714202000	24-SDE-L15-M18T •
L 18	M 22 x 1.5 keg	14	15	36	31	23.5	24	14	13.0	0714252000	24-SDE-L18-M22T •
S 6	M 12 x 1.5 keg	4	4	26	23	16	14	12	5.2	0714502000	24-SDE-S6-M12T-P •
S 8	M 14 x 1.5 keg	5	5	27	24	17	17	12	7.4	0714552000	24-SDE-S8-M14T-P •
S 10	M 16 x 1.5 keg	7	7	28	25	17.5	19	12	10.1	0714602000	24-SDE-S10-M16T-P •
S 12	M 18 x 1.5 keg	8	8	28	29	21.5	22	12	12.9	0714652000	24-SDE-S12-M18T-P •
S 14	M 20 x 1.5 keg	10	10	32	30	22	19	14	10.4	0714702000	24-SDE-S14-M20T •
S 16	M 22 x 1.5 keg	12	12	32	33	24.5	24	14	14.5	0714752000	24-SDE-S16-M22T •

• Standard size

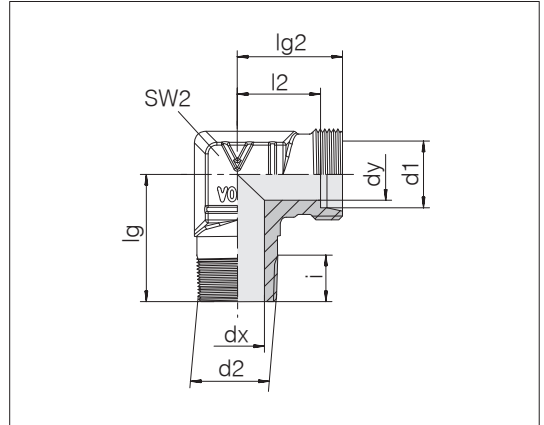
Example for comp. :  
WE06LMX  
DIN 2353-FL6-St



# Elbow stud connector

Male thread: BSPT thread, tapered  
DIN 3852-2 form C

Sealed by tapered thread



Series	Tube OD	d2	dx	dy	lg	lg2	l2	SW2	i	kg/100 ca.	Order-No.	Designation
L	6	R 1/8	4	4	20	19	12	12	8	2.7	0716002000	24-SDE-L6-R1/8T-P •
L	6	R 1/4	7	4	26	14	14	14	12	4.5	0716022000	24-SDE-L6-R1/4T-P
L	6	R 3/8	9	4	27	24	17	17	12	6.8	0716032000	24-SDE-L6-R3/8T-P
L	8	R 1/8	4	6	26	21	14	14	8	4.6	0716062000	24-SDE-L8-R1/8T-P
L	8	R 1/4	6	6	26	21	14	14	12	4.8	0716052000	24-SDE-L8-R1/4T-P •
L	8	R 3/8	8	6	28	22	15	19	15	8.8	0716072000	24-SDE-L8-R3/8T-P
L	10	R 1/8	4	7	25	22	15	17	8	6.7	0716112000	24-SDE-L10-R1/8T-P
L	10	R 1/4	7	8	27	22	15	17	12	5.9	0716102000	24-SDE-L10-R1/4T-P •
L	10	R 3/8	7	7	28	23	16	19	15	9.3	0716122000	24-SDE-L10-R3/8T-P
L	10	R 1/2	11	7	34	27	20	19	10	9.6	0716132000	24-SDE-L10-R1/2T
L	12	R 1/4	7	9	28	24	17	19	12	8.5	0716162000	24-SDE-L12-R1/4T-P
L	12	R 3/8	9	10	28	24	17	19	12	9.1	0716152000	24-SDE-L12-R3/8T-P •
L	12	R 1/2	11	9	34	27	20	19	14	9.7	0716172000	24-SDE-L12-R1/2T
L	15	R 3/8	9	11	32	28	21	19	12	9.0	0716212000	24-SDE-L15-R3/8T
L	15	R 1/2	11	12	34	28	21	19	14	9.5	0716202000	24-SDE-L15-R1/2T •
L	15	R 3/4	16	12	42	28.5	21.5	27	16	18.6	0716222000	24-SDE-L15-R3/4T
L	18	R 1/2	14	15	36	31	23.5	24	14	12.6	0716252000	24-SDE-L18-R1/2T •
L	18	R 3/4	18	15	42	35	27.5	27	16	20.2	0716272000	24-SDE-L18-R3/4T
L	22	R 3/4	18	19	42	27.5	27.5	27	16	17.3	0716342000	24-SDE-L22-R3/4T

• Standard size

Example for comp. :  
WE06LRX  
DIN 2353-GL6-St

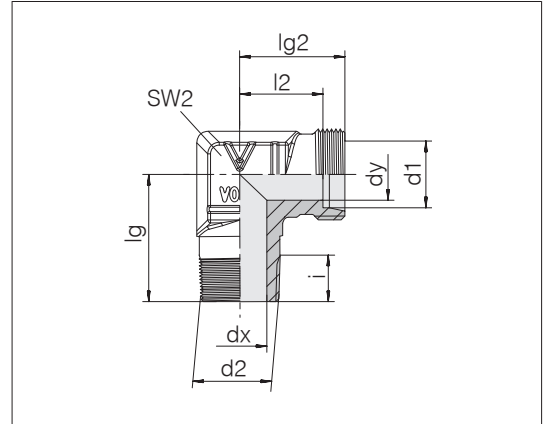
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## Elbow stud connector

Male thread: BSPT thread, tapered  
DIN 3852-2 form C

Sealed by tapered thread



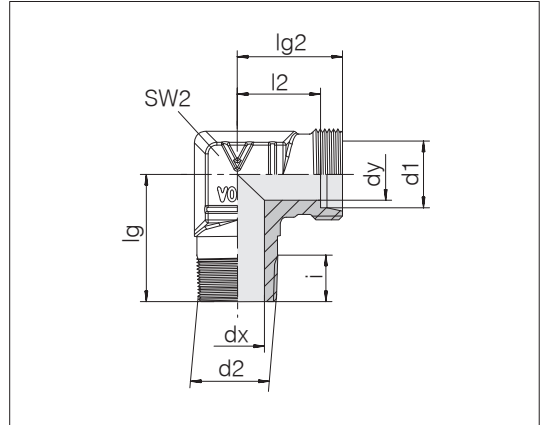
Series	Tube OD	d2	dx	dy	lg	lg2	l2	SW2	i	kg/100 ca.	Order-No.	Designation
S	6	R 1/4	4	4	26	23	16	14	12	5.4	0716502000	24-SDE-S6-R1/4T-P •
S	8	R 1/4	5	5	27	24	17	17	12	7.0	0716552000	24-SDE-S8-R1/4T-P •
S	10	R 1/4	5	7	27	25	17.5	19	12	9.3	0716612000	24-SDE-S10-R1/4T-P •
S	10	R 3/8	7	7	28	25	17.5	19	12	10.2	0716602000	24-SDE-S10-R3/8T-P •
S	10	R 1/2	10	7	34	27	19.5	19	16	11.5	716622000	24-SDE-S10-R1/2T •
S	12	R 3/8	8	8	28	29	21.5	22	12	12.7	0716652000	24-SDE-S12-R3/8T-P •
S	12	R 1/2	11	8	34	29	21.5	19	14	10.3	0716672000	24-SDE-S12-R1/2T •
S	14	R 1/4	7	10	30	30	22	19	12	9.3	0716732000	24-SDE-S14-R1/4T •
S	14	R 3/8	8	10	30	30	22	19	12	9.7	0716712000	24-SDE-S14-R3/8T •
S	14	R 1/2	10	10	32	30	22	19	14	10.5	0716702000	24-SDE-S14-R1/2T •
S	16	R 1/2	12	12	32	33	24.5	24	14	13.9	0716752000	24-SDE-S16-R1/2T •
S	16	R 3/4	16	12	42	33	24.5	27	16	18.9	0716772000	24-SDE-S16-R3/4T •
S	20	R 1/2	12	16	40	37	26.5	27	14	21.6	0716812000	24-SDE-S20-R1/2T •
S	20	R 3/4	16	16	42	37	26.5	27	16	21.7	0716842000	24-SDE-S20-R3/4T •

• Standard size

# Elbow stud connector

Male thread: NPT  
ANSI/ASME B 1 - 20.01.2013

Sealed by tapered thread



Series	d2	dx	dy	lg	lg2	l2	SW2	i	kg/100 ca.	Order-No.	Designation
Tube OD d1											
L 6	1/8 NPT	4	4	20	19	12	12	9.9	3.0	0718002000	24-SDE-L6-N1/8T-P •
L 6	1/4 NPT	4	4	26	21	14	14	15.1	4.9	0718022000	24-SDE-L6-N1/4T-P •
L 8	1/4 NPT	6	6	26	21	14	14	15.1	4.7	0718052000	24-SDE-L8-N1/4T-P •
L 10	1/4 NPT	7	7	27	22	15	17	15.1	6.2	0718102000	24-SDE-L10-N1/4T-P •
L 10	3/8 NPT	9	8	28	24	17	19	15.1	9.1	0718122000	24-SDE-L10-N3/8T-P •
L 12	1/4 NPT	7	9	28	24	17	19	15.1	8.6	0718162000	24-SDE-L12-N1/4T-P •
L 12	3/8 NPT	9	9	28	24	17	19	15.2	9.0	0718152000	24-SDE-L12-N3/8T-P •
L 12	1/2 NPT	12	9	33	28	21	24	19.8	12.3	0718172000	24-SDE-L12-N1/2T •
L 15	1/2 NPT	11	11	36	31	24	24	19.8	14.2	0718202000	24-SDE-L15-N1/2T •
L 18	1/2 NPT	14	14	37	31	23.5	24	19.8	12.9	0718252000	24-SDE-L18-N1/2T •
L 22	3/4 NPT	18	19	42	35	27.5	27	20.1	17.4	0718302000	24-SDE-L22-N3/4T •
L 28	1 NPT	23	24	48	38	30.5	36	25	28.5	0718352000	24-SDE-L28-N1T •
L 35	1 1/4 NPT	30	30	54	45	34.5	41	25.6	47.7	0718402000	24-SDE-L35-N11/4T •
L 42	1 1/2 NPT	36	36	61	51	40	50	26	72.3	0718452000	24-SDE-L42-N11/2T •
S 6	1/4 NPT	4	4	26	23	16	14	15.1	5.6	0718502000	24-SDE-S6-N1/4T-P •
S 8	1/4 NPT	5	5	27	24	17	17	15.1	7.3	0718552000	24-SDE-S8-N1/4T-P •
S 10	3/8 NPT	7	7	28	25	17.5	19	15.2	10.4	0718602000	24-SDE-S10-N3/8T-P •
S 12	3/8 NPT	8	8	29	29	21.5	22	15.2	12.6	0718652000	24-SDE-S12-N3/8T-P •
S 14	1/2 NPT	10	10	33	33	25	24	19.8	14.9	0718702000	24-SDE-S14-N1/2T •
S 16	1/2 NPT	12	12	36	33	24.5	24	19.8	14.6	0718752000	24-SDE-S16-N1/2T •
S 20	3/4 NPT	16	16	42	37	26.5	27	20.1	21.5	0718802000	24-SDE-S20-N3/4T •
S 25	1 NPT	20	20	49	42	30	36	25	37.6	0718852000	24-SDE-S25-N1T •
S 30	1 1/4 NPT	25	25	54	49	35.5	41	25.6	64.8	0718902000	24-SDE-S30-N11/4T •
S 38	1 1/2 NPT	32	32	61	57	41	50	26	97.1	0718952000	24-SDE-S38-N11/2T •

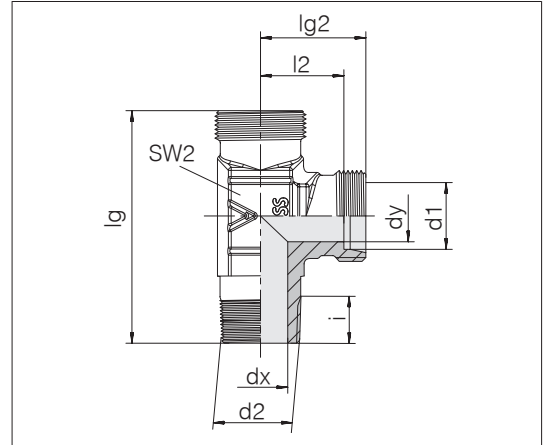
• Standard size



## L male stud couplings

Male thread: metric fine thread, tapered  
DIN 3852-1 form C

Sealed by tapered thread



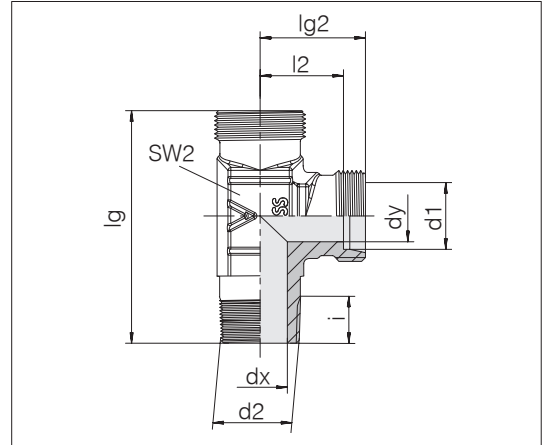
Series	Tube OD	d2	dx	dy	lg	lg2	l2	SW2	i	kg/100 ca.	Order-No.	Designation
L	6	M 10 x 1 keg	4	20	39	19	12	12	8	3.8	0722002000	24-SDL-L6-M10T-P
L	8	M 12 x 1.5 keg	6	20	47	21	14	14	12	5.4	0722052000	24-SDL-L8-M12T-P
L	10	M 14 x 1.5 keg	7	20	49	22	15	17	12	7.2	0722102000	24-SDL-L10-M14T-P
L	12	M 16 x 1.5 keg	9	20	52	24	17	19	12	10.1	0722152000	24-SDL-L12-M16T-P
L	15	M 18 x 1.5 keg	11	20	60	28	21	19	12	10.4	0722202000	24-SDL-L15-M18T
L	18	M 22 x 1.5 keg	14	20	67	31	23.5	24	14	16.5	0722252000	24-SDL-L18-M22T
S	6	M 12 x 1.5 keg	4	20	49	23	16	14	12	7.0	0722502000	24-SDL-S6-M12T-P
S	8	M 14 x 1.5 keg	5	20	51	24	17	17	12	9.3	0722552000	24-SDL-S8-M14T-P
S	10	M 16 x 1.5 keg	7	20	53	25	17.5	19	12	11.8	0722602000	24-SDL-S10-M16T-P
S	12	M 18 x 1.5 keg	8	20	57	29	21.5	22	12	16.8	0722652000	24-SDL-S12-M18T-P
S	14	M 20 x 1.5 keg	10	20	62	30	22	19	14	13.2	0722702000	24-SDL-S14-M20T
S	16	M 22 x 1.5 keg	12	20	65	33	24.5	24	14	16.5	0722752000	24-SDL-S16-M22T

Example for comp. :  
LE06LMX  
DIN 2353-AAL6-St

## L male stud couplings

Male thread: BSPT thread, tapered  
DIN 3852-2 form C

Sealed by tapered thread



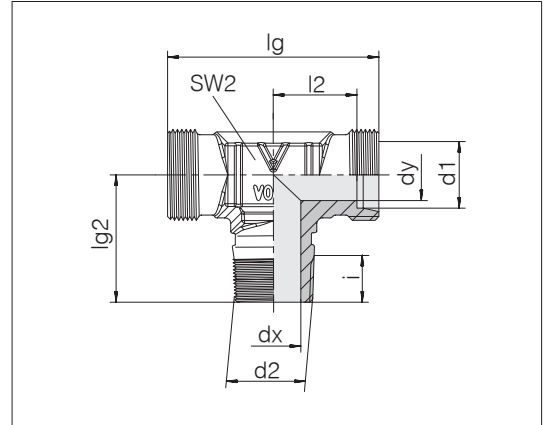
Series	d2	dx	dy	lg	lg2	l2	SW2	i	kg/100 ca.	Order-No.	Designation
Tube OD											
d1											
L 6	R 1/8	4	4	39	19	12	12	8	3.7	0724002000	24-SDL-L6-R1/8T-P
L 8	R 1/4	6	6	47	21	14	14	12	5.6	0724052000	24-SDL-L8-R1/4T-P
L 10	R 1/4	7	8	49	22	15	17	12	7.3	0724102000	24-SDL-L10-R1/4T-P
L 12	R 3/8	9	10	52	24	17	19	12	9.8	0724152000	24-SDL-L12-R3/8T-P
L 15	R 1/2	11	12	62	28	21	19	14	11.7	0724202000	24-SDL-L15-R1/2T
L 18	R 1/2	14	15	67	31	23.5	24	14	15.7	0724252000	24-SDL-L18-R1/2T
S 6	R 1/4	4	4	49	23	16	14	12	12.1	0724502000	24-SDL-S6-R1/4T-P
S 8	R 1/4	5	5	51	24	17	17	12	9.0	0724552000	24-SDL-S8-R1/4T-P
S 10	R 3/8	7	7	53	25	17.5	19	12	11.9	0724602000	24-SDL-S10-R3/8T-P
S 12	R 3/8	8	8	57	29	21.5	22	12	16.2	0724652000	24-SDL-S12-R3/8T-P
S 14	R 1/2	10	10	62	30	22	19	14	13.7	0724702000	24-SDL-S14-R1/2T
S 16	R 1/2	12	12	65	33	24.5	24	14	16.5	0724752000	24-SDL-S16-R1/2T

Example for comp. :  
LE06LRX  
DIN 2353-ABL6-St

## T male stud couplings

Male thread: metric fine thread, tapered  
DIN 3852-1 form C

Sealed by tapered thread



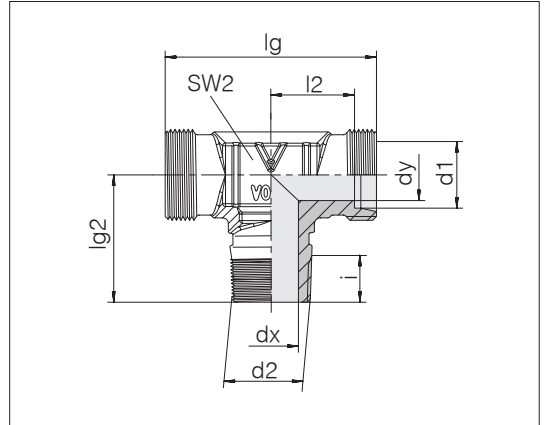
Series	d2	dx	dy	lg	lg2	l2	SW2	i	kg/100 ca.	Order-No.	Designation
L 6	M 10 x 1 keg	4	4	38	20	12	12	8	3.6	0728002000	24-SDT-L6-M10T-P
L 8	M 12 x 1.5 keg	6	6	42	26	14	14	12	5.5	0728052000	24-SDT-L8-M12T-P
L 10	M 14 x 1.5 keg	7	8	44	27	15	17	12	7.2	0728102000	24-SDT-L10-M14T-P
L 12	M 16 x 1.5 keg	9	10	48	28	17	19	12	9.8	0728152000	24-SDT-L12-M16T-P
L 15	M 18 x 1.5 keg	11	12	56	32	21	19	12	10.2	0728202000	24-SDT-L15-M18T
L 18	M 22 x 1.5 keg	14	15	62	36	23.5	24	14	14.1	0728252000	24-SDT-L18-M22T
S 6	M 12 x 1.5 keg	4	4	46	26	16	14	12	6.6	0728502000	24-SDT-S6-M12T-P
S 8	M 14 x 1.5 keg	5	5	48	27	17	17	12	9.2	0728552000	24-SDT-S8-M14T-P
S 10	M 16 x 1.5 keg	7	7	50	28	17.5	19	12	12.1	0728602000	24-SDT-S10-M16T-P
S 12	M 18 x 1.5 keg	8	8	58	28	21.5	22	12	16.7	0728652000	24-SDT-S12-M18T-P
S 14	M 20 x 1.5 keg	10	10	60	32	22	19	14	13.2	0728702000	24-SDT-S14-M20T
S 16	M 22 x 1.5 keg	12	12	66	32	24.5	24	14	16.1	0728752000	24-SDT-S16-M22T

Example for comp. :  
TE06LMX  
DIN 2353-ML6-St

# T male stud couplings

Male thread: BSPT thread, tapered  
DIN 3852-2 form C

Sealed by tapered thread



Series	d2	dx	dy	lg	lg2	l2	SW2	i	kg/100 ca.	Order-No.	Designation
Tube OD d1											
L 6	R 1/8	4	4	38	20	12	12	8	3.6	0730002000	24-SDT-L6-R1/8T-P •
L 8	R 1/4	6	6	42	26	14	14	12	5.8	0730052000	24-SDT-L8-R1/4T-P •
L 10	R 1/4	7	8	44	27	15	17	12	7.2	0730102000	24-SDT-L10-R1/4T-P •
L 12	R 1/4	7	9	48	28	17	19	12	10.2	0730162000	24-SDT-L12-R1/4T-P •
L 12	R 3/8	9	10	48	28	17	19	12	10.0	0730152000	24-SDT-L12-R3/8T-P •
L 15	R 1/2	11	12	56	34	21	19	14	11.6	0730202000	24-SDT-L15-R1/2T •
L 18	R 1/2	14	15	62	36	23.5	24	14	15.7	0730252000	24-SDT-L18-R1/2T •
S 6	R 1/4	4	4	46	26	16	14	12	7.1	0730502000	24-SDT-S6-R1/4T-P •
S 8	R 1/4	5	5	48	27	17	17	12	9.2	0730552000	24-SDT-S8-R1/4T-P •
S 10	R 3/8	7	7	50	28	17.5	19	12	12.1	0730602000	24-SDT-S10-R3/8T-P •
S 12	R 3/8	8	8	58	28	21.5	22	12	16.3	0730652000	24-SDT-S12-R3/8T-P •
S 14	R 1/2	10	10	60	32	22	19	14	13.8	0730702000	24-SDT-S14-R1/2T •
S 16	R 1/2	12	12	66	32	24.5	24	14	18.5	0730752000	24-SDT-S16-R1/2T •

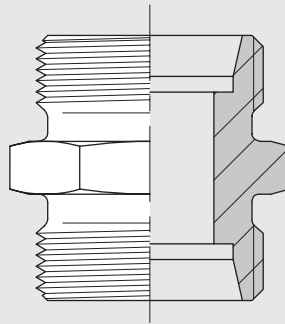
• Standard size

Example for comp. :  
TE06LRX  
DIN 2353-NL6-St



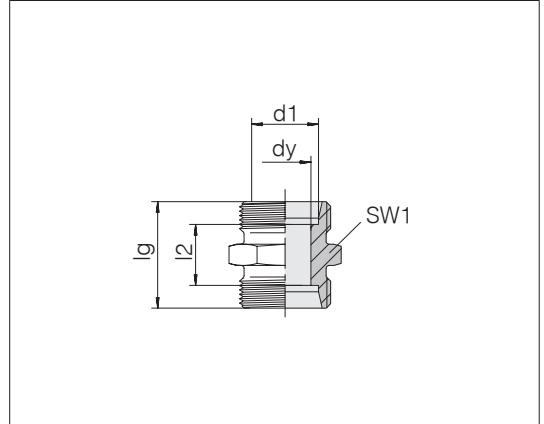


## Unions



# Straight unions

For tube to tube connection according to ISO 8434-1



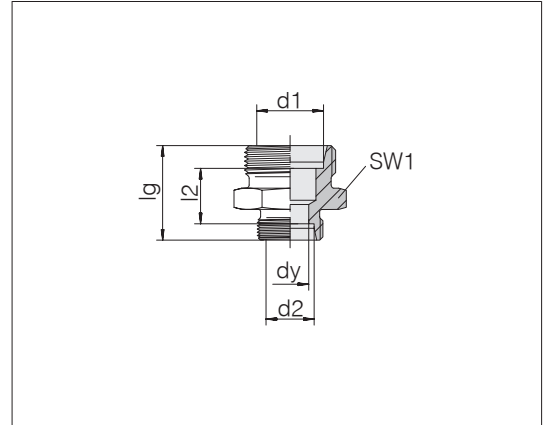
Series	Tube OD	$d_y$	$l_g$	$l_2$	SW1	kg/100 ca.	Order-No.	Designation
L	6	4	24	10	12	1.2	0712002000	24-S-L6
L	8	6	25	11	14	1.6	0712052000	24-S-L8
L	10	8	27	13	17	2.2	0712102000	24-S-L10
L	12	10	28	14	19	2.8	0712152000	24-S-L12
L	15	12	30	16	24	4.9	0712202000	24-S-L15
L	18	15	31	16	27	6.7	0712252000	24-S-L18
L	22	19	35	20	32	8.8	0712302000	24-S-L22
L	28	24	36	21	41	13.6	0712352000	24-S-L28
L	35	30	41	20	46	21.0	0712402000	24-S-L35
L	42	36	43	21	55	29.4	0712452000	24-S-L42
S	6	4	30	16	14	2.5	0712502000	24-S-S6
S	8	5	32	18	17	3.7	0712552000	24-S-S8
S	10	7	32	17	19	4.3	0712602000	24-S-S10
S	12	8	34	19	22	5.9	0712652000	24-S-S12
S	14	10	38	22	24	7.5	0712702000	24-S-S14
S	16	12	38	21	27	8.7	0712752000	24-S-S16
S	20	16	44	23	32	14.2	0712802000	24-S-S20
S	25	20	50	26	41	25.0	0712852000	24-S-S25
S	30	25	54	27	46	32.3	0712902000	24-S-S30
S	38	32	61	29	55	53.8	0712952000	24-S-S38

Example for comp. :  
G06LX  
ISO 8434-1-S-L6-St



## Straight reducing sleeve

For tube to tube connection according to ISO 8434-1

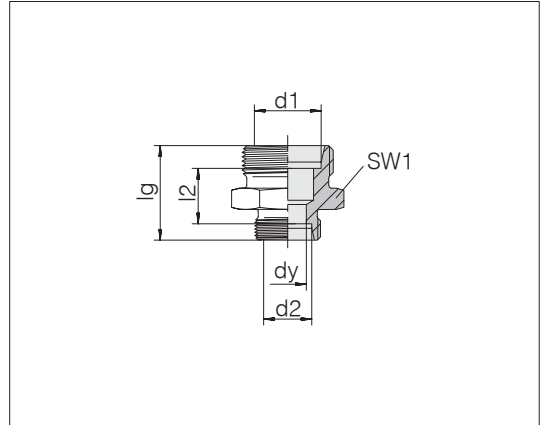


Series Tube OD d1	Series Tube OD d2	dy	lg	l2	SW1	kg/100 ca.	Order-No.	Designation
L 8	L 6	4	25	11	14	1.5	0712062000	24-S-L8-L6
L 10	L 6	4	26	12	17	2.0	0712122000	24-S-L10-L6
L 10	L 8	6	26	12	17	2.1	0712112000	24-S-L10-L8
L 12	L 6	4	27	13	19	2.5	0712182000	24-S-L12-L6
L 12	L 8	6	27	13	19	2.6	0712172000	24-S-L12-L8
L 12	L 10	8	28	14	19	2.7	0712162000	24-S-L12-L10
L 15	L 6	4	28	14	24	3.8	0712242000	24-S-L15-L6
L 15	L 8	6	28	14	24	4.0	0712232000	24-S-L15-L8
L 15	L 10	8	29	15	24	4.1	0712222000	24-S-L15-L10
L 15	L 12	10	29	15	24	4.2	0712212000	24-S-L15-L12
L 18	L 8	6	29	14.5	27	6.0	0712292000	24-S-L18-L8
L 18	L 10	8	30	15.5	27	5.6	0712282000	24-S-L18-L10
L 18	L 12	10	30	15.5	27	5.7	0712272000	24-S-L18-L12
L 18	L 15	12	31	16.5	27	6.1	0712262000	24-S-L18-L15
L 22	L 10	8	32	17.5	32	7.5	0712342000	24-S-L22-L10
L 22	L 12	10	32	17.5	32	7.6	0712332000	24-S-L22-L12
L 22	L 15	12	33	18.5	32	8.1	0712322000	24-S-L22-L15
L 22	L 18	15	33	18	32	8.6	0712312000	24-S-L22-L18
L 28	L 10	8	33	18.5	41	12.2	0711822000	24-S-L28-L10
L 28	L 15	12	34	19.5	41	12.2	0712382000	24-S-L28-L15
L 28	L 18	15	34	19	41	12.3	0712372000	24-S-L28-L18
L 28	L 22	19	36	21	41	13.2	0712362000	24-S-L28-L22
L 35	L 22	19	39	21	46	19.0	0712422000	24-S-L35-L22
L 35	L 28	24	39	21	46	19.0	0712412000	24-S-L35-L28
L 42	L 28	24	41	22.5	55	26.8	0712472000	24-S-L42-L28
L 42	L 35	30	43	21.5	55	29.3	0712462000	24-S-L42-L35

Continued on following page

# Straight reducing sleeve

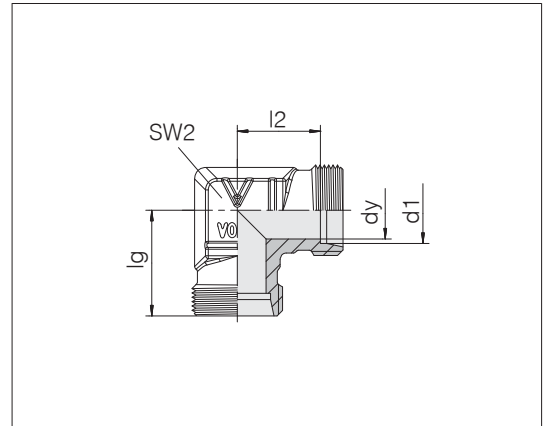
For tube to tube connection according to ISO 8434-1



Series Tube OD d1	Series Tube OD d2	dy	lg	l2	SW1	kg/100 ca.	Order-No.	Designation
S 8	S 6	4	32	18	17	3.4	0712562000	24-S-S8-S6
S 10	S 6	4	32	17.5	19	4.0	0712622000	24-S-S10-S6
S 10	S 8	5	32	17.5	19	4.2	0712612000	24-S-S10-S8
S 12	S 6	4	34	19.5	22	5.4	0712682000	24-S-S12-S6
S 12	S 8	5	34	19.5	22	5.6	0712672000	24-S-S12-S8
S 12	S 10	7	34	19	22	5.8	0712662000	24-S-S12-S10
S 14	S 10	7	36	20.5	24	6.9	0712722000	24-S-S14-S10
S 14	S 12	8	36	20.5	24	7.0	0712712000	24-S-S14-S12
S 16	L 12	10	35	19.5	27	7.7	0711982000	24-S-S16-L12
S 16	L 15	12	36	20.5	27	7.9	0799632000	24-S-S16-L15
S 16	S 8	5	36	20.5	27	7.8	0712792000	24-S-S16-S8
S 16	S 10	7	36	20	27	7.9	0712782000	24-S-S16-S10
S 16	S 12	8	36	20	27	8.0	0712772000	24-S-S16-S12
S 16	S 14	10	38	21.5	27	8.7	0712762000	24-S-S16-S14
S 20	L 15	12	40	22.5	32	13.9	0796222000	24-S-S20-L15
S 20	S 10	7	40	22	32	12.2	0712842000	24-S-S20-S10
S 20	S 12	8	40	22	32	12.5	0712832000	24-S-S20-S12
S 20	S 14	10	42	23.5	32	12.9	0712822000	24-S-S20-S14
S 20	S 16	12	42	23	32	12.9	0712812000	24-S-S20-S16
S 25	S 16	12	46	25.5	41	22.0	0712872000	24-S-S25-S16
S 25	S 20	16	48	25.5	41	23.2	0712862000	24-S-S25-S20
S 30	S 20	16	50	26	46	29.4	0712922000	24-S-S30-S20
S 30	S 25	20	52	26.5	46	31.1	0712912000	24-S-S30-S25
S 38	S 25	20	57	29	55	48.2	0712972000	24-S-S38-S25
S 38	S 30	25	59	29.5	55	48.8	0712962000	24-S-S38-S30

## Union elbows

For tube to tube connection according to ISO 8434-1

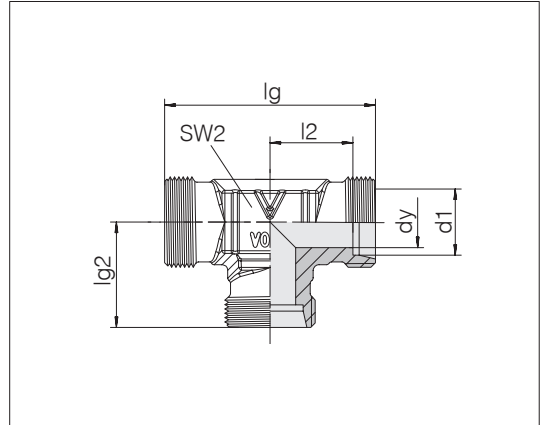


Series	Tube OD	dy	lg	l2	SW2	kg/100 ca.	Order-No.	Designation
L	6	4	19	12	12	2.8	0720002000	24-E-L6-P
L	8	6	21	14	14	4.1	0720052000	24-E-L8-P
L	10	8	22	15	17	5.6	0720102000	24-E-L10-P
L	12	10	24	17	19	7.7	0720152000	24-E-L12-P
L	15	12	28	21	19	7.4	0720202000	24-E-L15
L	18	15	31	23.5	24	11.9	0720252000	24-E-L18
L	22	19	35	27.5	27	15.2	0720302000	24-E-L22
L	28	24	38	30.5	36	25.1	0720352000	24-E-L28
L	35	30	45	34.5	41	43.1	0720402000	24-E-L35
L	42	36	51	40	50	78.2	0720452000	24-E-L42
S	6	4	23	16	14	5.1	0720502000	24-E-S6-P
S	8	5	24	17	17	7.2	0720552000	24-E-S8-P
S	10	7	25	17.5	19	9.8	0720602000	24-E-S10-P
S	12	8	29	21.5	22	14.4	0720652000	24-E-S12-P
S	14	10	30	22	19	10.4	0720702000	24-E-S14
S	16	12	33	24.5	24	12.7	0720752000	24-E-S16
S	20	16	37	26.5	27	20.5	0720802000	24-E-S20
S	25	20	42	30	36	34.9	0720852000	24-E-S25
S	30	25	49	35.5	41	58.8	0720902000	24-E-S30
S	38	32	57	41	50	103.1	0720952000	24-E-S38

Example for comp. :  
W06LX  
ISO 8434-1-E-L6-St

# Union tees

Three sided tube connection according to ISO 8434-1



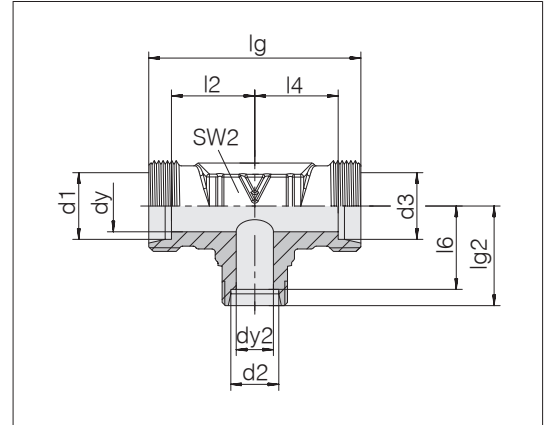
Series	dy	lg	lg2	l2	SW2	kg/100 ca.	Order-No.	Designation
Tube OD d1								
L 6	4	38	19	12	12	3.5	0734002000	24-T-L6-P
L 8	6	42	21	14	14	5.1	0734052000	24-T-L8-P
L 10	8	44	22	15	17	6.7	0734102000	24-T-L10-P
L 12	10	48	24	17	19	9.1	0734152000	24-T-L12-P
L 15	12	56	28	21	19	10.0	0734202000	24-T-L15
L 18	15	62	31	23.5	24	15.0	0734252000	24-T-L18
L 22	19	70	35	27.5	27	18.6	0734302000	24-T-L22
L 28	24	76	38	30.5	36	29.9	0734352000	24-T-L28
L 35	30	90	45	34.5	41	52.3	0734402000	24-T-L35
L 42	36	102	51	40	50	91.5	0734452000	24-T-L42
S 6	4	46	23	16	14	6.7	0734502000	24-T-S6-P
S 8	5	48	24	17	17	9.1	0734552000	24-T-S8-P
S 10	7	50	25	17.5	19	11.5	0734602000	24-T-S10-P
S 12	8	58	29	21.5	22	17.3	0734652000	24-T-S12-P
S 14	10	60	30	22	19	13.1	0734702000	24-T-S14
S 16	12	66	33	24.5	24	16.5	0734752000	24-T-S16
S 20	16	74	37	26.5	27	26.0	0734802000	24-T-S20
S 25	20	84	42	30	36	43.6	0734852000	24-T-S25
S 30	25	98	49	35.5	41	71.5	0734902000	24-T-S30
S 38	32	114	57	41	50	125.8	0734952000	24-T-S38

Example for comp. :  
T06LX  
ISO 8434-1-T-L6-St



## T reducing couplings

Three sided tube connection according to ISO 8434-1

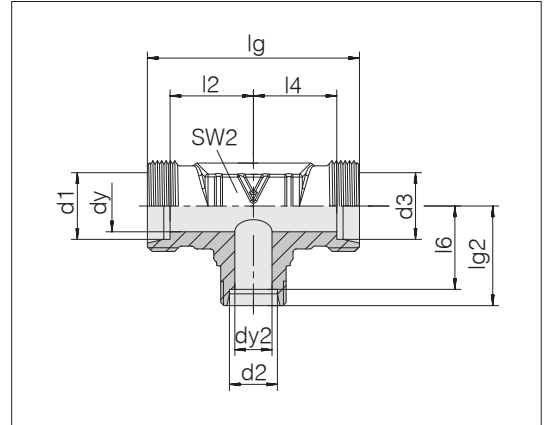


Series	d2	d3	dy	dy2	lg	lg2	l2	l4	l6	SW2	kg/100 ca.	Order-No.	Designation	
L	6	8	6	4	6	42	21	14	14	14	5.1	0799772000	24-T-L6-L8-L6-P	
L	6	10	6	4	8	44	22	15	15	15	6.6	0799562000	24-T-L6-L10-L6-P	
L	8	6	8	6	4	42	21	14	14	14	5.2	0734062000	24-T-L8-L6-L8-P	
L	8	8	6	4	6	42	21	14	14	14	5.0	0799592000	24-T-L8-L8-L6-P	
L	8	10	8	6	8	44	22	15	15	15	6.9	0799762000	24-T-L8-L10-L8-P	
L	8	12	8	6	10	48	24	17	17	17	9.7	0799512000	24-T-L8-L12-L8-P	
L	10	6	10	8	4	44	22	15	15	15	6.6	0734122000	24-T-L10-L6-L10-P	
L	10	6	6	4	4	44	22	15	15	15	6.5	0799572000	24-T-L10-L6-L6-P	
L	10	8	10	8	6	44	22	15	15	15	6.7	0734112000	24-T-L10-L8-L10-P	
L	10	10	6	4	8	44	22	15	15	15	6.5	0733542000	24-T-L10-L10-L6-P	
L	10	12	10	8	10	48	24	17	17	17	8.9	0799522000	24-T-L10-L12-L10-P	
L	10	15	10	8	11	56	28	21	21	21	10.5	0799462000	24-T-L10-L15-L10	
L	12	6	12	10	4	48	24	17	17	17	9.4	0734182000	24-T-L12-L6-L12-P	
L	12	8	12	10	6	48	24	17	17	17	9.3	0734172000	24-T-L12-L8-L12-P	
L	12	8	8	6	6	48	24	17	17	17	9.3	0799932000	24-T-L12-L8-L8-P	
L	12	10	10	8	8	48	24	17	17	17	9.2	0797322000	24-T-L12-L10-L10-P	
L	12	10	12	10	8	48	24	17	17	17	9.0	0734162000	24-T-L12-L10-L12-P	
L	12	12	10	8	10	48	24	17	17	17	9.1	0799552000	24-T-L12-L12-L10-P	
L	12	12	8	6	10	48	24	17	17	17	9.2	0799542000	24-T-L12-L12-L8-P	
L	12	15	12	10	12	56	28	21	21	21	9.9	0799472000	24-T-L12-L15-L12	
L	12	18	12	10	15	62	31	24	24	23.5	24	15.5	0799382000	24-T-L12-L18-L12
L	12	22	12	10	19	70	35	28	28	27.5	27	23.5	0796532000	24-T-L12-L22-L12
L	15	6	15	12	4	56	28	21	21	21	19	10.2	0734242000	24-T-L15-L6-L15
L	15	8	15	12	6	56	28	21	21	21	19	10.2	0734232000	24-T-L15-L8-L15
L	15	10	10	8	8	56	28	21	21	21	19	9.9	0799492000	24-T-L15-L10-L10
L	15	10	15	12	8	56	28	21	21	21	19	9.8	0734222000	24-T-L15-L10-L15
L	15	12	12	10	10	56	28	21	21	21	19	9.9	0797612000	24-T-L15-L12-L12
L	15	12	15	12	10	56	28	21	21	21	19	9.9	0734212000	24-T-L15-L12-L15
L	15	15	10	8	12	56	28	21	21	21	19	10.0	0799942000	24-T-L15-L15-L10
L	15	15	12	10	12	56	28	21	21	21	19	9.9	0797732000	24-T-L15-L15-L12
L	15	18	15	12	15	62	31	24	24	24	19.3	0799952000	24-T-L15-L18-L15	



# T reducing couplings

Three sided tube connection according to ISO 8434-1



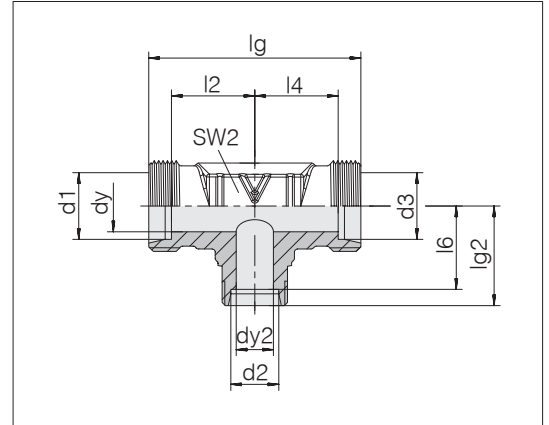
Series	d2	d3	dy	dy2	lg	lg2	l2	l4	l6	SW2	kg/100 ca.	Order-No.	Designation
Tube OD d1													
L 15	22	15	12	19	70	35	28	28	27.5	27	22.6	0799972000	24-T-L15-L22-L15
L 18	8	18	15	6	62	31	23.5	23.5	24	24	19.0	0734292000	24-T-L18-L8-L18
L 18	10	10	8	8	62	31	23.5	23.5	24	24	15.2	0799402000	24-T-L18-L10-L10
L 18	10	18	15	8	62	31	23.5	23.5	24	24	15.4	0734282000	24-T-L18-L10-L18
L 18	12	18	15	10	62	31	23.5	23.5	24	24	15.1	0734272000	24-T-L18-L12-L18
L 18	15	15	12	12	62	31	23.5	23.5	24	24	18.9	0799412000	24-T-L18-L15-L15
L 18	15	18	15	12	62	31	23.5	23.5	24	24	15.4	0734262000	24-T-L18-L15-L18
L 18	18	10	8	15	62	31	23.5	23.5	23.5	24	15.1	0799422000	24-T-L18-L18-L10
L 18	18	15	12	15	62	31	23.5	23.5	23.5	24	18.9	0799442000	24-T-L18-L18-L15
L 18	22	15	12	19	70	35	27.5	27.5	27.5	27	23.3	0799742000	24-T-L18-L22-L15
L 18	22	18	15	19	70	35	27.5	27.5	27.5	27	22.2	0799962000	24-T-L18-L22-L18
L 22	10	22	19	8	70	35	27.5	27.5	28	27	20.4	0734342000	24-T-L22-L10-L22
L 22	12	22	19	10	70	35	27.5	27.5	28	27	19.7	0734332000	24-T-L22-L12-L22
L 22	15	15	12	12	70	35	28	27.5	28	27	21.2	0799362000	24-T-L22-L15-L15
L 22	15	22	19	12	70	35	27.5	27.5	28	27	19.9	0734322000	24-T-L22-L15-L22
L 22	18	18	15	15	70	35	27.5	27.5	27.5	27	21.2	0733562000	24-T-L22-L18-L18
L 22	18	22	19	15	70	35	27.5	27.5	27.5	27	20.5	0734312000	24-T-L22-L18-L22
L 22	22	18	15	19	70	35	27.5	27.5	27.5	27	19.8	0733652000	24-T-L22-L22-L18
L 22	28	22	19	24	76	38	30.5	30.5	30.5	36	36.4	0796512000	24-T-L22-L28-L22
L 28	10	28	24	8	76	38	30.5	30.5	31	36	31.8	0799312000	24-T-L28-L10-L28
L 28	12	28	24	10	76	38	30.5	30.5	31	36	32.1	0734392000	24-T-L28-L12-L28
L 28	15	28	24	12	76	38	30.5	30.5	31	36	32.3	0734382000	24-T-L28-L15-L28
L 28	18	28	24	15	76	38	30.5	30.5	30.5	36	31.7	0734372000	24-T-L28-L18-L28
L 28	22	22	19	19	76	38	30.5	30.5	30.5	36	32.3	0796352000	24-T-L28-L22-L22
L 28	22	28	24	19	76	38	30.5	30.5	30.5	36	30.0	0734362000	24-T-L28-L22-L28
L 28	35	28	24	30	90	45	37.5	37.5	34.5	41	61.8	1734082000	24-T-L28-L35-L28
L 28	42	28	24	36	102	51	43.5	43.5	40	50	112.0	1734102000	24-T-L28-L42-L28
L 35	18	35	30	15	90	45	34.5	34.5	37.5	41	60.0	0734432000	24-T-L35-L18-L35
L 35	28	28	24	24	90	45	34.5	37.5	37.5	41	59.0	1734042000	24-T-L35-L28-L28
L 35	28	35	30	24	90	45	34.5	34.5	37.5	41	54.0	0734412000	24-T-L35-L28-L35
L 35	42	35	30	36	102	51	40.5	40.5	40	50	106.0	1734092000	24-T-L35-L42-L35

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## T reducing couplings

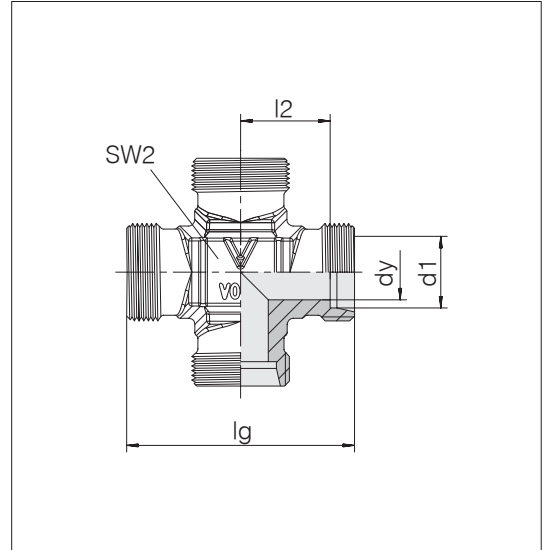
Three sided tube connection according to ISO 8434-1



Series	d2	d3	dy	dy2	lg	lg2	l2	l4	l6	SW2	kg/100 ca.	Order-No.	Designation	
L	42	18	42	36	15	102	51	40	40	43.5	50	92.2	0734492000	24-T-L42-L18-L42
L	42	22	42	36	19	102	51	40	40	43.5	50	101.6	0734482000	24-T-L42-L22-L42
L	42	28	42	36	24	102	51	40	40	43.5	50	97.4	0734472000	24-T-L42-L28-L42
S	10	6	10	7	4	50	25	17.5	17.5	18	19	11.7	0734622000	24-T-S10-S6-S10-P
S	12	8	12	8	5	58	29	21.5	21.5	22	22	17.5	0734672000	24-T-S12-S8-S12-P
S	12	8	8	5	5	58	29	21.5	21.5	22	22	16.9	0799302000	24-T-S12-S8-S8-P
S	12	10	12	8	7	58	29	21.5	21.5	21.5	22	17.6	0734662000	24-T-S12-S10-S12-P
S	12	16	12	8	12	66	33	24.5	24.5	24.5	24	17.7	0797822000	24-T-S12-S16-S12
S	16	6	16	12	4	66	33	24.5	24.5	26	24	16.8	0799292000	24-T-S16-S6-S16
S	16	8	16	12	5	66	33	24.5	24.5	26	24	17.1	0734792000	24-T-S16-S8-S16
S	16	10	16	12	7	66	33	24.5	24.5	25.5	24	17.1	0734782000	24-T-S16-S10-S16
S	16	12	16	12	8	66	33	24.5	24.5	25.5	24	16.9	0734772000	24-T-S16-S12-S16
S	16	20	16	12	16	74	37	28.5	28.5	26.5	27	26.7	0799222000	24-T-S16-S20-S16
S	20	10	20	16	7	74	37	26.5	26.5	29.5	27	26.4	0734842000	24-T-S20-S10-S20
S	20	12	20	16	8	74	37	26.5	26.5	29.5	27	26.5	0734832000	24-T-S20-S12-S20
S	20	16	16	12	12	74	37	26.5	28.5	28.5	27	25.3	0795972000	24-T-S20-S16-S16
S	20	16	20	16	12	74	37	26.5	26.5	28.5	27	25.9	0734812000	24-T-S20-S16-S20
S	20	25	20	16	20	84	42	31.5	31.5	30	36	45.3	0797452000	24-T-S20-S25-S20
S	25	12	25	20	8	84	42	30	30	34.5	36	44.8	0734892000	24-T-S25-S12-S25
S	25	16	25	20	12	84	42	30	30	33.5	36	44.5	0734872000	24-T-S25-S16-S25
S	25	18	25	20	15	84	42	30	30	34.5	36	46.6	1796912000	24-T-S25-L18-S25
S	25	20	25	20	16	84	42	30	30	31.5	36	43.4	0734862000	24-T-S25-S20-S25
S	25	25	20	16	20	84	42	30	31.5	30	36	47.4	0733572000	24-T-S25-S25-S20
S	25	30	25	20	25	98	49	37	37	35.5	41	77.8	0733982000	24-T-S25-S30-S25
S	30	16	30	25	12	98	49	35.5	35.5	40.5	41	79.0	0734932000	24-T-S30-S16-S30
S	30	20	30	25	16	98	49	35.5	35.5	38.5	41	71.0	0734922000	24-T-S30-S20-S30
S	38	16	38	32	12	114	57	41	41	48.5	50	120.4	0734992000	24-T-S38-S16-S38
S	38	25	38	32	20	114	57	41	41	45	50	118.3	0734972000	24-T-S38-S25-S38
S	38	38	25	20	32	114	57	41	45	41	50	134.1	0733482000	24-T-S38-S38-S25

# Cross couplings

Four sided tube connection according to ISO 8434-1

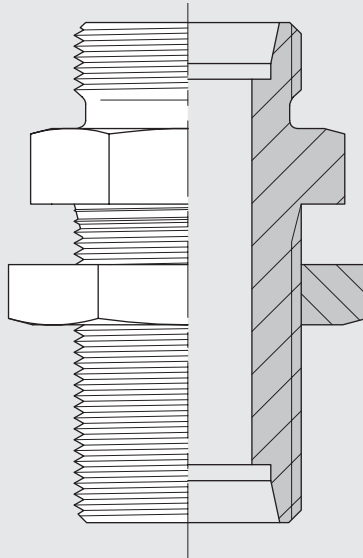


Series	Tube OD	dy	lg	l2	SW2	kg/100 ca.	Order-No.	Designation
L	6	4	38	12	12	3.9	0736002000	24-K-L6
L	8	6	42	14	12	4.6	0736052000	24-K-L8
L	10	8	44	15	14	5.2	0736102000	24-K-L10
L	12	10	48	17	17	8.2	0736152000	24-K-L12
L	15	12	56	21	19	12.7	0736202000	24-K-L15
L	18	15	62	23.5	24	18.8	0736252000	24-K-L18
L	22	19	70	27.5	27	21.0	0736302000	24-K-L22
L	28	24	76	30.5	36	34.6	0736352000	24-K-L28
L	35	30	90	34.5	41	62.3	0736402000	24-K-L35
L	42	36	102	40	50	94.5	0736452000	24-K-L42
S	6	4	46	16	12	6.6	0736502000	24-K-S6
S	8	5	48	17	14	8.1	0736552000	24-K-S8
S	10	7	50	17.5	17	10.7	0736602000	24-K-S10
S	12	8	58	21.5	17	14.9	0736652000	24-K-S12
S	14	10	60	22	19	15.8	0736702000	24-K-S14
S	16	12	66	24.5	24	23.3	0736752000	24-K-S16
S	20	16	74	26.5	27	29.4	0736802000	24-K-S20
S	25	20	84	30	36	51.9	0736852000	24-K-S25
S	30	25	98	35.5	41	89.0	0736902000	24-K-S30
S	38	32	114	41	50	140.3	0736952000	24-K-S38

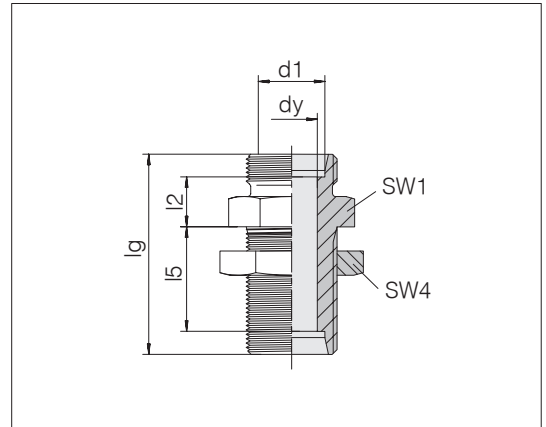
Example for comp. :  
K06LX  
ISO 8434-1-K-L6-St



## Bulkhead connectors



## Straight bulkhead connectors

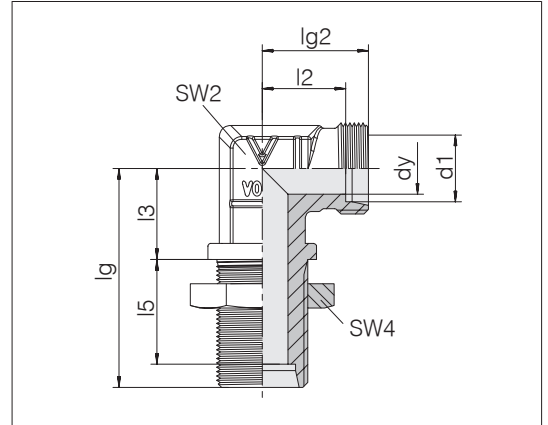


Series	dy	lg	l2	l5	SW1	SW4	kg/100 ca.	Order-No.	Designation
Tube OD d1									
L 6	4	48	7	27	17	17	3.8	0137002066	24-BHSLN-L6
L 8	6	49	8	27	19	19	4.9	0137052066	24-BHSLN-L8
L 10	8	52	10	28	22	22	6.6	0137102066	24-BHSLN-L10
L 12	10	53	10	29	24	24	7.6	0137152066	24-BHSLN-L12
L 15	12	57	12	31	27	30	12.8	0137202066	24-BHSLN-L15
L 18	15	61	13.5	32.5	32	36	19.9	0137252066	24-BHSLN-L18
L 22	19	66	16.5	34.5	36	41	24.8	0137302066	24-BHSLN-L22
L 28	24	69	18.5	35.5	41	46	33.8	0137352066	24-BHSLN-L28
L 35	30	76	18.5	36.5	50	55	53.9	0137402066	24-BHSLN-L35
L 42	36	77	19	36	60	65	75.6	0137452066	24-BHSLN-L42
S 6	4	55	12	29	19	19	6.5	0137502066	24-BHSLN-S6
S 8	5	56	13	29	22	22	8.7	0137552066	24-BHSLN-S8
S 10	7	59	14.5	29.5	24	24	11.0	0137602066	24-BHSLN-S10
S 12	8	60	14.5	30.5	27	27	13.9	0137652066	24-BHSLN-S12
S 14	10	65	17	32	30	30	17.8	0137702066	24-BHSLN-S14
S 16	12	65	16.5	31.5	32	32	19.7	0137752066	24-BHSLN-S16
S 20	16	72	17.5	33.5	41	41	34.5	0137802066	24-BHSLN-S20
S 25	20	79	20	35	46	46	49.2	0137852066	24-BHSLN-S25
S 30	25	86	21.5	37.5	50	50	61.7	0137902066	24-BHSLN-S30
S 38	32	91	22	37	65	65	108.0	0137952066	24-BHSLN-S38

Bulkhead material thickness  
max. 16 mm.

Example for comp. :  
SV06LOMD  
ISO 8434-1-BHSLN-L6-St

## Elbow bulkhead connectors



Series	Tube OD	d1	dy	lg	lg2	l2	l3	l5	SW2	SW4	kg/100 ca.	Order-No.	Designation
L	6	4	48	19	12	14	27	12	17	4.9	0138002066	24-BHELN-L6	
L	8	6	51	21	14	17	27	12	19	6.1	0138052066	24-BHELN-L8	
L	10	8	53	22	15	18	28	14	22	7.9	0138102066	24-BHELN-L10	
L	12	10	56	24	17	20	29	17	24	9.6	0138152066	24-BHELN-L12	
L	15	12	61	28	21	23	31	19	30	16.9	0138202066	24-BHELN-L15	
L	18	15	64	31	23.5	24	32.5	24	36	25.5	0138252066	24-BHELN-L18	
L	22	19	72	35	27.5	30	34.5	27	41	31.8	0138302066	24-BHELN-L22	
L	28	24	77	38	30.5	34	35.5	36	46	46.2	0138352066	24-BHELN-L28	
L	35	30	86	45	34.5	39	36.5	41	55	76.9	0138402066	24-BHELN-L35	
L	42	36	90	51	40	43	36	50	65	112.3	0138452066	24-BHELN-L42	
S	6	4	53	23	16	17	29	12	19	7.6	0138502066	24-BHELN-S6	
S	8	5	54	24	17	18	29	14	22	10.2	0138552066	24-BHELN-S8	
S	10	7	57	25	17.5	20	29.5	17	24	12.4	0138602066	24-BHELN-S10	
S	12	8	59	29	21.5	21	30.5	17	27	16.0	0138652066	24-BHELN-S12	
S	14	10	63	30	22	23	32	19	30	19.6	0138702066	24-BHELN-S14	
S	16	12	64	33	24.5	24	31.5	24	32	23.8	0138752066	24-BHELN-S16	
S	20	16	74	37	26.5	30	33.5	27	41	39.9	0138802066	24-BHELN-S20	
S	25	20	81	42	30	34	35	36	46	60.9	0138852066	24-BHELN-S25	
S	30	25	90	49	35.5	39	37.5	41	50	93.2	0138902066	24-BHELN-S30	
S	38	32	96	57	41	43	37	50	65	144.9	0138952066	24-BHELN-S38	

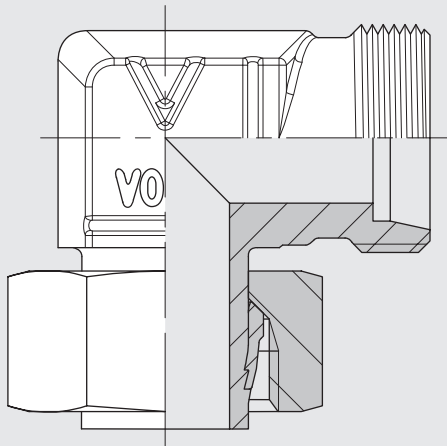
Bulkhead material thickness  
max. 16 mm.

Example for comp. :  
WSV06LOMD  
ISO 8434-1-BHELN-L6-St



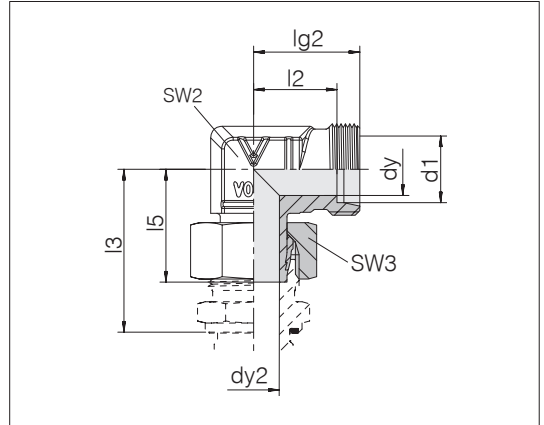


## Adjustable couplings with tube socket



# Swivel elbows

Tube socket pre-assembled



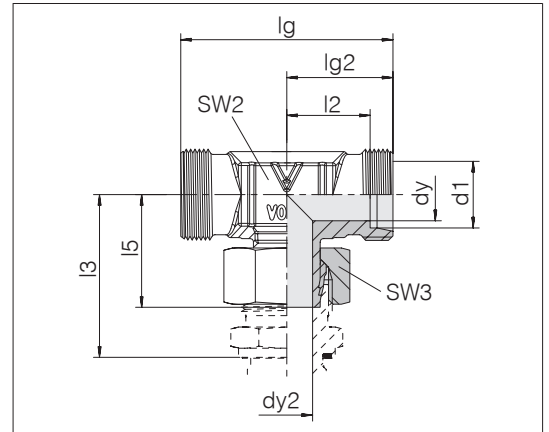
Series	dy	lg2	l2	l5	SW2	SW3	kg/100 ca.	Order-No.	Designation
Tube OD d1									
L 6	4	19	12	26	12	14	2.8	0158032007	24-SWE-L6
L 8	6	21	14	27.5	12	17	3.8	0158082007	24-SWE-L8
L 10	8	22	15	29	14	19	5.0	0158132007	24-SWE-L10
L 12	10	24	17	29.5	17	22	6.6	0158182007	24-SWE-L12
L 15	12	28	21	32.5	19	27	11.5	0158232007	24-SWE-L15
L 18	15	31	23.5	35.5	24	32	17.8	0158282007	24-SWE-L18
L 22	19	35	27.5	38.5	27	36	23.5	0158332007	24-SWE-L22
L 28	24	38	30.5	41.5	36	41	34.1	0158382007	24-SWE-L28
L 35	30	45	34.5	51	41	50	57.7	0158432007	24-SWE-L35
L 42	36	51	40	56	50	60	87.2	0158482007	24-SWE-L42
S 6	4	23	16	27	12	17	4.4	0158532007	24-SWE-S6
S 8	5	24	17	27.5	14	19	5.9	0158582007	24-SWE-S8
S 10	7	25	17.5	30	17	22	8.3	0158632007	24-SWE-S10
S 12	8	29	21.5	31	17	24	10.5	0158682007	24-SWE-S12
S 14	10	30	22	35	19	27	14.6	0158732007	24-SWE-S14
S 16	12	33	24.5	36.5	24	30	19.9	0158782007	24-SWE-S16
S 20	16	37	26.5	44.5	27	36	29.4	0158832007	24-SWE-S20
S 25	20	42	30	50	36	46	54.1	0158882007	24-SWE-S25
S 30	25	49	35.5	55	41	50	76.2	0158932007	24-SWE-S30
S 38	32	57	41	63	50	60	118.9	0158982007	24-SWE-S38

Example for comp. :  
EWW06LOMD



## Swivel T-connectors

Tube socket pre-assembled

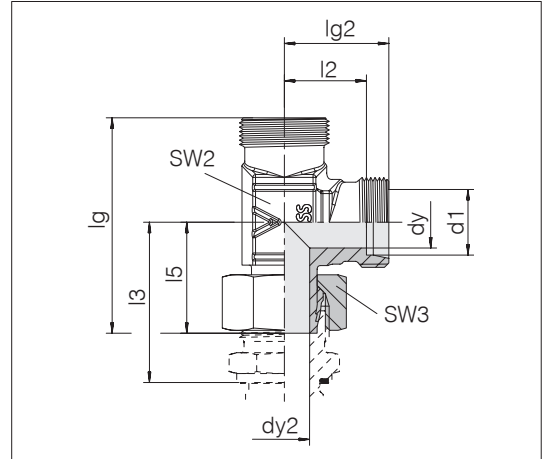


Series	dy	lg	lg2	l2	l5	SW2	SW3	kg/100 ca.	Order-No.	Designation
Tube OD										
d1										
L 6	4	38	19	12	26	12	14	3.8	0160032007	24-SWT-L6
L 8	6	42	21	14	27.5	12	17	4.8	0160082007	24-SWT-L8
L 10	8	44	22	15	29	14	19	6.0	0160132007	24-SWT-L10
L 12	10	48	24	17	29.5	17	22	7.9	0160182007	24-SWT-L12
L 15	12	56	28	21	32.5	19	27	14.2	0160232007	24-SWT-L15
L 18	15	62	31	23.5	35.5	24	32	21.1	0160282007	24-SWT-L18
L 22	19	70	35	27.5	38.5	27	36	27.8	0160332007	24-SWT-L22
L 28	24	76	38	30.5	41.5	36	41	38.6	0160382007	24-SWT-L28
L 35	30	90	45	34.5	51	41	50	66.0	0160432007	24-SWT-L35
L 42	36	102	51	40	56	50	60	101.8	0160482007	24-SWT-L42
S 6	4	46	23	16	27	12	17	5.8	0160532007	24-SWT-S6
S 8	5	48	24	17	27.5	14	19	7.6	0160582007	24-SWT-S8
S 10	7	50	25	17.5	30	17	22	10.3	0160632007	24-SWT-S10
S 12	8	58	29	21.5	31	17	24	13.5	0160682007	24-SWT-S12
S 14	10	60	30	22	35	19	27	17.9	0160732007	24-SWT-S14
S 16	12	66	33	24.5	36.5	24	30	24.1	0160782007	24-SWT-S16
S 20	16	74	37	26.5	44.5	27	36	34.8	0160832007	24-SWT-S20
S 25	20	84	42	30	50	36	46	63.0	0160882007	24-SWT-S25
S 30	25	98	49	35.5	55	41	50	90.8	0160932007	24-SWT-S30
S 38	32	114	57	41	63	50	60	141.7	0160982007	24-SWT-S38

Example for comp. :  
EVT06LOMD

# Swivel L-connectors

Tube socket pre-assembled



Series	dy	lg	lg2	l2	l5	SW2	SW3	kg/100 ca.	Order-No.	Designation
Tube OD										
d1										
L 6	4	45	19	12	26	12	14	3.4	0162032007	24-SWL-L6
L 8	6	48.5	21	14	27.5	12	17	4.7	0162082007	24-SWL-L8
L 10	8	51	22	15	29	14	19	6.0	0162132007	24-SWL-L10
L 12	10	53.5	24	17	29.5	17	22	7.9	0162182007	24-SWL-L12
L 15	12	60.5	28	21	32.5	19	27	13.7	0162232007	24-SWL-L15
L 18	15	66.5	31	23.5	35.5	24	32	20.8	0162282007	24-SWL-L18
L 22	19	73.5	35	27.5	38.5	27	36	27.2	0162332007	24-SWL-L22
L 28	24	79.5	38	30.5	41.5	36	41	39.1	0162382007	24-SWL-L28
L 35	30	96	45	34.5	51	41	50	66.1	0162432007	24-SWL-L35
L 42	36	107	51	40	56	50	60	100.6	0162482007	24-SWL-L42
S 6	4	50	23	16	27	12	17	5.6	0162532007	24-SWL-S6
S 8	5	51.5	24	17	27.5	14	19	7.8	0162582007	24-SWL-S8
S 10	7	55	25	17.5	30	17	22	10.3	0162632007	24-SWL-S10
S 12	8	60	29	21.5	31	17	24	13.4	0162682007	24-SWL-S12
S 14	10	65	30	22	35	19	27	17.7	0162732007	24-SWL-S14
S 16	12	69.5	33	24.5	36.5	24	30	22.5	0162782007	24-SWL-S16
S 20	16	81.5	37	26.5	44.5	27	36	34.8	0162832007	24-SWL-S20
S 25	20	92	42	30	50	36	46	63.5	0162882007	24-SWL-S25
S 30	25	104	49	35.5	55	41	50	91.4	0162932007	24-SWL-S30
S 38	32	120	57	41	63	50	60	141.7	0162982007	24-SWL-S38

Example for comp. :  
EVL06LOMD

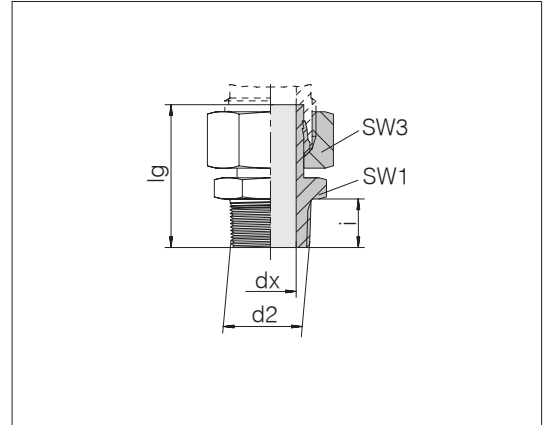


## Straight stud standpipe adapters

Male thread: NPT  
ANSI/ASME B 1 - 20.01.2013

Sealed by tapered thread

Tube socket pre-assembled



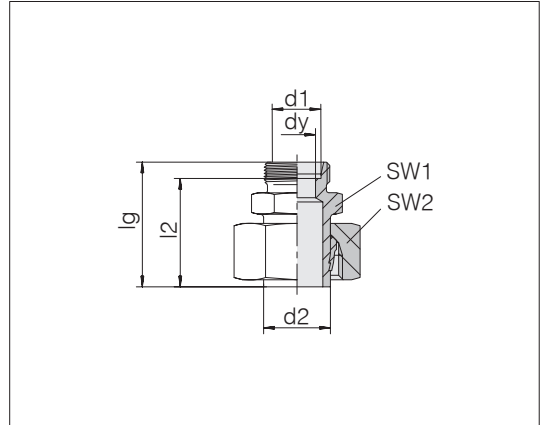
Series	d2	dx	lg	SW1	SW3	i	kg/100 ca.	Order-No.	Designation
L 6	1/8 NPT	3.5	33	11	14	9.9	2.2	0172802007	24-SWSDS-L6-N1/8T
L 8	1/4 NPT	5	39.6	14	17	15.1	3.5	0172812007	24-SWSDS-L8-N1/4T
L 10	1/4 NPT	7	40.6	14	19	15.1	4.2	0172822007	24-SWSDS-L10-N1/4T
L 12	3/8 NPT	7	43	19	22	15.2	7.2	0172832007	24-SWSDS-L12-N3/8T
L 15	1/2 NPT	11	48.5	22	27	19.8	11.0	0172842007	24-SWSDS-L15-N1/2T
L 18	1/2 NPT	13	48	22	32	19.8	13.0	0172852007	24-SWSDS-L18-N1/2T
L 22	3/4 NPT	17	50	27	36	20.1	18.2	0172862007	24-SWSDS-L22-N3/4T
L 28	1 NPT	22.5	57	36	41	25	25.9	0172872007	24-SWSDS-L28-N1T
L 35	1 1/4 NPT	29	65	46	50	25.6	42.8	0172882007	24-SWSDS-L35-N11/4T
L 42	1 1/2 NPT	35	69	50	60	26	57.5	0172892007	24-SWSDS-L42-N11/2T
S 6	1/4 NPT	3.5	40	14	17	15.1	4.3	0172902007	24-SWSDS-S6-N1/4T
S 8	1/4 NPT	4.5	42	14	19	15.1	4.9	0172912007	24-SWSDS-S8-N1/4T
S 10	3/8 NPT	6	44	19	22	15.2	8.0	0172922007	24-SWSDS-S10-N3/8T
S 12	3/8 NPT	7	46	19	24	15.2	8.6	0172932007	24-SWSDS-S12-N3/8T
S 14	1/2 NPT	9	53	22	27	19.8	13.8	0172942007	24-SWSDS-S14-N1/2T
S 16	1/2 NPT	11	52.8	22	30	19.8	14.7	0172952007	24-SWSDS-S16-N1/2T
S 20	3/4 NPT	15	60	27	36	20.1	23.9	0172962007	24-SWSDS-S20-N3/4T
S 25	1 NPT	18	69	36	46	25	46.0	0172972007	24-SWSDS-S25-N1T
S 30	1 1/4 NPT	22.5	72.6	46	50	25.6	65.2	0172982007	24-SWSDS-S30-N11/4T
S 38	1 1/2 NPT	28.5	83	50	60	26	86.3	0172992007	24-SWSDS-S38-N11/2T

Example for comp. :  
EVGE06L1/8NPT

# Reducing couplings

with hexagon for locking

Tube socket pre-assembled



Tube socket d2	Series	Tube OD d1	dy	lg	l2	SW1	SW2	kg/100 ca.	Order-No.	Designation
L 6	LL 4	3	31	27	11	14	2.1	0188462074	24-SWS-L6-LL4	
L 8	L 6	4	33	26	12	17	2.9	0148052074	24-SWS-L8-L6	
L 10	L 6	4	34	27	12	19	3.4	0148112074	24-SWS-L10-L6	
L 10	L 8	6	35	28	14	19	3.8	0148102074	24-SWS-L10-L8	
L 12	L 6	4	37	30	14	22	4.7	0148172074	24-SWS-L12-L6	
L 12	L 8	6	37	30	14	22	4.8	0148162074	24-SWS-L12-L8	
L 12	L 10	8	38	31	17	22	5.2	0148152074	24-SWS-L12-L10	
L 12	S 8	5	39	32	17	22	5.7	0186092074	24-SWS-L12-S8	
L 15	L 6	4	38	31	17	27	7.4	0148232074	24-SWS-L15-L6	
L 15	L 8	6	38	31	17	27	7.5	0148222074	24-SWS-L15-L8	
L 15	L 10	8	39	32	17	27	7.7	0148212074	24-SWS-L15-L10	
L 15	L 12	10	40	33	19	27	8.2	0148202074	24-SWS-L15-L12	
L 18	L 6	4	37.5	30.5	19	32	11.0	0148292074	24-SWS-L18-L6	
L 18	L 8	6	37.5	30.5	19	32	10.2	0148282074	24-SWS-L18-L8	
L 18	L 10	8	38.5	31.5	19	32	10.2	0148272074	24-SWS-L18-L10	
L 18	L 12	10	38.5	31.5	19	32	10.3	0148262074	24-SWS-L18-L12	
L 18	L 15	12	39.5	32.5	24	32	11.9	0148252074	24-SWS-L18-L15	
L 18	S 16	12	50	41.5	30	32	19.2	0196612074	24-SWS-L18-S16	
L 22	L 6	4	41	34	24	36	14.8	0199032074	24-SWS-L22-L6	
L 22	L 8	6	38.5	31.5	24	36	14.5	0148342074	24-SWS-L22-L8	
L 22	L 10	8	39.5	32.5	24	36	14.1	0148332074	24-SWS-L22-L10	
L 22	L 12	10	39.5	32.5	24	36	14.1	0148322074	24-SWS-L22-L12	
L 22	L 15	12	40.5	33.5	24	36	14.7	0148312074	24-SWS-L22-L15	
L 22	L 18	15	41.5	34	27	36	16.2	0148302074	24-SWS-L22-L18	
L 22	S 20	16	50.5	40	32	36	21.5	0198362074	24-SWS-L22-S20	
L 28	L 6	4	42	35	30	41	19.1	0198652074	24-SWS-L28-L6	
L 28	L 8	6	42	35	30	41	17.5	0199022074	24-SWS-L28-L8	
L 28	L 10	8	41	34	30	41	17.8	0148392074	24-SWS-L28-L10	
L 28	L 12	10	41	34	30	41	18.3	0148382074	24-SWS-L28-L12	
L 28	L 15	12	42	35	30	41	18.4	0148372074	24-SWS-L28-L15	
L 28	L 18	15	43	35.5	30	41	19.1	0148362074	24-SWS-L28-L18	

Other diameter combinations available upon request.

Example for comp. : KOR08/06LOMD

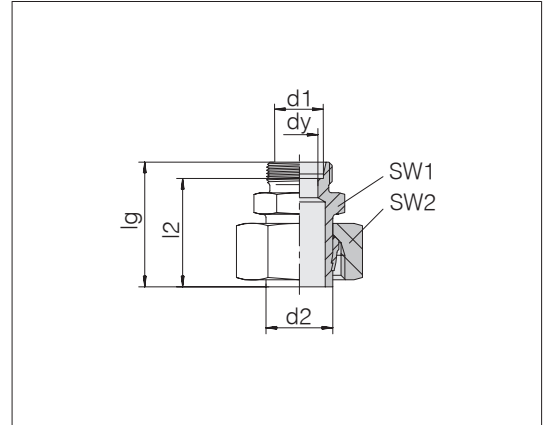
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## Reducing couplings

with hexagon for locking

Tube socket pre-assembled



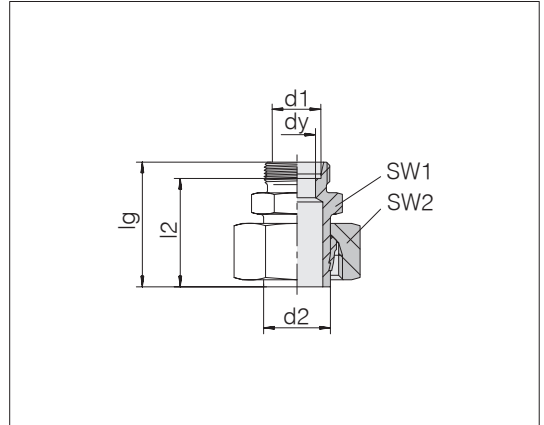
Tube socket d2	Series Tube OD d1	dy	lg	l2	SW1	SW2	kg/100 ca.	Order-No.	Designation
L 28	L 22	19	45	37.5	32	41	20.2	0148352074	24-SWS-L28-L22
L 28	S 25	20	58	46	41	41	38.7	0197632074	24-SWS-L28-S25
L 35	L 8	6	48	41	36	50	27.9	0198712074	24-SWS-L35-L8
L 35	L 10	8	49	42	36	50	28.8	0198892074	24-SWS-L35-L10
L 35	L 12	10	47.5	40.5	36	50	28.6	0148442074	24-SWS-L35-L12
L 35	L 15	12	48.5	41.5	36	50	29.1	0148432074	24-SWS-L35-L15
L 35	L 18	15	49.5	42	36	50	28.7	0148422074	24-SWS-L35-L18
L 35	L 22	19	51.5	44	36	50	28.8	0148412074	24-SWS-L35-L22
L 35	L 28	24	52.5	45	41	50	31.8	0148402074	24-SWS-L35-L28
L 42	L 10	8	51	44	46	60	44.2	0199802074	24-SWS-L42-L10
L 42	L 12	10	51	44	46	60	45.2	0199812074	24-SWS-L42-L12
L 42	L 15	12	52	45	46	60	45.0	0148492074	24-SWS-L42-L15
L 42	L 18	15	52	44.5	46	60	46.2	0148482074	24-SWS-L42-L18
L 42	L 22	19	54	46.5	46	60	44.9	0148472074	24-SWS-L42-L22
L 42	L 28	24	55	47.5	46	60	45.1	0148462074	24-SWS-L42-L28
L 42	L 35	30	58	47.5	46	60	47.8	0148452074	24-SWS-L42-L35

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# Reducing couplings

with hexagon for locking

Tube socket pre-assembled



Tube socket d2	Series Tube OD d1	dy	lg	l2	SW1	SW2	kg/100 ca.	Order-No.	Designation
S 8	S 6	4	37	30	14	19	4.4	0148552074	24-SWS-S8-S6
S 10	S 6	4	39	32	14	22	5.9	0148612074	24-SWS-S10-S6
S 10	S 8	5	41	34	17	22	6.7	0148602074	24-SWS-S10-S8
S 12	L 12	7	38	31	19	24	6.9	0198922074	24-SWS-S12-L12
S 12	S 6	4	39	32	14	24	6.6	0148672074	24-SWS-S12-S6
S 12	S 8	5	41	34	17	24	7.4	0148662074	24-SWS-S12-S8
S 12	S 10	7	41	33.5	19	24	7.8	0148652074	24-SWS-S12-S10
S 14	S 6	4	42	35	17	27	9.6	0148732074	24-SWS-S14-S6
S 14	S 8	5	44	37	17	27	10.0	0148722074	24-SWS-S14-S8
S 14	S 10	7	44	36.5	19	27	10.6	0148712074	24-SWS-S14-S10
S 14	S 12	8	46	38.5	22	27	12.0	0148702074	24-SWS-S14-S12
S 16	L 12	10	43	36	19	30	11.6	1148022074	24-SWS-S16-L12
S 16	L 15	12	46	39	24	30	13.4	0197872074	24-SWS-S16-L15
S 16	S 6	4	42	35	17	30	11.1	0148792074	24-SWS-S16-S6
S 16	S 8	5	44	37	17	30	11.6	0148782074	24-SWS-S16-S8
S 16	S 10	7	44	36.5	19	30	11.9	0148772074	24-SWS-S16-S10
S 16	S 12	8	46	38.5	22	30	13.3	0148762074	24-SWS-S16-S12
S 16	S 14	10	48	40	24	30	14.7	0148752074	24-SWS-S16-S14
S 20	L 15	12	51	44	24	36	18.6	0198902074	24-SWS-S20-L15
S 20	L 18	14	51	43.5	27	36	20.6	0198912074	24-SWS-S20-L18
S 20	S 6	4	47	40	22	36	7.4	0199012074	24-SWS-S20-S6
S 20	S 8	5	48	41	22	36	17.2	0148842074	24-SWS-S20-S8
S 20	S 10	7	48	40.5	22	36	16.8	0148832074	24-SWS-S20-S10
S 20	S 12	8	50	42.5	22	36	17.9	0148822074	24-SWS-S20-S12
S 20	S 14	10	52	44	24	36	19.1	0148812074	24-SWS-S20-S14
S 20	S 16	12	52	43.5	27	36	20.3	0148802074	24-SWS-S20-S16
S 25	L 18	15	51	43.5	27	46	31.7	0198622074	24-SWS-S25-L18
S 25	L 22	18	55	47.5	32	46	36.0	0198372074	24-SWS-S25-L22
S 25	S 6	4	51	44	27	46	31.2	0198992074	24-SWS-S25-S6
S 25	S 8	5	51	44	27	46	31.5	0199002074	24-SWS-S25-S8
S 25	S 10	7	51	43.5	27	46	31.9	0148892074	24-SWS-S25-S10
S 25	S 12	8	53	45.5	27	46	32.6	0148882074	24-SWS-S25-S12
S 25	S 14	10	55	47	27	46	33.1	0148872074	24-SWS-S25-S14

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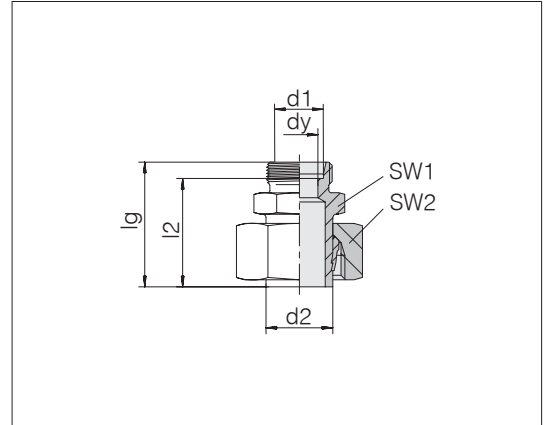




## Reducing couplings

with hexagon for locking

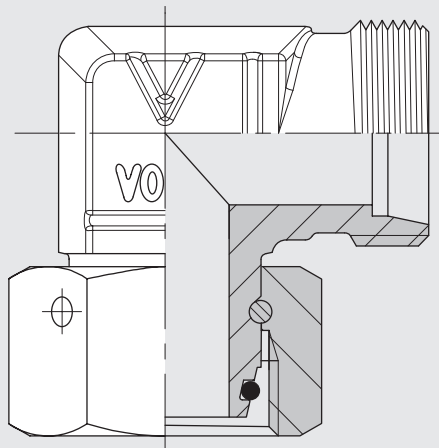
Tube socket pre-assembled



Tube socket d2	Series Tube OD d1	dy	lg	l2	SW1	SW2	kg/100 ca.	Order-No.	Designation
S 25	S 16	12	55	46.5	27	46	33.2	0148862074	24-SWS-S25-S16
S 25	S 20	16	59	48.5	32	46	37.0	0148852074	24-SWS-S25-S20
S 30	S 8	5	59	52	32	50	40.9	0198972074	24-SWS-S30-S8
S 30	S 12	8	56	48.5	32	50	37.5	0148942074	24-SWS-S30-S12
S 30	S 14	10	58	50	32	50	18.1	0148932074	24-SWS-S30-S14
S 30	S 16	12	58	49.5	32	50	37.9	0148922074	24-SWS-S30-S16
S 30	S 20	16	62	51.5	32	50	39.9	0148912074	24-SWS-S30-S20
S 30	S 25	20	66	54	41	50	49.4	0148902074	24-SWS-S30-S25
S 38	S 10	7	62	54.5	41	60	28.2	0199872074	24-SWS-S38-S10
S 38	S 12	8	62	54.5	41	60	60.9	0199882074	24-SWS-S38-S12
S 38	S 16	12	64	55.5	41	60	58.9	0148982074	24-SWS-S38-S16
S 38	S 20	16	68	57.5	41	60	60.5	0148972074	24-SWS-S38-S20
S 38	S 25	20	72	60	41	60	64.5	0148962074	24-SWS-S38-S25
S 38	S 30	25	74	60.5	46	60	71.4	0148952074	24-SWS-S38-S30



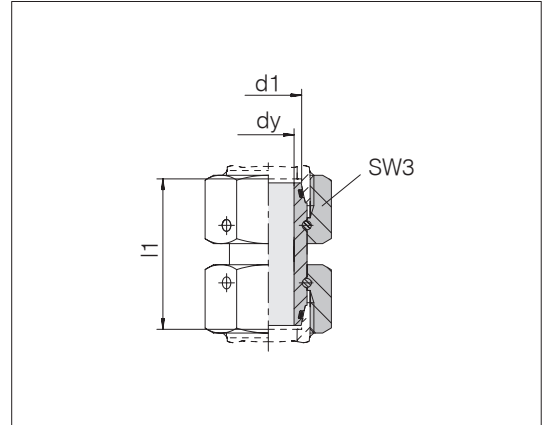
## 24° taper couplings (DKO)



# Straight couplings

With taper and O-ring  
fit in bore type  
W DIN 3861/ISO 8434-1

Standard O-ring material is FKM



Series	dy	l1	SW3	kg/100 ca.	Order-No.	Designation
Tube OD d1						
L 6	2.5	33.5	14	2.9	1178342058	24-SW2OS-L6-CP1
L 6	2.5	36	14	3.0	1178352058	24-SW2OS-L6-CP2
L 6	2.5	39	14	3.1	1178002058	24-SW2OS-L6
L 8	4.5	33.5	17	4.4	1178852058	24-SW2OS-L8-CP1
L 8	4.5	36	17	4.6	1178372058	24-SW2OS-L8-CP2
L 8	4.5	39.5	17	4.6	1178012058	24-SW2OS-L8
L 10	6	34	19	5.5	1178472058	24-SW2OS-L10-CP1
L 10	6	37	19	5.9	1178382058	24-SW2OS-L10-CP2
L 10	6	39.5	19	6.0	1178022058	24-SW2OS-L10
L 12	8	34	22	7.4	1178752058	24-SW2OS-L12-CP1
L 12	8	37	22	7.7	1178392058	24-SW2OS-L12-CP2
L 12	8	39.5	22	7.9	1178032058	24-SW2OS-L12
L 15	10	40	27	14.3	1178442058	24-SW2OS-L15-CP12
L 15	10	42.5	27	14.8	1178042058	24-SW2OS-L15
L 18	13	39	32	17.6	1178452058	24-SW2OS-L18-CP1
L 18	13	42.5	32	18.3	1178802058	24-SW2OS-L18-CP2
L 18	13	45	32	18.8	1178052058	24-SW2OS-L18
L 22	17	44	36	24.4	1178652058	24-SW2OS-L22-CP1
L 22	17	46.5	36	25.1	1178812058	24-SW2OS-L22-CP2
L 22	17	49.5	36	25.6	1178062058	24-SW2OS-L22
L 28	22	48	41	31.2	1178482058	24-SW2OS-L28-CP12
L 28	22	51.5	41	31.7	1178072058	24-SW2OS-L28
L 35	28	52	50	45.1	1178822058	24-SW2OS-L35-CP1
L 35	28	57.5	50	48.3	1178832058	24-SW2OS-L35-CP2
L 35	28	61	50	49.8	1178082058	24-SW2OS-L35
L 42	34	57.5	60	74.6	1178842058	24-SW2OS-L42-CP12
L 42	34	62.5	60	78.1	1178092058	24-SW2OS-L42

● Standard size

Example for comp. :  
GZ06LVT

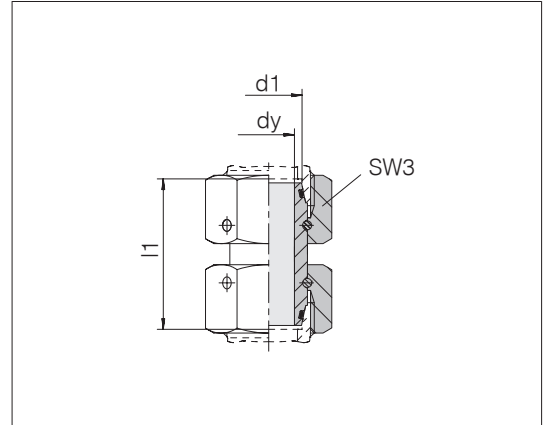
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## Straight couplings

With taper and O-ring  
fit in bore type  
W DIN 3861/ISO 8434-1

Standard O-ring material is FKM



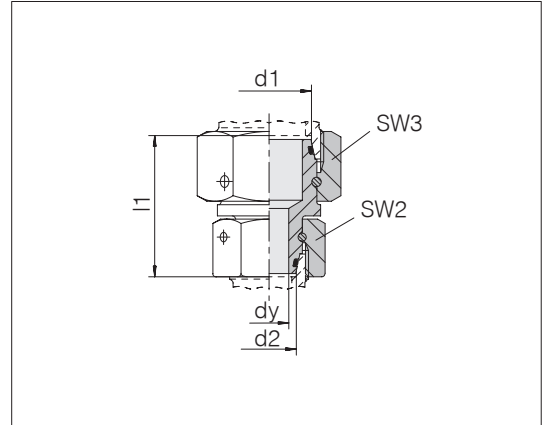
Series	Tube OD	d1	dy	l1	SW3	kg/100 ca.	Order-No.	Designation
S	6	2.5	33	17	4.2	1178862058	24-SW2OS-S6-CP1	
S	6	2.5	39	17	4.6	1178872058	24-SW2OS-S6-CP2	
S	6	2.5	40.5	17	4.7	1178102058	24-SW2OS-S6	
S	8	4	34	19	5.6	1178882058	24-SW2OS-S8-CP1	
S	8	4	39	19	6.0	1178892058	24-SW2OS-S8-CP2	
S	8	4	40.5	19	6.1	1178112058	24-SW2OS-S8	
S	10	6	35	22	7.7	1178902058	24-SW2OS-S10-CP1	
S	10	6	43.5	22	8.5	1178122058	24-SW2OS-S10-CP2	
S	12	8	38	24	9.7	1178912058	24-SW2OS-S12-CP1	
S	12	8	44	24	10.4	1178132058	24-SW2OS-S12-CP2	
S	14	9	41	27	14.4	1178922058	24-SW2OS-S14-CP1	
S	14	9	48.5	27	15.6	1178142058	24-SW2OS-S14-CP2	
S	16	11	42	30	17.5	1178932058	24-SW2OS-S16-CP1	
S	16	11	49	30	18.6	1178152058	24-SW2OS-S16-CP2	
S	20	14	48	36	26.1	1178942058	24-SW2OS-S20-CP1	
S	20	14	60.5	36	29.6	1178162058	24-SW2OS-S20-CP2	
S	25	16	73	46	63.1	1178712058	24-SW2OS-S25-LG73	
S	25	16	107	46	80.4	1178722058	24-SW2OS-S25-LG107	
S	25	18	54.5	46	51.7	1178952058	24-SW2OS-S25-CP1	
S	25	18	65.5	46	56.4	1178962058	24-SW2OS-S25-CP2	
S	25	18	67.5	46	56.9	1178172058	24-SW2OS-S25	
S	30	23	62	50	63.1	1178702058	24-SW2OS-S30-CP1	
S	30	23	72.5	50	68.6	1178182058	24-SW2OS-S30-CP2	
S	38	30	67	60	86.7	1178692058	24-SW2OS-S38-CP1	
S	38	30	83	60	99.6	1178192058	24-SW2OS-S38-CP2	

● Standard size

# Straight reducing couplings

With taper and O-ring  
fit in bore type  
W DIN 3861/ISO 8434-1

Standard O-ring material is FKM



Series Tube OD d1	Series Tube OD d2	dy	l1	SW2	SW3	kg/100 ca.	Order-No.	Designation
L 6	S 6	2.5	34	17	14	3.7	1180262058	24-SW2OS-L6-S6-CP1
L 6	S 6	2.5	37.5	17	14	3.9	1178232058	24-SW2OS-L6-S6-CP2
L 8	L 6	2.5	34	14	17	3.8	1180002058	24-SW2OS-L8-L6-CP1
L 8	S 8	4	34.5	19	17	5.3	1180272058	24-SW2OS-L8-S8-CP1
L 10	L 6	2.5	34.5	14	19	4.4	1178662058	24-SW2OS-L10-L6-CP1
L 10	L 8	4.5	34.5	17	19	5.2	1180012058	24-SW2OS-L10-L8-CP1
L 10	S 10	6	35	22	19	6.8	1180282058	24-SW2OS-L10-S10-CP1
L 10	S 10	6	40	22	19	7.2	1178242058	24-SW2OS-L10-S10-CP2
L 12	L 6	2.5	34.5	14	22	5.4	1180022058	24-SW2OS-L12-L6-CP1
L 12	L 8	4.5	34.5	17	22	6.2	1180032058	24-SW2OS-L12-L8-CP1
L 12	L 10	6	34.5	19	22	6.8	1180042058	24-SW2OS-L12-L10-CP1
L 12	L 10	6	37.5	19	22	7.1	1178682058	24-SW2OS-L12-L10-CP2
L 12	S 12	8	37.5	24	22	8.9	1180292058	24-SW2OS-L12-S12-CP1
L 12	S 12	8	40.5	24	22	9.3	1178252058	24-SW2OS-L12-S12-CP2
L 15	L 8	4.5	38	17	27	9.6	1178612058	24-SW2OS-L15-L8-CP12
L 15	L 10	6	38	19	27	10.5	1178222058	24-SW2OS-L15-L10-CP12
L 15	L 12	8	39	22	27	11.4	1178432058	24-SW2OS-L15-L12-CP1
L 18	L 10	6	37.5	19	32	12.2	1180062058	24-SW2OS-L18-L10-CP1
L 18	L 12	8	37.5	22	32	13.1	1180072058	24-SW2OS-L18-L12-CP1
L 18	L 15	10	40.5	27	32	16.5	1180082058	24-SW2OS-L18-L15-CP1
L 18	L 15	10	45	27	32	17.3	1178202058	24-SW2OS-L18-L15
L 18	S 16	11	41.5	30	32	18.2	1180302058	24-SW2OS-L18-S16-CP1
L 22	L 12	8	43.5	22	36	18.1	1180092058	24-SW2OS-L22-L12-CP1
L 22	L 15	10	43.5	27	36	20.2	1180102058	24-SW2OS-L22-L15-CP12
L 22	L 18	13	44	32	36	22.1	1178212058	24-SW2OS-L22-L18-CP1
L 22	S 20	14	47	36	36	25.9	1180312058	24-SW2OS-L22-S20-CP1
L 22	S 20	14	53.5	36	36	27.5	1178262058	24-SW2OS-L22-S20-CP2
L 28	L 15	10	46	27	41	24.8	1180112058	24-SW2OS-L28-L15
L 28	L 18	13	46	32	41	26.0	1178622058	24-SW2OS-L28-L18-CP2
L 28	L 22	17	46	36	41	28.2	1178302058	24-SW2OS-L28-L22-CP1
L 28	S 25	18	50.5	46	41	40.8	1180322058	24-SW2OS-L28-S25-CP1

Example for comp. :  
GZR08/06LVIT

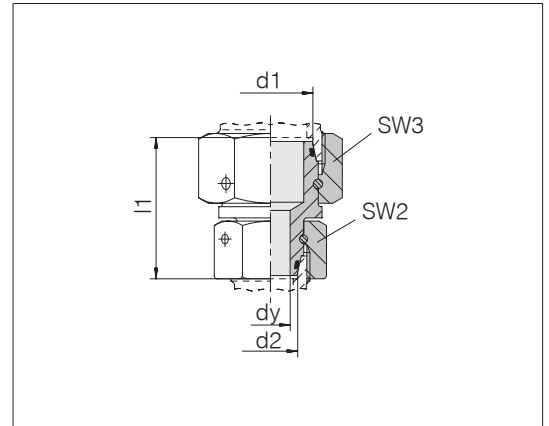
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## Straight reducing couplings

With taper and O-ring  
fit in bore type  
W DIN 3861/ISO 8434-1

Standard O-ring material is FKM



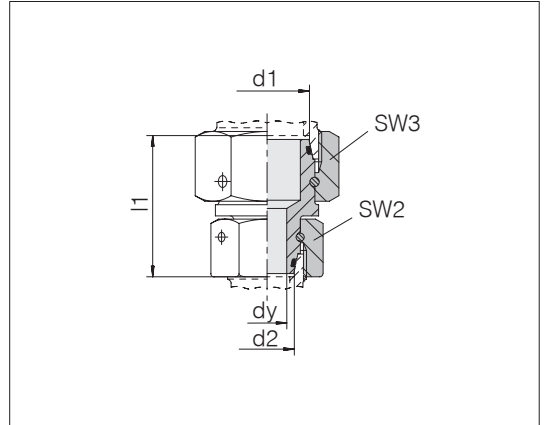
Series Tube OD d1	Series Tube OD d2	dy	l1	SW2	SW3	kg/100 ca.	Order-No.	Designation
L 35	L 18	13	51	32	50	37.5	1180122058	24-SW2OS-L35-L18-CP12
L 35	L 22	17	51	36	50	38.4	1180132058	24-SW2OS-L35-L22-CP1
L 35	L 28	18	51	41	50	40.3	1180142058	24-SW2OS-L35-L28-CP1
L 35	L 28	18	52.5	41	50	41.0	1178672058	24-SW2OS-L35-L28-CP2
L 35	S 30	23	59	50	50	55.8	1180332058	24-SW2OS-L35-S30-CP1
L 42	L 22	17	54	36	60	55.7	1180152058	24-SW2OS-L42-L22
L 42	L 28	18	54	41	60	57.5	1178632058	24-SW2OS-L42-L28-CP2
L 42	L 35	28	56.5	50	60	62.5	1178642058	24-SW2OS-L42-L35-CP1
L 42	S 38	30	62	60	60	78.3	1180342058	24-SW2OS-L42-S38-CP1
L 42	S 38	30	66	60	60	84.1	1178282058	24-SW2OS-L42-S38-CP2
S 8	S 6	2.5	34	17	19	5.2	1180162058	24-SW2OS-S8-S6-CP1
S 10	S 6	2.5	34.5	17	22	6.2	1180172058	24-SW2OS-S10-S6-CP1
S 10	S 8	4	34.5	19	22	6.8	1180182058	24-SW2OS-S10-S8-CP1
S 10	S 8	4	41	19	22	7.7	1178492058	24-SW2OS-S10-S8-CP2
S 12	S 6	2.5	37.5	17	24	7.6	1180192058	24-SW2OS-S12-S6-CP1
S 12	S 8	4	37.5	19	24	8.0	1178742058	24-SW2OS-S12-S8-CP1
S 12	S 10	6	38	22	24	9.0	1178502058	24-SW2OS-S12-S10-CP1
S 16	L 15	10	41	27	30	16.1	1180352058	24-SW2OS-S16-L15-CP1
S 16	L 15	10	45	27	30	16.8	1178292058	24-SW2OS-S16-L15-CP2
S 16	S 10	6	41.5	22	30	13.5	1178522058	24-SW2OS-S16-S10-CP1
S 16	S 12	8	41.5	24	30	14.1	1178532058	24-SW2OS-S16-S12-CP1
S 20	L 18	13	47	32	36	23.9	1180362058	24-SW2OS-S20-L18-CP1
S 20	S 12	8	47	24	36	19.8	1180202058	24-SW2OS-S20-S12-CP1
S 20	S 12	8	52	24	36	21.4	1178542058	24-SW2OS-S20-S12-CP2
S 20	S 16	11	47.5	30	36	23.0	1178552058	24-SW2OS-S20-S16-CP1
S 25	L 18	13	47.5	32	46	35.4	1178762058	24-SW2OS-S25-L18-CP1
S 25	L 22	17	50.5	36	46	38.9	1180372058	24-SW2OS-S25-L22-CP1
S 25	S 16	11	51	30	46	36.2	1178562058	24-SW2OS-S25-S16-CP1
S 25	S 20	14	53	36	46	40.2	1178572058	24-SW2OS-S25-S20

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# Straight reducing couplings

With taper and O-ring  
fit in bore type  
W DIN 3861/ISO 8434-1

Standard O-ring material is FKM



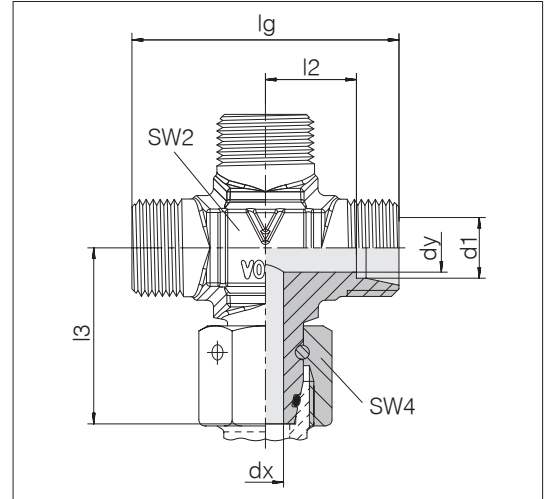
Series Tube OD $d1$	Series Tube OD $d2$	$dy$	$l1$	SW2	SW3	kg/100 ca.	Order-No.	Designation
S 30	L 28	22	58	41	50	51.9	1178272058	24-SW2OS-S30-L28-CP1
S 30	S 16	11	58.5	30	50	44.9	1180212058	24-SW2OS-S30-S16-CP1
S 30	S 20	14	59	36	50	47.9	1180222058	24-SW2OS-S30-S20-CP1
S 30	S 25	18	60.5	46	50	58.9	1180232058	24-SW2OS-S30-S25-CP1
S 30	S 25	18	69.5	46	50	65.2	1178582058	24-SW2OS-S30-S25
S 38	L 35	28	61.5	50	60	70.3	1178732058	24-SW2OS-S38-L35-CP1
S 38	S 20	14	61.5	36	60	62.5	1180242058	24-SW2OS-S38-S20-CP1
S 38	S 25	18	63	46	60	72.7	1178592058	24-SW2OS-S38-S25-CP1
S 38	S 30	23	66.5	50	60	77.2	1180252058	24-SW2OS-S38-S30
S 38	S 30	23	78	50	60	89.1	1178602058	24-SW2OS-S38-S30-CP2



## Cross couplings

With taper and O-ring

Standard O-ring material is FKM

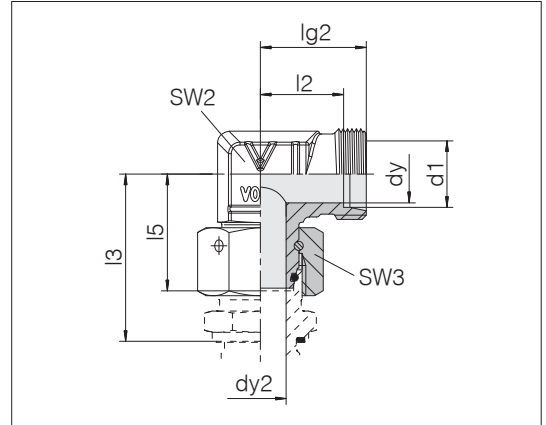


Series	dx	dy	lg	l2	l3	SW2	SW4	Order-No.	Designation
L 6	2.5	4	38	12	24	12	14	1190412058	24-SWOK-L6
L 8	4	6	42	14	27.5	17	17	1196702058	24-SWOK-L8
L 10	6	8	44	15	29	17	19	1196962058	24-SWOK-L10
L 12	8	10	48	17	29.5	17	22	1196952058	24-SWOK-L12
L 15	10	12	56	21	32.5	24	27	1196262058	24-SWOK-L15
L 18	13	15	68	26.5	38.5	27	32	1196792058	24-SWOK-L18
L 35	28	30	90	34.5	51	41	50	1190662058	24-SWOK-L35
L 42	34	36	102	40	56	50	60	1194942058	24-SWOK-L42

# Swivel elbows

With taper and O-ring

Standard O-ring material is FKM



Series	dy	dy2	lg2	l2	l3	l5	SW2	SW3	kg/100 ca.	Order-No.	Designation
Tube OD d1											
L 6	4	2.5	19	12	34.5	26	12	14	4.1	1158032058	24-SWOE-L6-P
L 8	6	4	21	14	37.5	27.5	14	17	6.2	1158082058	24-SWOE-L8-P
L 10	8	6	22	15	40	29	14	19	5.3	1158132058	24-SWOE-L10
L 12	10	8	24	17	42	29.5	17	22	10.1	1158182058	24-SWOE-L12
L 15	12	10	28	21	46	32.5	19	27	12.9	1158232058	24-SWOE-L15
L 18	15	13	31	23.5	50	35.5	24	32	18.6	1158282058	24-SWOE-L18
L 22	19	17	35	27.5	55	38.5	27	36	25.3	1158332058	24-SWOE-L22
L 28	24	22	38	30.5	59	41.5	36	41	34.2	1158382058	24-SWOE-L28
L 35	30	28	45	34.5	68.5	51	41	50	57.4	1158432058	24-SWOE-L35
L 42	36	34	51	40	75	56	50	60	103.0	1158482058	24-SWOE-L42
S 6	4	2.5	23	16	40	27	14	17	6.2	1158532058	24-SWOE-S6-P
S 8	5	4	24	17	42.5	27.5	17	19	8.5	1158582058	24-SWOE-S8-P
S 10	7	6	25	17.5	45	30	19	22	12.2	1158632058	24-SWOE-S10-P
S 12	8	8	29	21.5	48	31	17	24	10.8	1158682058	24-SWOE-S12
S 14	10	9	30	22	54	35	19	27	14.9	1158732058	24-SWOE-S14
S 16	12	11	33	24.5	55	36.5	24	30	20.1	1158782058	24-SWOE-S16
S 20	16	14	37	26.5	65	44.5	27	36	30.5	1158832058	24-SWOE-S20
S 25	20	18	42	30	73	50	36	46	55.4	1158882058	24-SWOE-S25
S 30	25	23	49	35.5	78.5	55	41	50	77.9	1158932058	24-SWOE-S30
S 38	32	30	57	41	89	63	50	60	118.6	1158982058	24-SWOE-S38

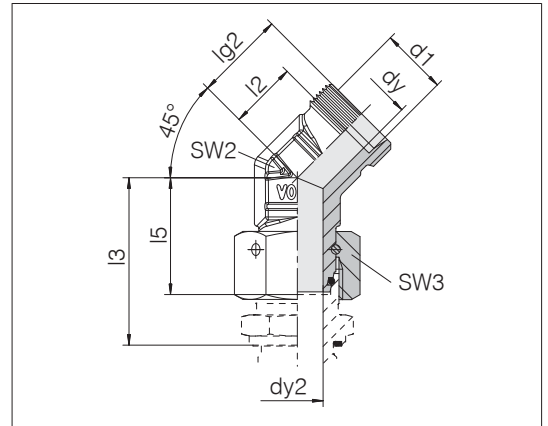
Example for comp. :  
EW06LVITOMD  
ISO 8434-1-SWOE-L6-St



## Swivel 45° elbows

With taper and O-ring

Standard O-ring material is FKM



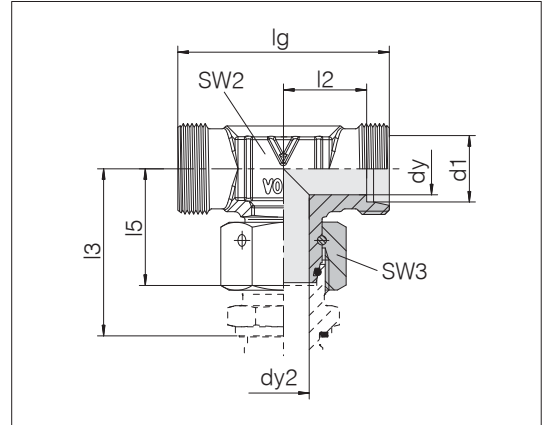
Series	dy	dy2	lg2	l2	l3	l5	SW2	SW3	kg/100 ca.	Order-No.	Designation
Tube OD d1											
L 6	4	2.5	21	14	34.5	26	19	14	6.9	1170032058	24-SW0E45-L6
L 8	6	4	22	15	37.5	27.5	19	17	7.0	1170082058	24-SW0E45-L8
L 10	8	6	23	16	40	29	19	19	7.8	1170132058	24-SW0E45-L10
L 12	10	8	24	17	42	29.5	19	22	8.6	1170182058	24-SW0E45-L12
L 15	12	10	24	17	46	32.5	19	27	12.6	1170232058	24-SW0E45-L15
L 18	15	13	26.5	19	50	35.5	24	32	17.8	1170282058	24-SW0E45-L18
L 22	19	17	30	22.5	55	38.5	27	36	23.6	1170332058	24-SW0E45-L22
L 28	24	22	32	24.5	59	41.5	36	41	33.6	1170382058	24-SW0E45-L28
L 35	30	28	37.5	27	68.5	51	41	50	54.6	1170432058	24-SW0E45-L35
L 42	36	34	37	27	75	56	50	60	83.6	1170482058	24-SW0E45-L42
S 6	4	2.5	23	16	40	27	19	17	7.3	1170532058	24-SW0E45-S6
S 8	5	4	23	16	42.5	27.5	19	19	8.2	1170582058	24-SW0E45-S8
S 10	7	6	24	16.5	45	30	19	22	9.5	1170632058	24-SW0E45-S10
S 12	8	8	24.5	17	48	31	19	24	11.2	1170682058	24-SW0E45-S12
S 14	10	9	25	17	54	35	19	27	13.6	1170732058	24-SW0E45-S14
S 16	12	11	27.5	19	55	36.5	24	30	18.8	1170782058	24-SW0E45-S16
S 20	16	14	32	21.5	65	44.5	27	36	28.6	1170832058	24-SW0E45-S20
S 25	20	18	35	23	73	50	36	46	52.3	1170882058	24-SW0E45-S25
S 30	25	23	37.5	24	78.5	55	41	50	69.7	1170932058	24-SW0E45-S30
S 38	32	30	44	28	89	63	50	60	106.8	1170982058	24-SW0E45-S38

Example for comp. :  
EVO6LVITOMD  
ISO 8434-1-SW0E45-L6-St

# Swivel T-connectors

With taper and O-ring

Standard O-ring material is FKM



Series	dy	dy2	lg	l2	l3	l5	SW2	SW3	kg/100 ca.	Order-No.	Designation
Tube OD d1											
L 6	4	2.5	38	12	34.5	26	12	14	4.9	1160032058	24-SWOT-L6-P
L 8	6	4	42	14	37.5	27.5	14	17	6.9	1160082058	24-SWOT-L8-P
L 10	8	6	44	15	40	29	14	19	9.2	1160132058	24-SWOT-L10
L 12	10	8	48	17	42	29.5	19	22	12.0	1160182058	24-SWOT-L12-P
L 15	12	10	56	21	46	32.5	19	27	15.4	1160232058	24-SWOT-L15
L 18	15	13	62	23.5	50	35.5	24	32	21.5	1160282058	24-SWOT-L18
L 22	19	17	70	27.5	55	38.5	27	36	27.7	1160332058	24-SWOT-L22
L 28	24	22	76	30.5	59	41.5	36	41	39.7	1160382058	24-SWOT-L28
L 35	30	28	90	34.5	68.5	51	41	50	68.0	1160432058	24-SWOT-L35
L 42	36	34	102	40	75	56	50	60	113.8	1160482058	24-SWOT-L42
S 6	4	2.5	46	16	40	27	14	17	7.7	1160532058	24-SWOT-S6-P
S 8	5	4	48	17	42.5	27.5	17	19	10.5	1160582058	24-SWOT-S8-P
S 10	7	6	50	17.5	45	30	19	22	14.0	1160632058	24-SWOT-S10-P
S 12	8	8	58	21.5	48	31	17	24	13.5	1160682058	24-SWOT-S12
S 14	10	9	60	22	54	35	19	27	18.1	1160732058	24-SWOT-S14
S 16	12	11	66	24.5	55	36.5	24	30	24.6	1160782058	24-SWOT-S16
S 20	16	14	74	26.5	65	44.5	27	36	35.6	1160832058	24-SWOT-S20
S 25	20	18	84	30	73	50	36	46	63.7	1160882058	24-SWOT-S25
S 30	25	23	98	35.5	78.5	55	41	50	91.6	1160932058	24-SWOT-S30
S 38	32	30	114	41	89	63	50	60	147.8	1160982058	24-SWOT-S38

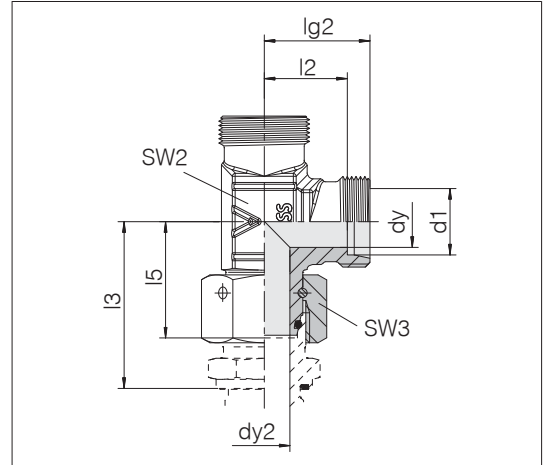
Example for comp. :  
ET06LVITOMD  
ISO 8434-1-SWOBT-L6-St



## Swivel L-connectors

With taper and O-ring

Standard O-ring material is FKM



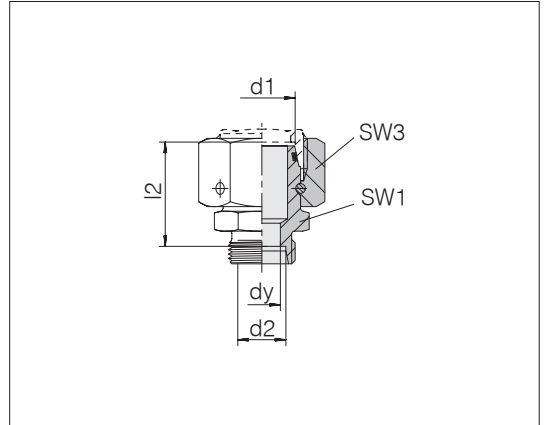
Series	dy	dy2	lg2	l2	l3	l5	SW2	SW3	kg/100 ca.	Order-No.	Designation
Tube OD d1											
L 6	4	2.5	19	12	34.5	26	12	14	4.8	1162032058	24-SWOL-L6-P
L 8	6	4	21	14	37.5	27.5	14	17	7.0	1162082058	24-SWOL-L8-P
L 10	8	6	22	15	40	29	14	19	9.6	1162132058	24-SWOL-L10
L 12	10	8	24	17	42	29.5	19	22	12.0	1162182058	24-SWOL-L12-P
L 15	12	10	28	21	46	32.5	19	27	15.4	1162232058	24-SWOL-L15
L 18	15	13	31	23.5	50	35.5	24	32	21.3	1162282058	24-SWOL-L18
L 22	19	17	35	27.5	55	38.5	27	36	28.1	1162332058	24-SWOL-L22
L 28	24	22	38	30.5	59	41.5	36	41	39.2	1162382058	24-SWOL-L28
L 35	30	28	45	34.5	68.5	51	41	50	67.7	1162432058	24-SWOL-L35
L 42	36	34	51	40	75	56	50	60	112.4	1162482058	24-SWOL-L42
S 6	4	2.5	23	16	40	27	12	17	7.8	1162532058	24-SWOL-S6
S 8	5	4	24	17	42.5	27.5	17	19	10.2	1162582058	24-SWOL-S8-P
S 10	7	6	25	17.5	45	30	19	22	14.0	1162632058	24-SWOL-S10-P
S 12	8	8	29	21.5	48	31	17	24	13.3	1162682058	24-SWOL-S12
S 14	10	9	30	22	54	35	19	27	18.0	1162732058	24-SWOL-S14
S 16	12	11	33	24.5	55	36.5	24	30	22.6	1162782058	24-SWOL-S16
S 20	16	14	37	26.5	65	44.5	27	36	35.3	1162832058	24-SWOL-S20
S 25	20	18	42	30	73	50	36	46	62.8	1162882058	24-SWOL-S25
S 30	25	23	49	35.5	78.5	55	41	50	91.7	1162932058	24-SWOL-S30
S 38	32	30	57	41	89	63	50	60	149.3	1162982058	24-SWOL-S38

Example for comp. :  
 EL06LVITOMD  
 ISO 8434-1-SWORT-L6-St

# Reducing couplings

With taper and O-ring  
fit in bore type W DIN 3861/ISO 8434-1

Standard O-ring material is FKM



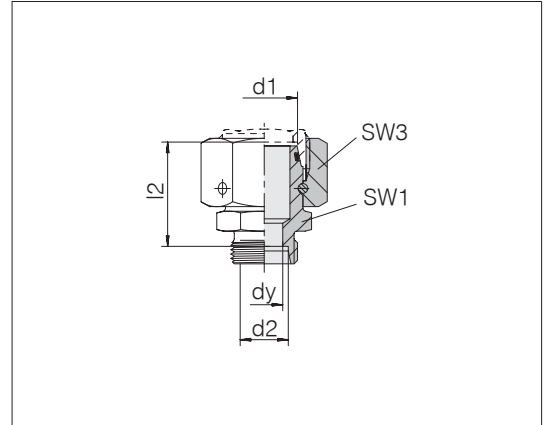
Series Tube OD d1	Series Tube OD d2	dy	l2	SW1	SW3	kg/100 ca.	Order-No.	Designation
L 8	L 6	4	23.5	12	17	2.9	1181002058	24-SWOS-L8-L6
L 10	L 6	4	25	14	19	3.8	1181012058	24-SWOS-L10-L6
L 10	L 8	6	25	14	19	3.8	1181022058	24-SWOS-L10-L8
L 10	S 8	5	28	17	19	4.9	1181962058	24-SWOS-L10-S8
L 12	L 6	4	25	17	22	5.0	1181032058	24-SWOS-L12-L6
L 12	L 8	6	25	17	22	5.1	1181042058	24-SWOS-L12-L8
L 12	L 10	8	26	17	22	5.2	1181052058	24-SWOS-L12-L10
L 12	S 6	4	28	17	22	5.6	1181952058	24-SWOS-L12-S6
L 12	S 8	5	28	17	22	6.0	1181982058	24-SWOS-L12-S8
L 15	L 6	4	28	19	27	8.7	1181062058	24-SWOS-L15-L6
L 15	L 8	6	28	19	27	8.8	1181072058	24-SWOS-L15-L8
L 15	L 10	8	29	19	27	8.9	1181082058	24-SWOS-L15-L10
L 15	L 12	10	29	19	27	9.0	1181092058	24-SWOS-L15-L12
L 15	L 18	10	31	27	27	11.8	1181942058	24-SWOS-L15-L18
L 15	S 8	5	30	19	27	9.4	1181992058	24-SWOS-L15-S8
L 18	L 6	4	28	24	32	11.1	1181102058	24-SWOS-L18-L6
L 18	L 8	6	28	24	32	11.1	1181112058	24-SWOS-L18-L8
L 18	L 10	8	29	24	32	11.2	1181122058	24-SWOS-L18-L10
L 18	L 12	10	29	24	32	11.3	1181132058	24-SWOS-L18-L12
L 18	L 15	12	30	24	32	11.8	1181142058	24-SWOS-L18-L15
L 18	S 8	5	30	24	32	11.6	1181972058	24-SWOS-L18-S8
L 22	L 6	4	32	27	36	15.4	1181152058	24-SWOS-L22-L6
L 22	L 8	6	32	27	36	15.5	1181162058	24-SWOS-L22-L8
L 22	L 10	8	33	27	36	15.7	1181172058	24-SWOS-L22-L10
L 22	L 12	10	33	27	36	16.1	1181182058	24-SWOS-L22-L12
L 22	L 15	12	34	27	36	16.2	1181192058	24-SWOS-L22-L15
L 22	L 18	15	33.5	27	36	16.6	1181202058	24-SWOS-L22-L18
L 28	L 8	6	34	32	41	20.1	1181222058	24-SWOS-L28-L8
L 28	L 10	8	35	32	41	20.1	1181232058	24-SWOS-L28-L10
L 28	L 12	10	35	32	41	20.1	1181242058	24-SWOS-L28-L12
L 28	L 15	12	36	32	41	20.6	1181252058	24-SWOS-L28-L15



## Reducing couplings

With taper and O-ring  
fit in bore type W DIN 3861/ISO 8434-1

Standard O-ring material is FKM



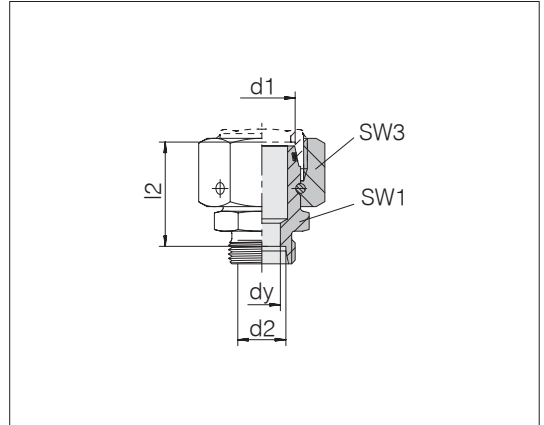
Series Tube OD d1	Series Tube OD d2	dy	l2	SW1	SW3	kg/100 ca.	Order-No.	Designation
L 28	L 18	15	35.5	32	41	21.0	1181262058	24-SWOS-L28-L18
L 28	L 22	19	37.5	32	41	21.0	1181272058	24-SWOS-L28-L22
L 28	S 16	12	36.5	32	41	21.5	1181922058	24-SWOS-L28-S16
L 28	S 20	16	36.5	32	41	23.2	1181912058	24-SWOS-L28-S20
L 35	L 6	4	37	41	50	31.9	1181282058	24-SWOS-L35-L6
L 35	L 8	6	37	41	50	30.6	1181292058	24-SWOS-L35-L8
L 35	L 10	8	38	41	50	32.3	1181302058	24-SWOS-L35-L10
L 35	L 12	10	38	41	50	31.3	1181312058	24-SWOS-L35-L12
L 35	L 15	12	39	41	50	31.6	1181322058	24-SWOS-L35-L15
L 35	L 18	15	38.5	41	50	31.9	1181332058	24-SWOS-L35-L18
L 35	L 22	19	40.5	41	50	32.1	1181342058	24-SWOS-L35-L22
L 35	L 28	24	40.5	41	50	32.3	1181352058	24-SWOS-L35-L28
L 42	L 6	4	40.5	50	60	52.5	1181812058	24-SWOS-L42-L6
L 42	L 8	6	40.5	50	60	51.9	1181362058	24-SWOS-L42-L8
L 42	L 10	8	41.5	50	60	52.8	1181372058	24-SWOS-L42-L10
L 42	L 12	10	41.5	50	60	51.8	1181382058	24-SWOS-L42-L12
L 42	L 15	12	42.5	50	60	53.4	1181392058	24-SWOS-L42-L15
L 42	L 18	15	42	50	60	52.7	1181412058	24-SWOS-L42-L18
L 42	L 22	19	44	50	60	51.5	1181422058	24-SWOS-L42-L22
L 42	L 28	24	44	50	60	51.5	1181432058	24-SWOS-L42-L28
L 42	L 35	30	43	50	60	53.1	1181442058	24-SWOS-L42-L35

Continued on following page

# Reducing couplings

With taper and O-ring  
fit in bore type W DIN 3861/ISO 8434-1

Standard O-ring material is FKM



Series Tube OD d1	Series Tube OD d2	dy	l2	SW1	SW3	kg/100 ca.	Order-No.	Designation
S 8	S 6	4	27	14	19	4.3	1181452058	24-SWOS-S8-S6
S 10	S 6	4	27.5	17	22	5.5	1181462058	24-SWOS-S10-S6
S 10	S 8	5	27.5	17	22	5.7	1181472058	24-SWOS-S10-S8
S 12	S 6	4	30	19	24	7.0	1181482058	24-SWOS-S12-S6
S 12	S 8	5	30	19	24	7.1	1181492058	24-SWOS-S12-S8
S 12	S 10	7	29.5	19	24	7.3	1181502058	24-SWOS-S12-S10
S 14	S 6	4	31.5	19	27	9.4	1181512058	24-SWOS-S14-S6
S 14	S 8	5	31.5	19	27	9.5	1181522058	24-SWOS-S14-S8
S 14	S 10	7	31	22	27	10.2	1181532058	24-SWOS-S14-S10
S 14	S 12	8	31	22	27	10.4	1181542058	24-SWOS-S14-S12
S 16	L 12	10	32	22	30	11.6	1181932058	24-SWOS-S16-L12
S 16	L 15	11	38.8	24	30	14.4	1198602058	24-SWOS-S16-L15
S 16	S 6	4	32	22	30	11.4	1181552058	24-SWOS-S16-S6
S 16	S 8	5	32	22	30	11.6	1181562058	24-SWOS-S16-S8
S 16	S 10	7	31.5	22	30	11.7	1181572058	24-SWOS-S16-S10
S 16	S 12	8	31.5	22	30	12.0	1181582058	24-SWOS-S16-S12
S 16	S 14	10	31.5	24	30	12.8	1181592058	24-SWOS-S16-S14
S 20	L 15	12	36	27	36	16.6	1197582058	24-SWOS-S20-L15
S 20	S 6	4	36	27	36	17.0	1181602058	24-SWOS-S20-S6
S 20	S 8	5	36	27	36	17.2	1181612058	24-SWOS-S20-S8
S 20	S 10	7	35.5	27	36	17.0	1181622058	24-SWOS-S20-S10
S 20	S 12	8	35.5	27	36	17.3	1181632058	24-SWOS-S20-S12
S 20	S 16	12	36.5	27	36	17.9	1181652058	24-SWOS-S20-S16
S 25	L 18	15	38	32	46	31.5	1198612058	24-SWOS-S25-L18
S 25	S 6	4	38.5	32	46	30.9	1181662058	24-SWOS-S25-S6
S 25	S 8	5	38.5	32	46	30.9	1181672058	24-SWOS-S25-S8
S 25	S 10	7	38	32	46	31.2	1181682058	24-SWOS-S25-S10
S 25	S 12	8	38	32	46	31.3	1181692058	24-SWOS-S25-S12
S 25	S 16	12	39	32	46	31.7	1181712058	24-SWOS-S25-S16
S 25	S 20	16	39	32	46	32.8	1181722058	24-SWOS-S25-S20
S 30	L 22	19	45.5	41	50	40.9	1198072058	24-SWOS-S30-L22
S 30	S 6	4	44	41	50	40.4	1181732058	24-SWOS-S30-S6
S 30	S 8	5	44	41	50	39.9	1181742058	24-SWOS-S30-S8

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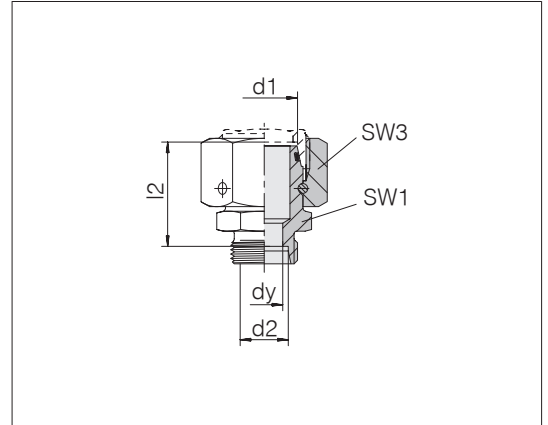




## Reducing couplings

With taper and O-ring  
fit in bore type W DIN 3861/ISO 8434-1

Standard O-ring material is FKM

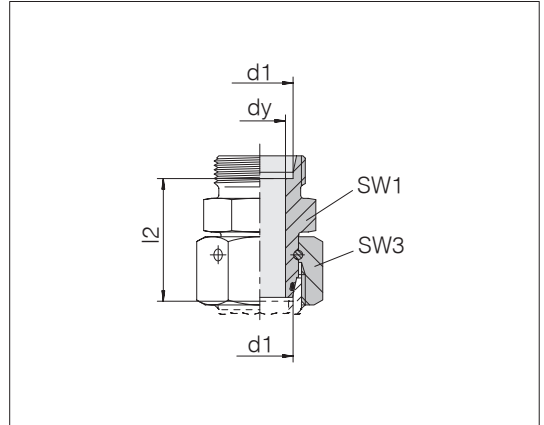


Series Tube OD d1	Series Tube OD d2	dy	l2	SW1	SW3	kg/100 ca.	Order-No.	Designation
S 30	S 10	7	43.5	41	50	40.4	1181752058	24-SWOS-S30-S10
S 30	S 12	8	43.5	41	50	40.5	1181762058	24-SWOS-S30-S12
S 30	S 16	12	44.5	41	50	40.6	1181782058	24-SWOS-S30-S16
S 30	S 20	16	44.5	41	50	42.2	1181792058	24-SWOS-S30-S20
S 30	S 25	20	45	41	50	44.8	1181802058	24-SWOS-S30-S25
S 38	S 6	4	47.5	50	60	57.6	1181822058	24-SWOS-S38-S6
S 38	S 8	5	47.5	50	60	57.8	1181832058	24-SWOS-S38-S8
S 38	S 10	7	47	50	60	58.4	1181842058	24-SWOS-S38-S10
S 38	S 12	8	47	50	60	59.2	1181852058	24-SWOS-S38-S12
S 38	S 16	12	48	50	60	59.2	1181862058	24-SWOS-S38-S16
S 38	S 20	16	48	50	60	59.7	1181872058	24-SWOS-S38-S20
S 38	S 25	20	48.5	50	60	62.3	1181882058	24-SWOS-S38-S25
S 38	S 30	25	49	50	60	63.6	1181892058	24-SWOS-S38-S30

# Distance adapters

With taper and O-ring

Standard O-ring material is FKM

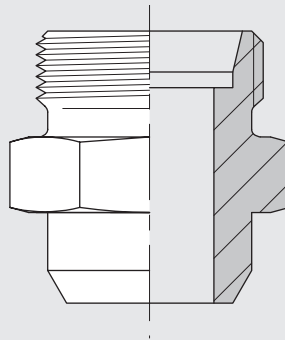


Series	Tube OD	$d1$	$dy$	$l2$	SW1	SW3	kg/100 ca.	Order-No.	Designation
L	6	2.5	36	12	14	3.7	1191402058	24-SWOS-L6	
L	8	4	36	14	17	5.0	1191412058	24-SWOS-L8	
L	10	6	36	17	19	6.6	1191422058	24-SWOS-L10	
L	12	8	36	19	22	8.7	1191862058	24-SWOS-L12	
L	15	10	36	24	27	13.2	1191432058	24-SWOS-L15	
L	18	13	36	27	32	16.8	1191882058	24-SWOS-L18	
L	22	17	40	32	36	23.0	1191872058	24-SWOS-L22	
L	28	22	40	41	41	29.7	1191892058	24-SWOS-L28	
L	35	28	50	46	50	49.0	1191902058	24-SWOS-L35	
L	42	34	60	55	60	85.0	1191912058	24-SWOS-L42	
S	6	2.5	36	14	17	5.3	1191442058	24-SWOS-S6	
S	8	4	36	17	19	7.0	1191492058	24-SWOS-S8	
S	10	6	36	19	22	8.7	1191522058	24-SWOS-S10	
S	12	8	36	22	24	10.4	1191482058	24-SWOS-S12	
S	14	9	40	24	27	14.7	1191532058	24-SWOS-S14	
S	16	11	40	27	30	17.8	1191542058	24-SWOS-S16	
S	20	14	46	32	36	28.0	1191512058	24-SWOS-S20	
S	25	18	50	41	46	50.3	1191502058	24-SWOS-S25	
S	30	23	56	46	50	65.6	1191342058	24-SWOS-S30	
S	38	30	60	55	60	93.6	1191692058	24-SWOS-S38	

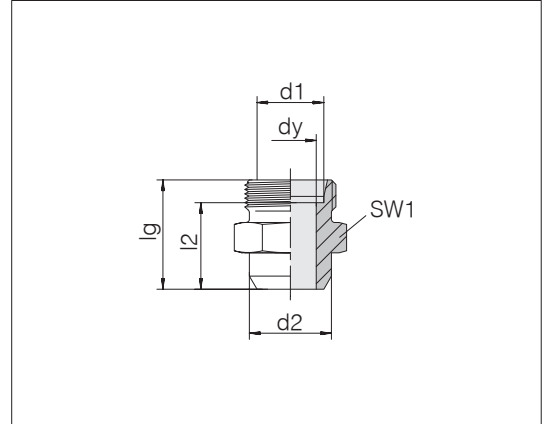
Example for comp. :  
DA06LOMDCF



## Weld-on adapters



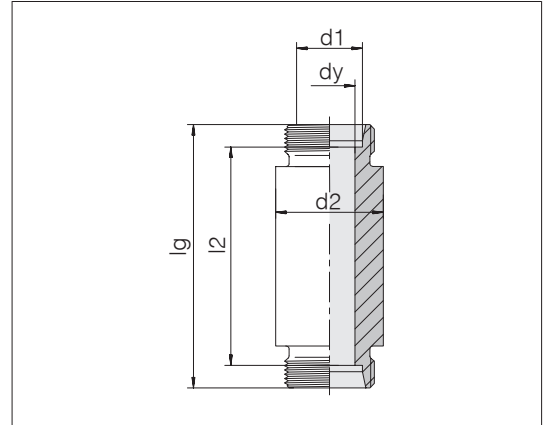
## Straight welding couplings



Series	Tube OD	d2	dy	lg	l2	SW1	kg/100 ca.	Order-No.	Designation
L	6	10	4	21	14	12	1.0	0739000000	24-WDS-L6-C00
L	8	12	6	23	16	14	1.5	0739050000	24-WDS-L8-C00
L	10	14	8	25	18	17	2.1	0739100000	24-WDS-L10-C00
L	12	16	10	25	18	19	2.6	0739150000	24-WDS-L12-C00
L	15	19	12	29	22	22	4.3	0739200000	24-WDS-L15-C00
L	18	22	15	31	23.5	27	6.6	0739250000	24-WDS-L18-C00
L	22	27	19	36	28.5	32	9.7	0739300000	24-WDS-L22-C00
L	28	32	24	38	30.5	41	15.9	0739350000	24-WDS-L28-C00
L	35	40	30	43	32.5	46	22.8	0739400000	24-WDS-L35-C00
L	42	46	36	46	35	55	32.8	0739450000	24-WDS-L42-C00
S	6	11	4	26	19	14	2.1	0739500000	24-WDS-S6-C00
S	8	13	5	28	21	17	3.0	0739550000	24-WDS-S8-C00
S	10	15	7	30	22.5	19	4.0	0739600000	24-WDS-S10-C00
S	12	17	8	32	24.5	22	5.5	0739650000	24-WDS-S12-C00
S	14	19	10	35	27	24	7.0	0739700000	24-WDS-S14-C00
S	16	21	12	35	26.5	27	8.3	0739750000	24-WDS-S16-C00
S	20	26	16	40	29.5	32	12.9	0739800000	24-WDS-S20-C00
S	25	31	20	44	32	41	22.2	0739850000	24-WDS-S25-C00
S	30	36	25	49	35.5	46	29.5	0739900000	24-WDS-S30-C00
S	38	44	32	54	38	55	45.5	0739950000	24-WDS-S38-C00

Example for comp. :  
AS06LX  
ISO 8434-1-WDS-L6-St

## Welding bulkhead couplings



Series	Tube OD	d2	d <sub>y</sub>	l <sub>g</sub>	l <sub>2</sub>	kg/100 ca.	Order-No.	Designation
L	6	18	4	70	56	10.3	0741000000	24-WDBHS-L6-C00
L	8	20	6	70	56	12.1	0741050000	24-WDBHS-L8-C00
L	10	22	8	72	58	14.3	0741100000	24-WDBHS-L10-C00
L	12	25	10	72	58	17.7	0741150000	24-WDBHS-L12-C00
L	15	28	12	84	70	25.9	0741200000	24-WDBHS-L15-C00
L	18	32	15	84	69	33.4	0741250000	24-WDBHS-L18-C00
L	22	36	19	88	73	40.0	0741300000	24-WDBHS-L22-C00
L	28	40	24	88	73	44.5	0741350000	24-WDBHS-L28-C00
L	35	50	30	92	71	72.3	0741400000	24-WDBHS-L35-C00
L	42	60	36	92	70	100.5	0741450000	24-WDBHS-L42-C00
S	6	20	4	74	60	13.5	0741500000	24-WDBHS-S6-C00
S	8	22	5	74	60	16.2	0741550000	24-WDBHS-S8-C00
S	10	25	7	74	59	20.0	0741600000	24-WDBHS-S10-C00
S	12	28	8	74	59	25.0	0741650000	24-WDBHS-S12-C00
S	14	30	10	88	72	33.7	0741700000	24-WDBHS-S14-C00
S	16	35	12	88	71	44.4	0741750000	24-WDBHS-S16-C00
S	20	38	16	92	71	51.5	0741800000	24-WDBHS-S20-C00
S	25	45	20	96	72	72.3	0741850000	24-WDBHS-S25-C00
S	30	50	25	100	73	87.3	0741900000	24-WDBHS-S30-C00
S	38	60	32	104	72	125.1	0741950000	24-WDBHS-S38-C00

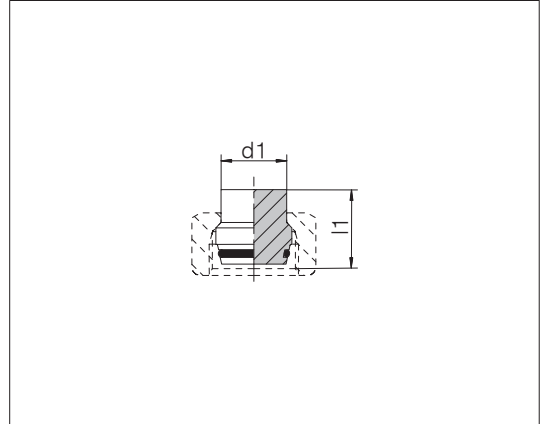
Example for comp. :  
 ESV06LX  
 ISO 8434-1-WDBHS-L6-St

# Caps

With taper and O-ring  
fit in bore type W DIN 3861/ISO 8434-1

For blind connections of tube couplings

Standard O-ring material is FKM



Series		l1	kg/100 ca.	Order-No.	Designation
Tube OD					
d1					
L/S	6	18.5	0.6	1793142058	24-PLO-L/S6
L/S	8	19	1.0	1793152058	24-PLO-L/S8
L/S	10	21	1.6	1793162058	24-PLO-L/S10
L/S	12	20.5	2.2	1793172058	24-PLO-L/S12
L	15	20.5	3.2	1793082058	24-PLO-L15
L	18	23.5	5.1	1793092058	24-PLO-L18
L	22	26	8.1	1793102058	24-PLO-L22
L	28	26.5	13.0	1793112058	24-PLO-L28
L	35	32	24.0	1793122058	24-PLO-L35
L	42	32.5	34.6	1793132058	24-PLO-L42
S	14	24	3.2	1793182058	24-PLO-S14
S	16	25	4.1	1793192058	24-PLO-S16
S	20	30.5	8.0	1793202058	24-PLO-S20
S	25	32.5	12.4	1793212058	24-PLO-S25
S	30	35.5	18.2	1793222058	24-PLO-S30
S	38	40.5	31.5	1793232058	24-PLO-S38

Example for comp. :  
VKA06VIT

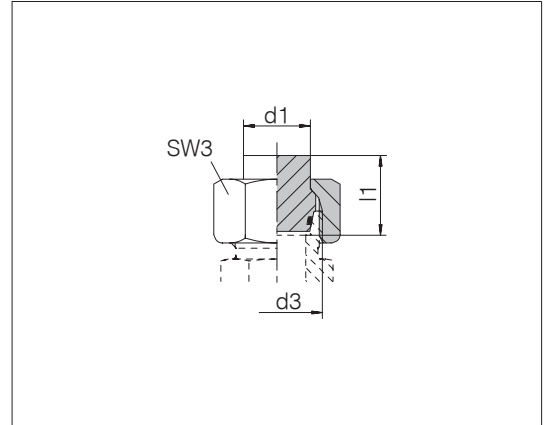


## Caps

With taper and O-ring  
fit in bore type W DIN 3861/ISO 8434-1

For blind connections of tube couplings

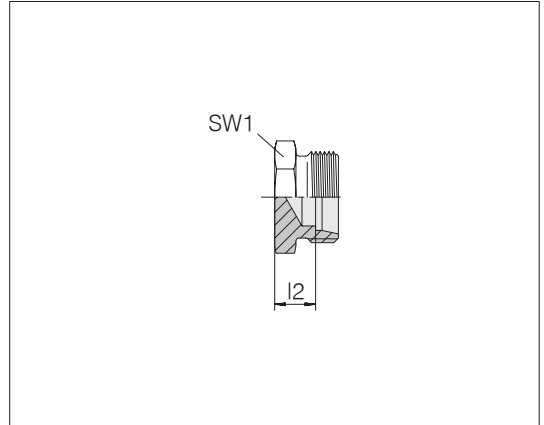
Standard O-ring material is FKM



Series	Tube OD	d3	l1	SW3	kg/100 ca.	Order-No.	Designation
L	6	M 12 x 1.5	18.5	14	1.6	1193042058	24-PLOC-L6
L	8	M 14 x 1.5	19	17	2.5	1193052058	24-PLOC-L8
L	10	M 16 x 1.5	21	19	3.4	1193062058	24-PLOC-L10
L	12	M 18 x 1.5	21.5	22	4.8	1193072058	24-PLOC-L12
L	15	M 22 x 1.5	20.5	27	7.5	1193082058	24-PLOC-L15
L	18	M 26 x 1.5	23.5	32	11.4	1193092058	24-PLOC-L18
L	22	M 30 x 2	26	36	16.3	1193102058	24-PLOC-L22
L	28	M 36 x 2	26.5	41	21.7	1193112058	24-PLOC-L28
L	35	M 45 x 2	32	50	37.4	1193122058	24-PLOC-L35
L	42	M 52 x 2	32.5	60	55.9	1193132058	24-PLOC-L42
S	6	M 14 x 1.5	18.5	17	2.4	1193142058	24-PLOC-S6
S	8	M 16 x 1.5	19	19	3.1	1193152058	24-PLOC-S8
S	10	M 18 x 1.5	21	22	4.7	1193162058	24-PLOC-S10
S	12	M 20 x 1.5	21.5	24	5.7	1193172058	24-PLOC-S12
S	14	M 22 x 1.5	24	27	8.5	1193182058	24-PLOC-S14
S	16	M 24 x 1.5	25	30	10.7	1193192058	24-PLOC-S16
S	20	M 30 x 2	30.5	36	18.3	1193202058	24-PLOC-S20
S	25	M 36 x 2	32.5	46	33.0	1193212058	24-PLOC-S25
S	30	M 42 x 2	35.5	50	39.8	1193222058	24-PLOC-S30
S	38	M 52 x 2	40.5	60	62.8	1193232058	24-PLOC-S38

Example for comp. :  
VKAM06LVIT

# Plugs



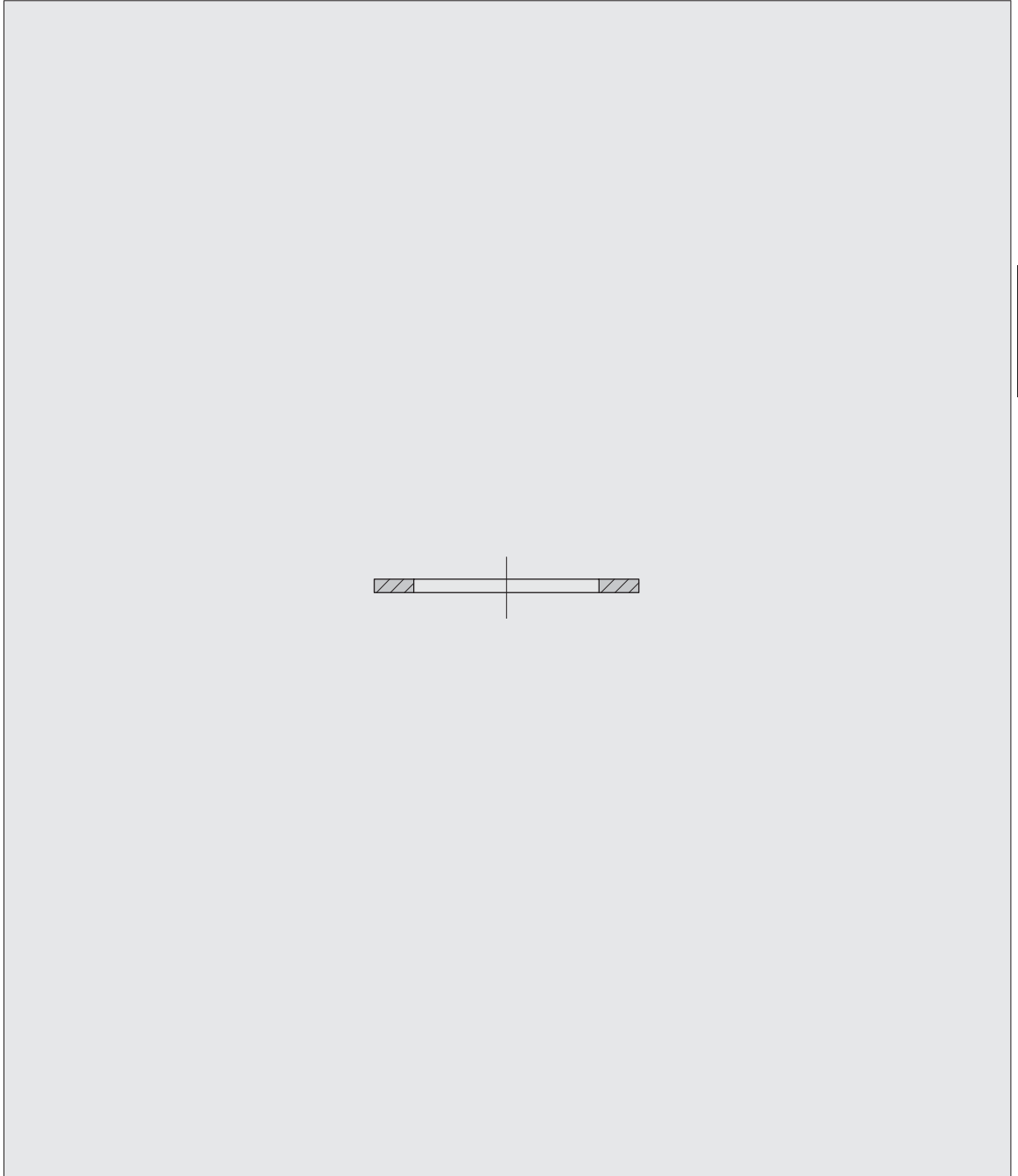
Series	l2	SW1	kg/100 ca.	Order-No.	Designation
Tube OD					
L 6	7	12	0.8	0793342000	24-TBS-L6
L 8	8	14	1.2	0793352000	24-TBS-L8
L 10	9	17	1.6	0793362000	24-TBS-L10
L 12	10	19	2.2	0793372000	24-TBS-L12
L 15	11	24	3.8	0793382000	24-TBS-L15
L 18	11.5	27	5.4	0793392000	24-TBS-L18
L 22	13.5	32	7.7	0793402000	24-TBS-L22
L 28	14.5	41	13.3	0793412000	24-TBS-L28
L 35	14.5	46	20.1	0793422000	24-TBS-L35
L 42	18.5	55	34.0	0793432000	24-TBS-L42
S 6	11	14	1.6	0793442000	24-TBS-S6
S 8	13	17	2.6	0793452000	24-TBS-S8
S 10	12.5	19	3.1	0793462000	24-TBS-S10
S 12	14.5	22	4.5	0793472000	24-TBS-S12
S 14	16	24	5.9	0793482000	24-TBS-S14
S 16	15.5	27	6.8	0793492000	24-TBS-S16
S 20	17.5	32	12.0	0793502000	24-TBS-S20
S 25	20	41	21.3	0793512000	24-TBS-S25
S 30	20.5	46	28.1	0793522000	24-TBS-S30
S 38	23	55	49.8	0793532000	24-TBS-S38

Example for comp. :  
ROV06LX



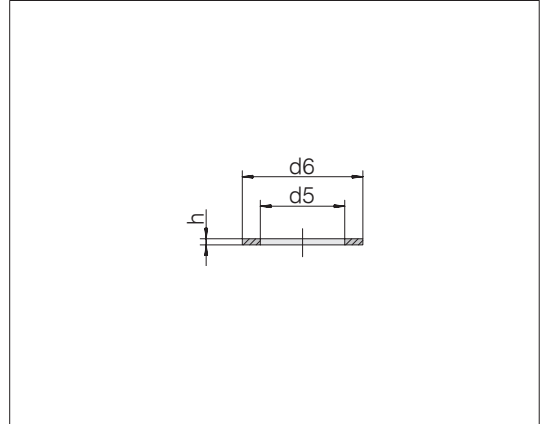


## Sealing rings



## Sealing rings for threaded studs according to DIN 3852-1/-2 form A

Standard seal material 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.

## Pre-assembly devices and tools



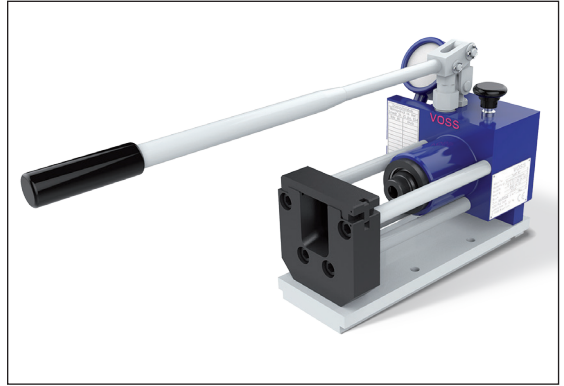
Content	Type/Page		
Pre-assembly devices	TYPE80N3	TYPE90B2	TYPE90C2
	P.120	P.121	P.122
Forming machines	TYPE100	TYPE100C	
	P.123	P.124	
Foot switch	FOOTSWITCH1		
	P.125		
Tube bending device	TBM1		
	P.126		
Thread gauge board	TIB		
	P.127		
Cone gauges	CG		
	P.128		
Inspections gauges	TGCR		
	P.129		

Content	Type/Page				
Pre-assembly tools cutting ring assemblies	VRPT	CRPT-MT	CRPT-PA	CRCB-TYPE80	CRPT-MT
	P.130	P.131	P.132	P.133	P.134
	CRCB				
	P.136				
Pre-assembly tools VOSSForm	SQRFH/SQRCJ				
	P.137				

## Pre-assembly devices

### Type 80 N3

Manual pump pre-assembly device



Type	Order-No.	Designation
For manual pre-assembly of cutting rings on tubes with OD 6 – 42 mm, and for manual pre-assembly of flared cones and ZAKO rings up to 1 1/4".	5991080400	TD-TYPE80N3

#### Dimensions

Width: 190 mm

Height: 267 mm

Depth: 590 mm

Weight: 15 kg

## Pre-assembly devices

### Type 90 Basic II

Device for electrical mains power  
400 V / 50 Hz / 3 Ph

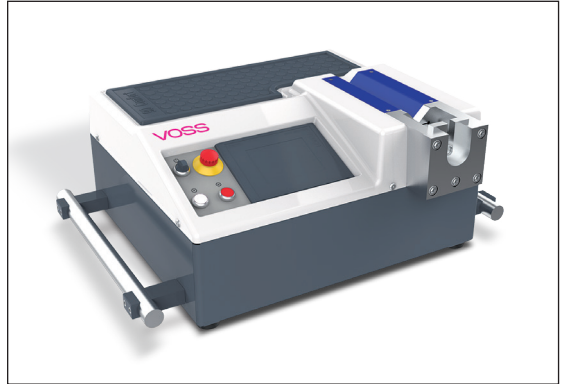


Type	Order-No.	Designation
For machine-assisted pre-assembly of cutting rings on tubes with OD 6 – 42 mm, and for machine-assisted pre-assembly of flared cones and ZAKO rings, by means of a conversion kit (not part of standard delivery package).	5992892000	TD-TYPE90B2
Dimensions		
Width:	681 mm	
Height:	260 mm	
Depth:	520 mm	
Weight:	66 kg	
Noise level:	60 dBA	
Conversion kit	9799600140	TD-BV10A-TYPE90B2
Other power supply ratings upon request.		

## Pre-assembly devices

### Type 90 Comfort

Device for electrical mains power  
400 V / 50 Hz / 3 Ph



Type	Order-No.	Designation
For machine-assisted pre-assembly of cutting rings on tubes with OD 6 - 42 mm, and for machine-assisted pre-assembly of flared cones and ZAKO rings, by means of a conversion kit (not part of standard delivery package).	5992893000	TD-TYPE90C2
Dimensions		
Width:	800 mm	
Height:	308 mm	
Depth:	615 mm	
Depth (with conversion kit):	636 mm	
Weight:		
Weight:	90 kg	
Noise level:		
Noise level:	70 dBA	
Conversion kit	9799600141	TD-BV10A-TYPE90C2
Other power supply ratings upon request.		



## Forming machines

### VOSSForm 100

Forming machine for electrical mains power supply  
 400 V 16 A AC  
 3Ph / N / PE 50 Hz / 4 kW



Type	Order-No.	Designation
For machine-assisted forming of the VOSSForm <sup>SOB</sup> contour on steel and stainless steel tubes with ODs 6 – 42 mm.	5991008000	TD-TYPE100

5-pin CEE plug

#### Dimensions

Width: 900 mm  
 Height: 1122 mm  
 Depth: 943 mm

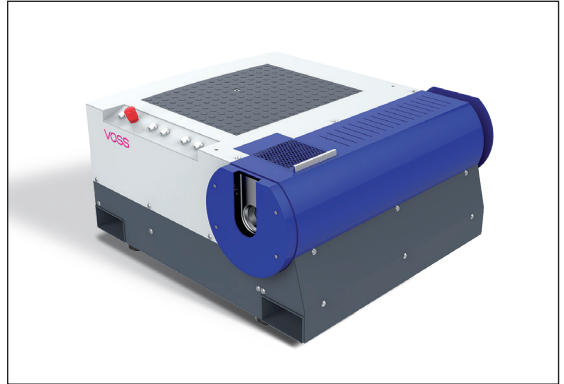
Weight: 630 kg  
 Noise level: < 74 dBA

Other power supply ratings upon request.

## Forming machines

### VOSSForm 100 Compact

Forming machine for electrical mains power supply  
400 V 16 A AC  
3Ph / N / PE 50 Hz / 3 kW



Type	Order-No.	Designation
For machine-assisted forming of the VOSSForm <sup>SQR</sup> contour on steel and stainless steel tubes with OD 6 – 42 mm.	5992895000	TD-TYPE100C

#### Technical details

Minor changes to cycle times compared to Type VOSSForm 100, omission of the integrated tool magazine and cooling system

5-pin CEE plug

#### Dimensions

Width: 800 mm  
Height: 485 mm  
Depth: 935 mm

Weight: 440 kg  
Noise level: < 74 dBA

Other power supply ratings upon request.

## Foot switch for pre-assembly devices

Connector: CA 3 LS  
Protection class: IP65



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

For operating pre-assembly devices:

Typ 90 Basic II

Typ 90 Comfort

VOSSForm 100

VOSSForm 100 Compact

Min. cable length 3 m

Dimensions

Width: 156 mm

Height: 146 mm

Depth: 250 mm

## Tube bending device

Mobile manual unit for producing precision tube bends



Type	Order-No.	Designation
Tube bending device for manual precision bending of tubes. Can be used to bend tubes with OD of 8 to 22 mm.	5994060000	TD-TBM1

The delivery package includes the following 9 bending templates:

Tube OD	Order-No.	Designation
8	5994059900	TD-TBM1-RR8
10	5994059800	TD-TBM1-RR10
12	5994059700	TD-TBM1-RR12
14	5994059600	TD-TBM1-RR14
15	5994059500	TD-TBM1-RR15
16	5994059400	TD-TBM1-RR16
18	5994059300	TD-TBM1-RR18
20	5994059200	TD-TBM1-RR20
22	5994058900	TD-TBM1-RR22

## Thread gauge board

For determining thread sizes of threaded studs



Type	Order-No.	Designation
Can be used to determine following thread sizes:	5993571149	TD-TIB
Metric fine thread, parallel M 10 x 1 – M 48 x 2		
BSPP thread, parallel G 1/8" – G 1 1/2"		

## Cone gauges for pre-assembly studs

For checking the 24° cone of a stud



Series Tube OD	Order-No.	Designation
L 6	5991001000	TD-CG-L/S6
L 8	5991001100	TD-CG-L/S8
L 10	5991001200	TD-CG-L/S10
L 12	5991001300	TD-CG-L/S12
L 15	5991001400	TD-CG-L15
L 18	5991001500	TD-CG-L18
L 22	5991001600	TD-CG-L22
L 28	5991001700	TD-CG-L28
L 35	5991001800	TD-CG-L35
L 42	5991001900	TD-CG-L42
S 6	5991001000	TD-CG-L/S6
S 8	5991001100	TD-CG-L/S8
S 10	5991001200	TD-CG-L/S10
S 12	5991001300	TD-CG-L/S12
S 14	5991002000	TD-CG-S14
S 16	5991002100	TD-CG-S16
S 20	5991002200	TD-CG-S20
S 25	5991002300	TD-CG-S25
S 30	5991002400	TD-CG-S30
S 38	5991002500	TD-CG-S38
Cone gages complete in handy case	5994090049	TD-CG

## Inspection gauges

For inspection of cutting ring pre-assemblies

Including union nut and test pin in a handy suitcase



Series	Order-No.	Designation
Tube OD		
L 6	5994502249	TD-TGCR-L6
L 8	5994502349	TD-TGCR-L8
L 10	5994502449	TD-TGCR-L10
L 12	5994502549	TD-TGCR-L12
L 15	5994502649	TD-TGCR-L15
L 18	5994502749	TD-TGCR-L18
L 22	5994502849	TD-TGCR-L22
L 28	5994503749	TD-TGCR-L28
L 35	5994503849	TD-TGCR-L35
L 42	5994503949	TD-TGCR-L42
S 6	5994502949	TD-TGCR-S6
S 8	5994503049	TD-TGCR-S8
S 10	5994503149	TD-TGCR-S10
S 12	5994503249	TD-TGCR-S12
S 14	5994503349	TD-TGCR-S14
S 16	5994503449	TD-TGCR-S16
S 20	5994503549	TD-TGCR-S20
S 25	5994504049	TD-TGCR-S25
S 30	5994504149	TD-TGCR-S30
S 38	5994504249	TD-TGCR-S38

# Pre-assembly tools for cutting ring assemblies

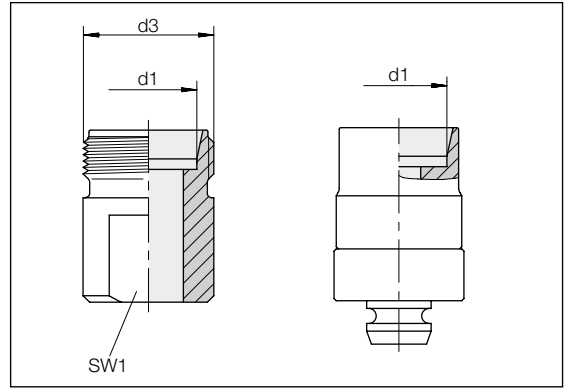
VOSS Ring-manual pre-assembly stud

VOSS Ring-pre-assembly stud

Typ 80 N3

Typ 90 Basic II

Typ 90 Comfort

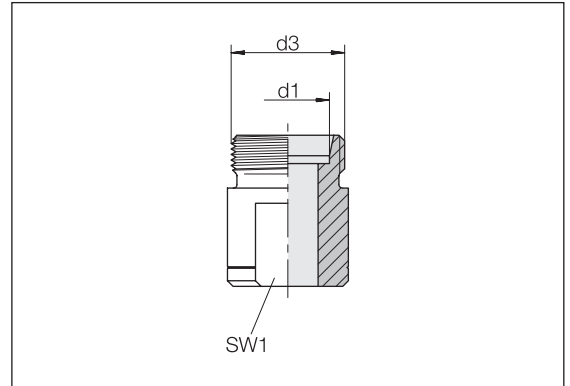


Series	d3	SW1	Order-No.	Designation	Order-No.	Designation	Order-No.	Designation
Tube OD				Manual pre-assembly stud		Pre-assembly stud		Pre-assembly stud
d1				<b>High-performance steel</b>		<b>High-performance steel</b>		<b>High-performance steel with RFID (Typ 90 Comfort)</b>
L 6	M 12 x 1.5	10	5993234100	TD-VRPT-L6-M-PM	5993230300	TD-VRPT-L6-MT-PM	5993230349	TD-VRPT-L6-MT-PM-RFID
L 8	M 14 x 1.5	12	5993234200	TD-VRPT-L8-M-PM	5993230400	TD-VRPT-L8-MT-PM	5993230449	TD-VRPT-L8-MT-PM-RFID
L 10	M 16 x 1.5	13	5993234300	TD-VRPT-L10-M-PM	5993230500	TD-VRPT-L10-MT-PM	5993230549	TD-VRPT-L10-MT-PM-RFID
L 12	M 18 x 1.5	14	5993234400	TD-VRPT-L12-M-PM	5993230600	TD-VRPT-L12-MT-PM	5993230649	TD-VRPT-L12-MT-PM-RFID
L 15	M 22 x 1.5	19	5993234500	TD-VRPT-L15-M-PM	5993230700	TD-VRPT-L15-MT-PM	5993230749	TD-VRPT-L15-MT-PM-RFID
L 18	M 26 x 1.5	22	5993234600	TD-VRPT-L18-M-PM	5993230800	TD-VRPT-L18-MT-PM	5993230849	TD-VRPT-L18-MT-PM-RFID
L 22	M 30 x 2	24	5993234700	TD-VRPT-L22-M-PM	5993230900	TD-VRPT-L22-MT-PM	5993230949	TD-VRPT-L22-MT-PM-RFID
L 28	M 36 x 2	30	5993234800	TD-VRPT-L28-M-PM	5993231000	TD-VRPT-L28-MT-PM	5993231049	TD-VRPT-L28-MT-PM-RFID
L 35	M 45 x 2	36	5993234900	TD-VRPT-L35-M-PM	5993231100	TD-VRPT-L35-MT-PM	5993231149	TD-VRPT-L35-MT-PM-RFID
L 42	M 52 x 2	41	5993235000	TD-VRPT-L42-M-PM	5993231200	TD-VRPT-L42-MT-PM	5993231249	TD-VRPT-L42-MT-PM-RFID
S 6	M 14 x 1.5	12	5993235100	TD-VRPT-S6-M-PM	5993231300	TD-VRPT-S6-MT-PM	5993231349	TD-VRPT-S6-MT-PM-RFID
S 8	M 16 x 1.5	13	5993235200	TD-VRPT-S8-M-PM	5993231400	TD-VRPT-S8-MT-PM	5993231449	TD-VRPT-S8-MT-PM-RFID
S 10	M 18 x 1.5	14	5993235300	TD-VRPT-S10-M-PM	5993231500	TD-VRPT-S10-MT-PM	5993231549	TD-VRPT-S10-MT-PM-RFID
S 12	M 20 x 1.5	17	5993235400	TD-VRPT-S12-M-PM	5993231600	TD-VRPT-S12-MT-PM	5993231649	TD-VRPT-S12-MT-PM-RFID
S 14	M 22 x 1.5	19	5993235500	TD-VRPT-S14-M-PM	5993231700	TD-VRPT-S14-MT-PM	5993231749	TD-VRPT-S14-MT-PM-RFID
S 16	M 24 x 1.5	19	5993235600	TD-VRPT-S16-M-PM	5993231800	TD-VRPT-S16-MT-PM	5993231849	TD-VRPT-S16-MT-PM-RFID
S 20	M 30 x 2	24	5993235700	TD-VRPT-S20-M-PM	5993231900	TD-VRPT-S20-MT-PM	5993231949	TD-VRPT-S20-MT-PM-RFID
S 25	M 36 x 2	30	5993235800	TD-VRPT-S25-M-PM	5993232000	TD-VRPT-S25-MT-PM	5993232049	TD-VRPT-S25-MT-PM-RFID
S 30	M 42 x 2	36	5993235900	TD-VRPT-S30-M-PM	5993232100	TD-VRPT-S30-MT-PM	5993232149	TD-VRPT-S30-MT-PM-RFID
S 38	M 52 x 2	41	5993236000	TD-VRPT-S38-M-PM	5993232200	TD-VRPT-S38-MT-PM	5993232249	TD-VRPT-S38-MT-PM-RFID



## Pre-assembly tools for cutting ring assemblies

Universal manual pre-assembly stud/mandrel

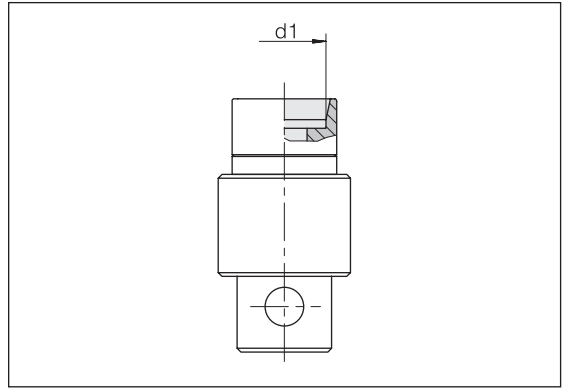


Series	d3	SW1	Order-No.	Designation	Order-No.	Designation
Tube OD				Manual pre-assembly stud		Manual pre-assembly stud
d1				<b>Standard</b>		<b>High-performance steel</b>
L 6	M 12 x 1.5	11	5993954000	TD-CRPT-L6-M	5993993400	TD-CRPT-L6-M-PM
L 8	M 14 x 1.5	12	5993955000	TD-CRPT-L8-M	5993993500	TD-CRPT-L8-M-PM
L 10	M 16 x 1.5	14	5993956000	TD-CRPT-L10-M	5993993600	TD-CRPT-L10-M-PM
L 12	M 18 x 1.5	17	5993957000	TD-CRPT-L12-M	5993993700	TD-CRPT-L12-M-PM
L 15	M 22 x 1.5	19	5993958000	TD-CRPT-L15-M	5993993800	TD-CRPT-L15-M-PM
L 18	M 26 x 1.5	24	5993959000	TD-CRPT-L18-M	5993993900	TD-CRPT-L18-M-PM
L 22	M 30 x 2	27	5993960000	TD-CRPT-L22-M	5993994000	TD-CRPT-L22-M-PM
L 28	M 36 x 2	32	5993961000	TD-CRPT-L28-M	5993994100	TD-CRPT-L28-M-PM
L 35	M 45 x 2	41	5993962000	TD-CRPT-L35-M	5993994200	TD-CRPT-L35-M-PM
L 42	M 52 x 2	46	5993963000	TD-CRPT-L42-M	5993994300	TD-CRPT-L42-M-PM
S 6	M 14 x 1.5	12	5993964000	TD-CRPT-S6-M	5993994400	TD-CRPT-S6-M-PM
S 8	M 16 x 1.5	14	5993965000	TD-CRPT-S8-M	5993994500	TD-CRPT-S8-M-PM
S 10	M 18 x 1.5	17	5993966000	TD-CRPT-S10-M	5993994600	TD-CRPT-S10-M-PM
S 12	M 20 x 1.5	17	5993967000	TD-CRPT-S12-M	5993994700	TD-CRPT-S12-M-PM
S 14	M 22 x 1.5	19	5993968000	TD-CRPT-S14-M	5993994800	TD-CRPT-S14-M-PM
S 16	M 24 x 1.5	22	5993969000	TD-CRPT-S16-M	5993994900	TD-CRPT-S16-M-PM
S 20	M 30 x 2	27	5993970000	TD-CRPT-S20-M	5993995000	TD-CRPT-S20-M-PM
S 25	M 36 x 2	32	5993971000	TD-CRPT-S25-M	5993995100	TD-CRPT-S25-M-PM
S 30	M 42 x 2	36	5993972000	TD-CRPT-S30-M	5993995200	TD-CRPT-S30-M-PM
S 38	M 52 x 2	46	5993973000	TD-CRPT-S38-M	5993995300	TD-CRPT-S38-M-PM

# Pre-assembly tools for cutting ring assemblies

Type 80 N2

Universal pre-assembly stud/mandrel

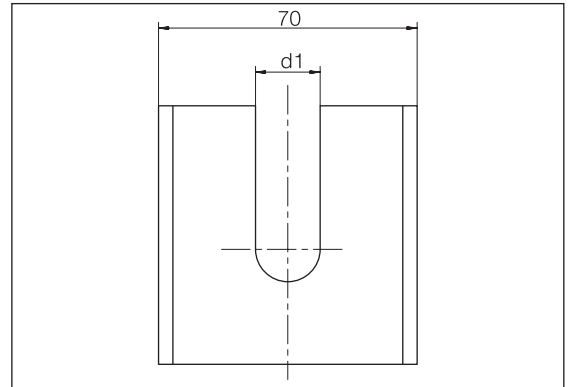


Series	Order-No.	Designation	Order-No.	Designation
Tube OD		Pre-assembly stud		Pre-assembly stud
d1		<b>Standard</b>		<b>High-performance steel</b>
L 6	5991207100	TD-CRPT-L6-PA	5993863400	TD-CRPT-L6-PA-PM
L 8	5991208100	TD-CRPT-L8-PA	5993863600	TD-CRPT-L8-PA-PM
L 10	5991209100	TD-CRPT-L10-PA	5993863800	TD-CRPT-L10-PA-PM
L 12	5991210100	TD-CRPT-L12-PA	5993864000	TD-CRPT-L12-PA-PM
L 15	5991211100	TD-CRPT-L15-PA	5993864300	TD-CRPT-L15-PA-PM
L 18	5991212100	TD-CRPT-L18-PA	5993864500	TD-CRPT-L18-PA-PM
L 22	5991213100	TD-CRPT-L22-PA	5993864700	TD-CRPT-L22-PA-PM
L 28	5991214100	TD-CRPT-L28-PA	5993864900	TD-CRPT-L28-PA-PM
L 35	5991215100	TD-CRPT-L35-PA	5993865100	TD-CRPT-L35-PA-PM
L 42	5991216100	TD-CRPT-L42-PA	5993865300	TD-CRPT-L42-PA-PM
S 6	5991217100	TD-CRPT-S6-PA	5993863500	TD-CRPT-S6-PA-PM
S 8	5991218100	TD-CRPT-S8-PA	5993863700	TD-CRPT-S8-PA-PM
S 10	5991219100	TD-CRPT-S10-PA	5993863900	TD-CRPT-S10-PA-PM
S 12	5991220100	TD-CRPT-S12-PA	5993864100	TD-CRPT-S12-PA-PM
S 14	5991221100	TD-CRPT-S14-PA	5993864200	TD-CRPT-S14-PA-PM
S 16	5991222100	TD-CRPT-S16-PA	5993864400	TD-CRPT-S16-PA-PM
S 20	5991223100	TD-CRPT-S20-PA	5993864600	TD-CRPT-S20-PA-PM
S 25	5991224100	TD-CRPT-S25-PA	5993864800	TD-CRPT-S25-PA-PM
S 30	5991225100	TD-CRPT-S30-PA	5993865000	TD-CRPT-S30-PA-PM
S 38	5991226100	TD-CRPT-S38-PA	5993865200	TD-CRPT-S38-PA-PM

## Pre-assembly tools for cutting ring assemblies

Type 80 N2 / N3

Support plate

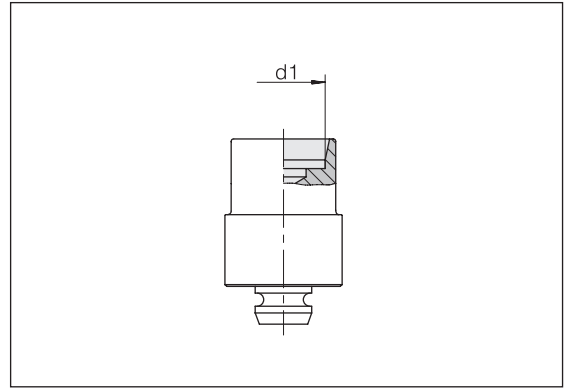


Series	Order-No.	Designation
Tube OD		Support plate
d1		<b>Type 80 N2 / N3</b>
L 6	5991327100	TD-CRCB-L/S6-TYPE80
L 8	5991328100	TD-CRCB-L/S8-TYPE80
L 10	5991329100	TD-CRCB-L/S10-TYPE80
L 12	5991330100	TD-CRCB-L/S12-TYPE80
L 15	5991331100	TD-CRCB-L15-TYPE80
L 18	5991332100	TD-CRCB-L18-TYPE80
L 22	5991333100	TD-CRCB-L22-TYPE80
L 28	5991334100	TD-CRCB-L28-TYPE80
L 35	5991335100	TD-CRCB-L35-TYPE80
L 42	5991336100	TD-CRCB-L42-TYPE80
S 6	5991327100	TD-CRCB-L/S6-TYPE80
S 8	5991328100	TD-CRCB-L/S8-TYPE80
S 10	5991329100	TD-CRCB-L/S10-TYPE80
S 12	5991330100	TD-CRCB-L/S12-TYPE80
S 14	5991337100	TD-CRCB-S14-TYPE80
S 16	5991338100	TD-CRCB-S16-TYPE80
S 20	5991339100	TD-CRCB-S20-TYPE80
S 25	5991340100	TD-CRCB-S25-TYPE80
S 30	5991341100	TD-CRCB-S30-TYPE80
S 38	5991342100	TD-CRCB-S38-TYPE80

# Pre-assembly tools for cutting ring assemblies

Type 80 N3  
Type 90 Basic II

Universal pre-assembly stud/mandrel

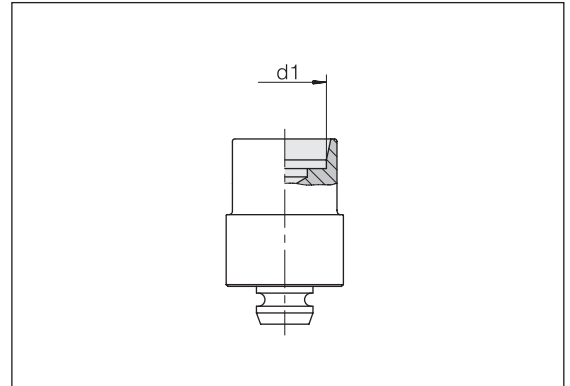


Series	Order-No.	Designation	Order-No.	Designation
Tube OD		Pre-assembly stud		Pre-assembly stud
d1		<b>Standard</b>		<b>High-performance steel</b>
L 6	5991207300	TD-CRPT-L6-MT	5993861400	TD-CRPT-L6-MT-PM
L 8	5991208300	TD-CRPT-L8-MT	5993861600	TD-CRPT-L8-MT-PM
L 10	5991209300	TD-CRPT-L10-MT	5993861800	TD-CRPT-L10-MT-PM
L 12	5991210300	TD-CRPT-L12-MT	5993862000	TD-CRPT-L12-MT-PM
L 15	5991211300	TD-CRPT-L15-MT	5993862300	TD-CRPT-L15-MT-PM
L 18	5991212300	TD-CRPT-L18-MT	5993862500	TD-CRPT-L18-MT-PM
L 22	5991213300	TD-CRPT-L22-MT	5993862700	TD-CRPT-L22-MT-PM
L 28	5991214300	TD-CRPT-L28-MT	5993862900	TD-CRPT-L28-MT-PM
L 35	5991215300	TD-CRPT-L35-MT	5993863100	TD-CRPT-L35-MT-PM
L 42	5991216300	TD-CRPT-L42-MT	5993863300	TD-CRPT-L42-MT-PM
S 6	5991217300	TD-CRPT-S6-MT	5993861500	TD-CRPT-S6-MT-PM
S 8	5991218300	TD-CRPT-S8-MT	5993861700	TD-CRPT-S8-MT-PM
S 10	5991219300	TD-CRPT-S10-MT	5993861900	TD-CRPT-S10-MT-PM
S 12	5991220300	TD-CRPT-S12-MT	5993862100	TD-CRPT-S12-MT-PM
S 14	5991221300	TD-CRPT-S14-MT	5993862200	TD-CRPT-S14-MT-PM
S 16	5991222300	TD-CRPT-S16-MT	5993862400	TD-CRPT-S16-MT-PM
S 20	5991223300	TD-CRPT-S20-MT	5993862600	TD-CRPT-S20-MT-PM
S 25	5991224300	TD-CRPT-S25-MT	5993862800	TD-CRPT-S25-MT-PM
S 30	5991225300	TD-CRPT-S30-MT	5993863000	TD-CRPT-S30-MT-PM
S 38	5991226300	TD-CRPT-S38-MT	5993863200	TD-CRPT-S38-MT-PM

## Pre-assembly tools for cutting ring assemblies

Type 90 Comfort

Universal pre-assembly stud/mandrel

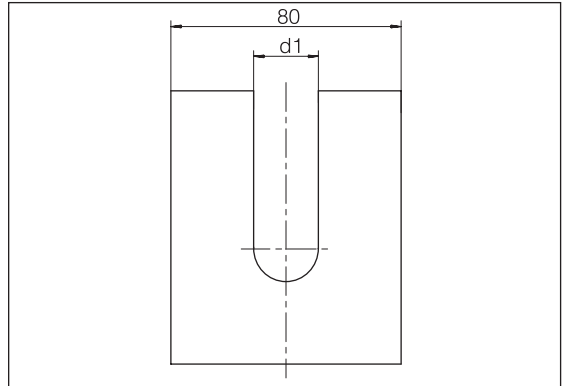


Series	Order-No.	Designation	Order-No.	Designation
Tube OD d1		Pre-assembly stud <b>Standard with RFID (Type 90 Comfort)</b>		Pre-assembly stud <b>High-performance steel with RFID (Type 90 Comfort)</b>
L 6	5993975449	TD-CRPT-L6-LG45,5-MT-RFID	5993974149	TD-CRPT-L6-LG45,5-MT-PM-RFID
L 8	5993975549	TD-CRPT-L8-LG45,5-MT-RFID	5993974249	TD-CRPT-L8-LG45,5-MT-PM-RFID
L 10	5993975649	TD-CRPT-L10-LG45,5-MT-RFID	5993974349	TD-CRPT-L10-LG45,5-MT-PM-RFID
L 12	5993975749	TD-CRPT-L12-LG45,5-MT-RFID	5993974449	TD-CRPT-L12-LG45,5-MT-PM-RFID
L 15	5993975849	TD-CRPT-L15-LG43,5-MT-RFID	5993879549	TD-CRPT-L15-LG43-MT-PM-RFID
L 18	5993851800	TD-CRPT-L18-MT-RFID	5993871800	TD-CRPT-L18-MT-PM-RFID
L 22	5993852000	TD-CRPT-L22-MT-RFID	5993872000	TD-CRPT-L22-MT-PM-RFID
L 28	5993975949	TD-CRPT-L28-LG41-MT-RFID	5993879649	TD-CRPT-L28-LG41-MT-PM-RFID
L 35	5993852400	TD-CRPT-L35-MT-RFID	5993872400	TD-CRPT-L35-MT-PM-RFID
L 42	5993976049	TD-CRPT-L42-LG36-MT-RFID	5993974549	TD-CRPT-L42-LG36-MT-PM-RFID
S 6	5993878849	TD-CRPT-S6-LG43,5-MT-RFID	5993976149	TD-CRPT-S6-LG43,5-MT-PM-RFID
S 8	5993878949	TD-CRPT-S8-LG43,5-MT-RFID	5993975049	TD-CRPT-S8-LG43,5-MT-PM-RFID
S 10	5993879049	TD-CRPT-S10-LG43,5-MT-RFID	5993975149	TD-CRPT-S10-LG43,5-MT-PM-RFID
S 12	5993879149	TD-CRPT-S12-LG43,5-MT-RFID	5993975249	TD-CRPT-S12-LG43,5-MT-PM-RFID
S 14	5993851500	TD-CRPT-S14-MT-RFID	5993871500	TD-CRPT-S14-MT-PM-RFID
S 16	5993851700	TD-CRPT-S16-MT-RFID	5993871700	TD-CRPT-S16-MT-PM-RFID
S 20	5993851900	TD-CRPT-S20-MT-RFID	5993871900	TD-CRPT-S20-MT-PM-RFID
S 25	5993852100	TD-CRPT-S25-MT-RFID	5993872100	TD-CRPT-S25-MT-PM-RFID
S 30	5993879249	TD-CRPT-S30-LG31-MT-RFID	5993975349	TD-CRPT-S30-LG31-MT-PM-RFID
S 38	5993852500	TD-CRPT-S38-MT-RFID	5993872500	TD-CRPT-S38-MT-PM-RFID

## Pre-assembly tools for cutting ring assemblies

Type 90 Basic II  
Type 90 Comfort

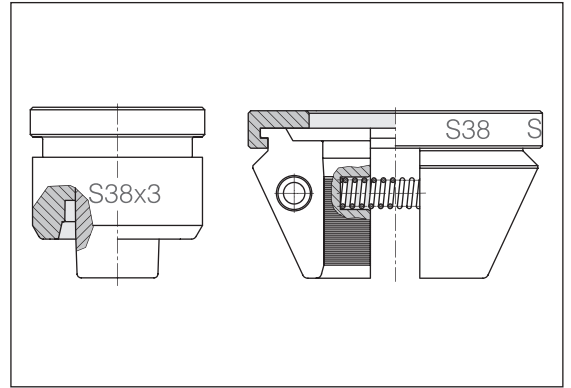
Support plate



Series	Order-No.	Designation
Tube OD		Support plate
d1		
L 6	5991327300	TD-CRCB-L/S6
L 8	5991328300	TD-CRCB-L/S8
L 10	5991329300	TD-CRCB-L/S10
L 12	5991330300	TD-CRCB-L/S12
L 15	5991331300	TD-CRCB-L15
L 18	5991332300	TD-CRCB-L18
L 22	5991333300	TD-CRCB-L22
L 28	5991334300	TD-CRCB-L28
L 35	5991335300	TD-CRCB-L35
L 42	5991336300	TD-CRCB-L42
S 6	5991327300	TD-CRCB-L/S6
S 8	5991328300	TD-CRCB-L/S8
S 10	5991329300	TD-CRCB-L/S10
S 12	5991330300	TD-CRCB-L/S12
S 14	5991337300	TD-CRCB-S14
S 16	5991338300	TD-CRCB-S16
S 20	5991339300	TD-CRCB-S20
S 25	5991340300	TD-CRCB-S25
S 30	5991341300	TD-CRCB-S30
S 38	5991342300	TD-CRCB-S38

## Pre-assembly tools VOSSForm<sup>SQR</sup> (steel)

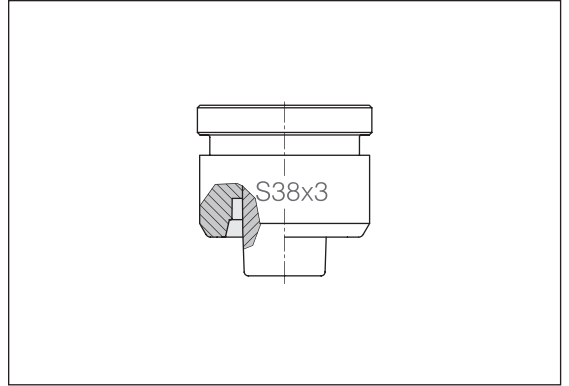
Type 100 / Type 100 Compact



Tube OD	Order-No.	Designation	Tube OD	Order-No.	Designation
Forming head			Clamping jaws		
L/S 6 x 1	5993290690	TD-SQRFH-L/S6x1	L/S 6	5993090149	TD-SQRCJ-L/S6
L/S 6 x 1.5	5993290691	TD-SQRFH-L/S6x1.5	L/S 8	5993092949	TD-SQRCJ-L/S8
L/S 6 x 2	5993290692	TD-SQRFH-L/S6x2	L/S 10	5993093649	TD-SQRCJ-L/S10
L/S 8 x 1	5993293490	TD-SQRFH-L/S8x1	L/S 12	5993094349	TD-SQRCJ-L/S12
L/S 8 x 1.5	5993293491	TD-SQRFH-L/S8x1.5	L 15	5993096049	TD-SQRCJ-L15
L/S 8 x 2	5993293492	TD-SQRFH-L/S8x2	L 18	5993096749	TD-SQRCJ-L18
L/S 8 x 2.5	5993293493	TD-SQRFH-L/S8x2.5	L 22	5993097449	TD-SQRCJ-L22
L 10 x 1	5993294190	TD-SQRFH-L10x1	L 28	5993098149	TD-SQRCJ-L28
L 10 x 1.5	5993294191	TD-SQRFH-L10x1.5	L 35	5993098849	TD-SQRCJ-L35
L 10 x 2	5993294192	TD-SQRFH-L10x2	L 42	5993092249	TD-SQRCJ-L42
L 12 x 1	5993294890	TD-SQRFH-L12x1	S 14	5993099549	TD-SQRCJ-S14
L 12 x 1.5	5993294891	TD-SQRFH-L12x1.5	S 16	5993090849	TD-SQRCJ-S16
L 12 x 2	5993294892	TD-SQRFH-L12x2	S 20	5993091549	TD-SQRCJ-S20
L 15 x 1.5	5993296591	TD-SQRFH-L15x1.5	S 25	5993100349	TD-SQRCJ-S25
L 15 x 2	5993296592	TD-SQRFH-L15x2	S 30	5993101049	TD-SQRCJ-S30
L 15 x 2.5	5993296593	TD-SQRFH-L15x2.5	S 38	5993101749	TD-SQRCJ-S38
L 18 x 1.5	5993297291	TD-SQRFH-L18x1.5			
L 18 x 2	5993297292	TD-SQRFH-L18x2			
L 18 x 2.5	5993297293	TD-SQRFH-L18x2.5			
L 18 x 3	5993297294	TD-SQRFH-L18x3			
L 22 x 1.5	5993297991	TD-SQRFH-L22x1.5			
L 22 x 2	5993297992	TD-SQRFH-L22x2			
L 22 x 2.5	5993297993	TD-SQRFH-L22x2.5			
L 22 x 3	5993297994	TD-SQRFH-L22x3			
L 28 x 2	5993298692	TD-SQRFH-L28x2			
L 28 x 2.5	5993298693	TD-SQRFH-L28x2.5			
L 28 x 3	5993298694	TD-SQRFH-L28x3			
L 35 x 2	5993299392	TD-SQRFH-L35x2			
L 35 x 2.5	5993299393	TD-SQRFH-L35x2.5			
L 35 x 3	5993299394	TD-SQRFH-L35x3			
L 35 x 4	5993299396	TD-SQRFH-L35x4			
L 42 x 2	5993292792	TD-SQRFH-L42x2			

# Pre-assembly tools VOSSForm<sup>SQR</sup> (steel)

Type 100 / Type 100 Compact

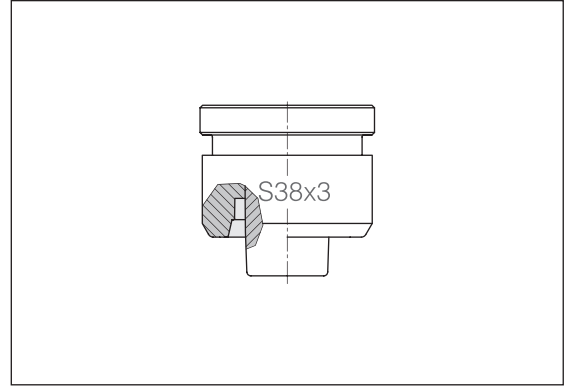


Tube OD	Order-No.	Designation
		<b>Forming head</b>
L 42 x 2.5	5993292793	TD-SQRFH-L42x2.5
L 42 x 3	5993292794	TD-SQRFH-L42x3
L 42 x 4	5993292796	TD-SQRFH-L42x4
S 10 x 1.5	5993295391	TD-SQRFH-S10x1.5
S 10 x 2	5993295392	TD-SQRFH-S10x2
S 10 x 2.5	5993295393	TD-SQRFH-S10x2.5
S 12 x 1.5	5993295891	TD-SQRFH-S12x1.5
S 12 x 2	5993295892	TD-SQRFH-S12x2
S 12 x 2.5	5993295893	TD-SQRFH-S12x2.5
S 12 x 3	5993295894	TD-SQRFH-S12x3
S 14 x 1.5	5993300191	TD-SQRFH-S14x1.5
S 14 x 2	5993300192	TD-SQRFH-S14x2
S 14 x 2.5	5993300193	TD-SQRFH-S14x2.5
S 14 x 3	5993300194	TD-SQRFH-S14x3
S 16 x 1.5	5993291391	TD-SQRFH-S16x1.5
S 16 x 2	5993291392	TD-SQRFH-S16x2
S 16 x 2.5	5993291393	TD-SQRFH-S16x2.5
S 16 x 3	5993291394	TD-SQRFH-S16x3
S 16 x 4	5993291396	TD-SQRFH-S16x4
S 20 x 2	5993292092	TD-SQRFH-S20x2
S 20 x 2.5	5993292093	TD-SQRFH-S20x2.5
S 20 x 3	5993292094	TD-SQRFH-S20x3
S 20 x 3.5	5993292095	TD-SQRFH-S20x3.5
S 20 x 4	5993292096	TD-SQRFH-S20x4
S 25 x 2	5993300892	TD-SQRFH-S25x2
S 25 x 2.5	5993300893	TD-SQRFH-S25x2.5
S 25 x 3	5993300894	TD-SQRFH-S25x3
S 25 x 4	5993300896	TD-SQRFH-S25x4
S 30 x 2	5993301592	TD-SQRFH-S30x2
S 30 x 2.5	5993301593	TD-SQRFH-S30x2.5
S 30 x 3	5993301594	TD-SQRFH-S30x3
S 30 x 4	5993301596	TD-SQRFH-S30x4



## Pre-assembly tools VOSSForm<sup>SQR</sup> (steel)

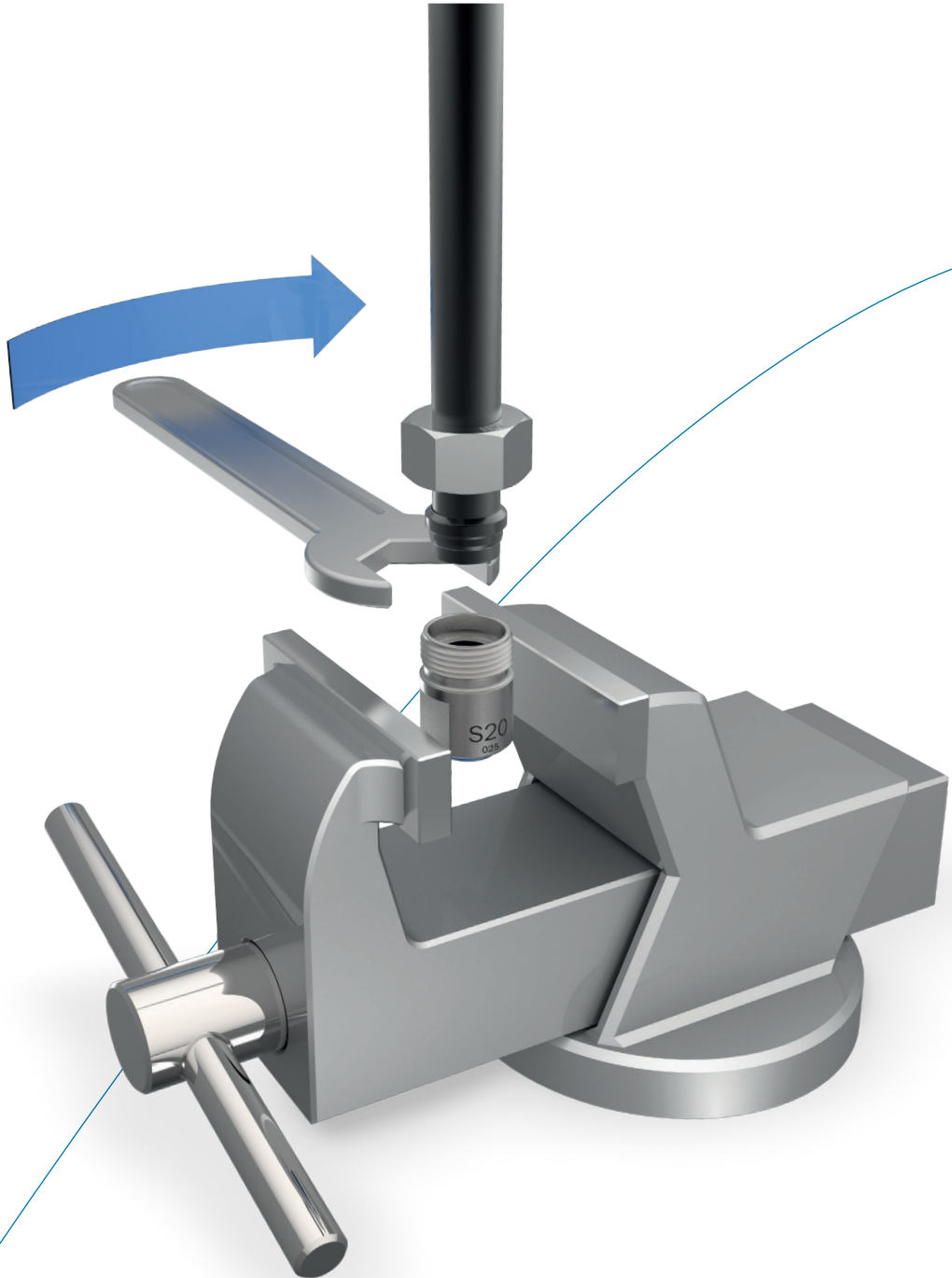
Type 100 / Type 100 Compact



Tube OD	Order-No.	Designation <b>Forming head</b>
S 30 x 5	5993301597	TD-SQRFH-S30x5
S 30 x 6	5993301598	TD-SQRFH-S30x6
S 38 x 2.5	5993302293	TD-SQRFH-S38x2.5
S 38 x 3	5993302294	TD-SQRFH-S38x3
S 38 x 4	5993302296	TD-SQRFH-S38x4
S 38 x 5	5993302297	TD-SQRFH-S38x5
S 38 x 6	5993302298	TD-SQRFH-S38x6
S 38 x 7	5993302299	TD-SQRFH-S38x7



## Assembly instructions



## Content

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(DKO) and weld nipple

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## Important notes on VOSS assembly instructions

In order to ensure maximum performance and functional reliability of VOSS products, the respective assembly instructions, operating conditions and tube recommendations have to be adhered to.

We recommend that you use VOSS pre-assembly devices at all times. The use of pre-assembly devices is a strict requirement from tube sizes L18/S16 and larger! It is absolutely essential to follow the operating instructions for the respective pre-assembly device used.

Do not start with assembly until you are absolutely sure that you have understood the operating and assembly instructions for each VOSS pre-assembly device or machine, tool and product. Incorrect handling leads to risks regarding safety and leak-tightness and can result in failure of the entire connection.

It is impossible for the manufacturer to monitor whether the user is adhering to the operating and assembly instructions for individual pre-assembly devices or machines, tools and products, as well as what conditions prevail and what methods are used for installation, operation, application and maintenance of the individual products. Improper workmanship can lead to material damage, which in turn may pose a danger to life and limb. This means that VOSS Fluid GmbH can accept no responsibility or liability for loss, damage or costs incurred due to faulty installation, improper operation or incorrect application and maintenance or from any related issue. Failure to heed this warning will lead to loss of guarantee.

VOSS Fluid GmbH reserves the right to make changes or additions to the information provided without prior notification. Customers can obtain the latest version of the operating and assembly instructions upon request, or from our download area at: [www.voss.net](http://www.voss.net)

## General notes on VOSS assembly instructions

Make sure that all components, including the tubes, are clean before assembly is started and that they remain clean during the entire assembly process. Soiled components may lead to failure of the system.

Before starting assembly, make sure that you have carried out all preparatory work in accordance with the respective instructions.

### Specifications concerning permissible steel tubes:

seamless, cold-drawn and normalized precision steel tubes as specified in DIN EN 10305-4, material E235+N, mat. no. 1.0308+N or E355, mat. no. 1.0580. The tubes must be ordered by specifying the outer diameter and the inner diameter.

### Specifications concerning permissible stainless steel tubes:

seamless, cold-drawn and solution-annealed, scale-free stainless steel tubes in CFA or CFD delivery condition of dimensions and tolerances according to DIN EN 10305-1 and all other delivery conditions as specified in DIN EN 10216-5, material X6CrNiMoTi17-12-2, mat. no. 1.4571. The tubes must be ordered by specifying the outer diameter and the inner diameter.

The tubes should be prepared with the same thoroughness as pre-assembly and final assembly of the connection. Especially when using long tubes, check the end sections for damage or distortion.

We recommend that pre-assembled tubes which are not to be finally assembled yet should be fitted with protective caps.

Marking a stroke on the union nut and the tube makes it easier to achieve the correct number of turns when tightening the coupling.

Before starting to assemble VOSS components with elastomer seals, always check that:

- the nut and the seal surfaces are clean and undamaged and/or
- the elastomer sealing is clean and undamaged

## Determining the tightening torque for screw couplings

The tightening torques specified in the catalogue apply under the following conditions:

- steel fittings with VOSS coat surface coating
- the specified nominal pressure ranges assume that the mating material has a tensile strength of  $\geq 600 \text{ N/mm}^2$
- our recommendations on lubrication of the threaded studs are observed

If other values for strength, modulus of elasticity and friction-surface combinations are used, the user has to adapt the tightening torque empirically.

The recommended tightening torques have to be adhered to if the pressure range is to be fully utilized and the appropriate safety level is to be maintained.

The recommended tightening torques for the threads are given in the tables for the respective type of thread.

## Explanation of symbols and other notes



Visual inspection



Use the tool to tighten the coupling according to the instructions



Turn until hand-tight or carry out another manual activity



Oil and lubricate at the point marked with an arrow

All dimensions in millimetres [mm]

# Assembly Instructions VOSSRing<sup>M</sup> cutting ring system in conjunction with VOSSRing pre-assembly stud

1

## Notes

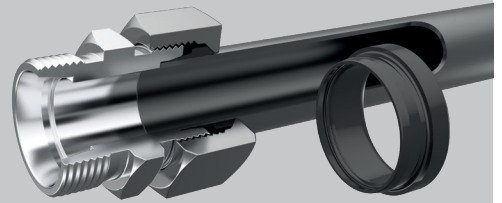
Before starting assembly work please consider the general notes in the latest VOSS catalog and check that your assembly instructions are up to date!

These assembly instructions describe the manual mounting options provided in DIN 3859-2.

However, we always recommend assembly using VOSS pre-assembly devices and tools. Here the respective operating instructions must be observed.

To use the VOSSRing<sup>M</sup> the use of specially developed VOSSRing pre-assembly mandrel is recommended. Only in this way can the patented stop function and the shortened 30° final assembly route be used.

Conventional VOSS pre-assembly mandrels can also be used. However, in this case separate installation instructions must be observed.



For use with steel and stainless steel tubes according to VOSS specification (see introduction assembly instructions).

### Attention:

Please note the recommendation on the use of support sleeves for thin-walled steel pipes and soft tubes of non-ferrous metals and support sleeves of material 1.4571 for thin-walled stainless steel tubes.

2

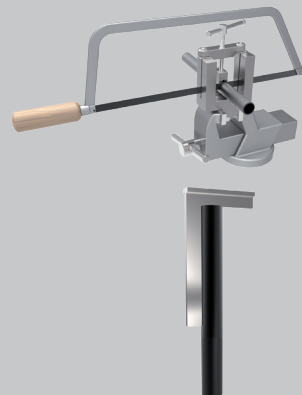
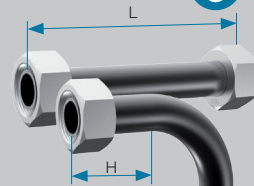
## Tube preparation

**2.1** Minimum dimensions of the straight tube ends must be taken into account for determining the tube lengths.

Series	Tube OD [mm]	H [mm]	L [mm]
L	6/8	31	39
L	10/12	33	42
L	15	36	45
L	18	38	48
L	22/28	42	53
L	35/42	48	60

Series	Tube OD [mm]	H [mm]	L [mm]
S	6/8	35	44
S	10/12	37	47
S	14/16	43	54
S	20	50	63
S	25	54	68
S	30	58	72
S	38	65	82

With machine pre-assembly, the minimum lengths are contained in the respective operating instructions of the pre-assembly devices.





## VOSSRing<sup>M</sup>

**2.2** Saw off tube at a right angle. An angular tolerance of  $\pm 1^\circ$  is permissible. Do not use pipe cutters or abrasive cutting machines.

**2.3** Slightly deburr tube ends inside and outside. Clean tube.

**Attention:**

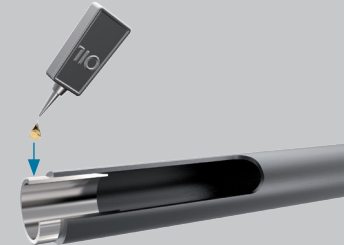
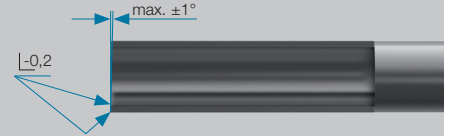
Tubes cut crookedly or improperly deburred reduce service life and the tightness of the connection.

**2.4** Assembly of VOSS reinforcement sleeves.

1a. Lightly coat the outer circumference of the steel sleeve with lubricant (e.g. mineral-oil based hydraulic oil HLP32). Then insert the sleeve into the tube up to the knurled section.

1b. Lightly coat the outer circumference of the stainless steel sleeve with assembly paste (e.g. assembly paste MPE). Then insert the sleeve into the tube up to the knurled section.

2. Use a hammer (plastic or hard rubber) to drive in the sleeve totally. In doing so, the knurled section is pressed against the inner wall of the tube and prevents the sleeve from being displaced or falling out.



Sleeve inserted



Sleeve driven in

Series	Tube OD [mm]	Wall thickness [mm]						
		0.5	0.75	1	1.5	2	2.5	3
L	6	•	•					
L	8	•	•					
L	10	•	•					
L	12	•	•	•				
L	15	•	•	•				
L	18	•	•	•	•			
L	22	•	•	•	•	•		
L	28	•	•	•	•	•		
L	35	•	•	•	•	•	•	
L	42	•	•	•	•	•	•	
S	6	•	•					
S	8	•	•					
S	10	•	•					
S	12	•	•	•				
S	14	•	•	•				
S	16	•	•	•	•			
S	20	•	•	•	•	•		
S	25	•	•	•	•	•		
S	30	•	•	•	•	•	•	
S	38	•	•	•	•	•	•	•

3

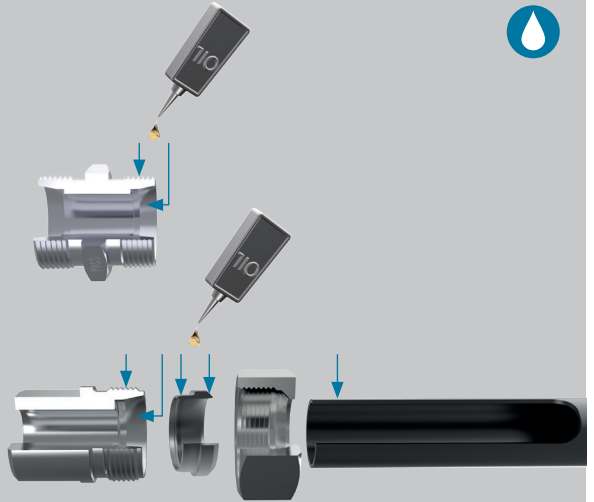
Assembly preparation

**3.1** Lightly lubricate the thread, the cutting ring, the tube end and the taper of the coupling connecting piece and/or the manual pre-assembly mandrel (e.g. using mineral-oil based hydraulic oil HLP32 or, with stainless steel, assembly paste MPE).

**3.2** Put the union nut and the VOSSRing<sup>M</sup> on the tube end one after the other. The cutting edges of the VOSSRing<sup>M</sup> point towards the tube end.

**Attention:**

Make sure that the VOSSRing<sup>M</sup> is in the right position!



4

Pre-assembly

The VOSSRing<sup>M</sup> can be pre-assembled directly in the coupling connecting piece or using the hardened VOSSRing pre-assembly mandrel.

VOSSRing<sup>M</sup> pre-assembly mandrels for heavy-duty steel show no typical wear and have no inspection intervals. When the usage limits of the pre-assembly mandrel are reached, the front end breaks off, so that a replacement must be made.

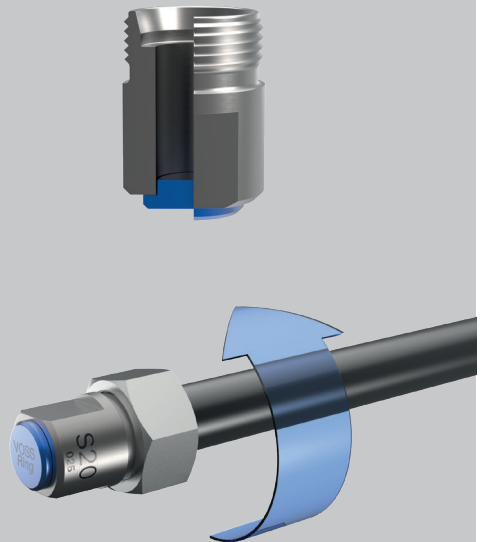
**Attention:**

When mounting these directly in the coupling connecting piece, this may be used only once for pre-assembly!

All given assembly instructions must be strictly adhered to! Otherwise the coupling could leak or the tube may be torn out of the coupling!

**4.1** Insert the tube end into the 24° taper as far as it will go and press on it. The tube must be held in as far as it can go during the assembly process in order to avoid faulty assembly.

**4.2** Tighten the union nut until it is hand tight.



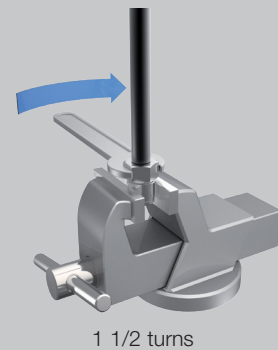
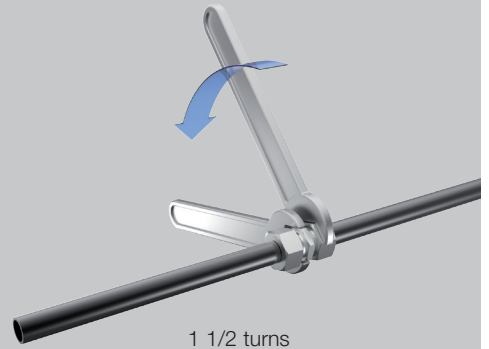
## VOSSRing<sup>M</sup>

### 4.3 Tighten the nut 1 1/2 turns with the wrench.

#### Notes:

In pre-assembly in the patented VOSSRing pre-assembly mandrel, the end of assembly is easily recognizable after about 1 1/2 turns thanks to the block stop installation or a noticeable force increase.

For assembly into the tube hold the coupling connecting piece in place with a wrench. For compliance with the specified number of turns marking lines are recommended on the union nut and tube.



5

## 5

### Assembly inspection

Loosen the nut and check the shoulder throw-up. The shoulder throw-up should cover the cutting-edge front face completely, i.e. cover approximately 100%. With thin-walled tubes and stainless steel tubes the shoulder throw-up has shown to be as markedly less.

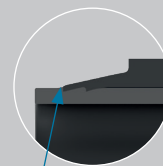
In this position, it is still permissible for the cutting ring to turn on the tube. Any dirt must be removed.

#### Attention:

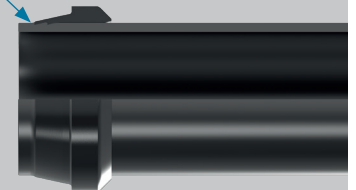
If not enough tube material has been raised, the procedure must be repeated using more force. The result must be rechecked.

#### Note:

We recommend the use of the VOSS gauge to check the correct axial position of the cutting ring.



Shoulder throw-up about 100%



## 6

### Final assembly

**6.1** Lightly lubricate the thread, the pre-assembled tube end and the taper of the coupling connecting piece easily with lubricant (e.g. using mineral-oil based hydraulic oil HLP32 or, with stainless steel, assembly paste MPE).

**6.2** Carefully insert the pre-assembled tube end into the coupling connecting piece. Then tighten the union nut until it is hand tight.

**Attention:**

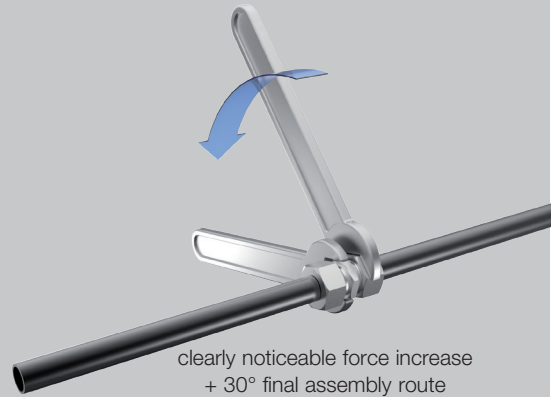
If the VOSSRing<sup>M</sup> was pre-assembled in the coupling connecting piece, the same coupling connecting piece used for the direct assembly must be used again for the final assembly.

**6.3** Tighten the union nut with a wrench until there is a noticeable force increase. As a result, the coupling components are elastically stressed and the state of assembly after pre-assembly is once again achieved.

**6.4** Then tighten a further **30° final assembly route**. As a result of this, a lower final cut of the cutting ring is achieved and an absolute tightness guaranteed.

**Attention:**

When tightening up the coupling connecting piece for the final time, always hold it in wrench or clamp it in a vise.



## 7

### Repeat assembly

The repeated assembly is carried out identically to the final assembly.

**7.1** Tighten the nut with a wrench until there is a noticeable force increase.

**7.2** Then tighten a further 30° final assembly route.



## VOSSRing<sup>M</sup>

8

### Coupling surface

VOSS coat corrosion protection is based on a zinc-nickel base coat, passivating and as a rule a sealing.

9

### Tube type

Seamless, normalized precision steel tubes as per DIN EN 10305-4, material E235+N, material number 1.0308+N or E355, material number 1.0580. Please order the tubes by the external diameter and interior diameter.

Thin-walled steel tubes are provided with reinforcing sleeves to stabilize the connection.

10

### Approved operating temperature range

The permissible ambient temperature ranges from -20°C to +60°C.

11

### Scope of application

Ideal for gases as per DVGW Worksheet G 260.

# Assembly instructions VOSSRing<sup>M</sup> cutting ring system in conjunction with universal pre-assembly stud

1

## Notes

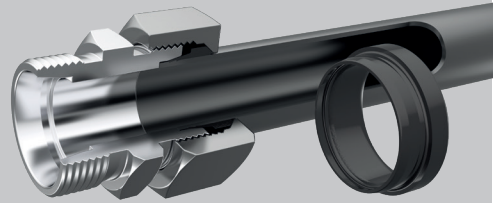
These assembly instructions describe the pre-assembly of the VOSSRing<sup>M</sup> in conjunction with the universal pre-assembly stud in steel or heavy duty steel.

However, to use the VOSSRing<sup>M</sup> the use of specially developed VOSSRing pre-assembly stud is nevertheless recommended. Only in this way can the patented stop function and the shortened 30° final assembly route be used.

Before starting assembly work please consider the general notes in the latest VOSS catalog and check that your assembly instructions are up to date!

These assembly instructions describe the manual mounting options provided in DIN 3859-2.

However, we always recommend assembly using VOSS pre-assembly devices and tools. Here the respective operating instructions must be observed.



For use with steel and stainless steel tubes according to VOSS specification (see introduction assembly instructions).

### Attention!

Please note the recommendation on the use of support sleeves for thin-walled steel tubes and soft tubes of non-ferrous metals and support sleeves of material 1.4571 for thin-walled stainless steel tubes.

2

## Tube preparation

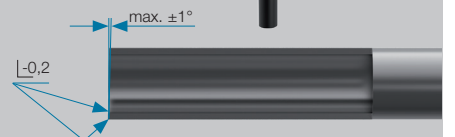
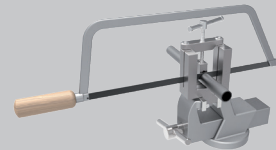
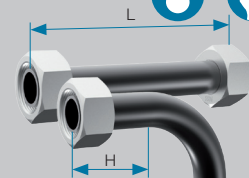
**2.1** Minimum dimensions of the straight tube ends must be taken into account for determining the tube lengths.

Series	Tube OD [mm]	H [mm]	L [mm]
L	6/8	31	39
L	10/12	33	42
L	15	36	45
L	18	38	48
L	22/28	42	53
L	35/42	48	60

Series	Tube OD [mm]	H [mm]	L [mm]
S	6/8	35	44
S	10/12	37	47
S	14/16	43	54
S	20	50	63
S	25	54	68
S	30	58	72
S	38	65	82

With machine pre-assembly, the minimum lengths are contained in the respective operating instructions of the pre-assembly devices.

**2.2** Saw off tube at a right angle. An angular tolerance of  $\pm 1^\circ$  is permissible. Do not use tube cutters or abrasive cutting machines.



## VOSSRing<sup>M</sup>

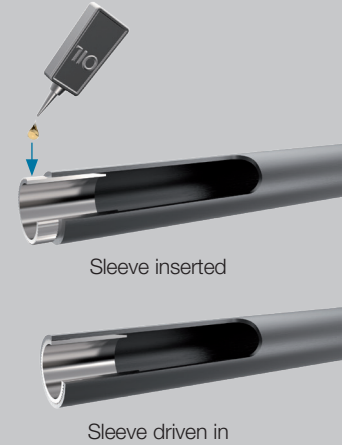
**2.3** Slightly deburr tube ends inside and outside.  
Clean tube.

**Attention!**

Tubes cut crookedly or improperly deburred reduce service life and the tightness of the connection.

**2.4** Assembly of VOSS reinforcement sleeves.

- 1a. Lightly coat the outer circumference of the steel sleeve with lubricant (e.g. mineral-oil based hydraulic oil HLP32). Then insert the sleeve into the tube up to the knurled section.
- 1b. Lightly coat the outer circumference of the stainless steel sleeve with assembly paste (e.g. assembly paste MPE). Then insert the sleeve into the tube up to the knurled section.
2. Use a hammer (plastic or hard rubber) to drive in the sleeve totally. In doing so, the knurled section is pressed against the inner wall of the tube and prevents the sleeve from being displaced or falling out.

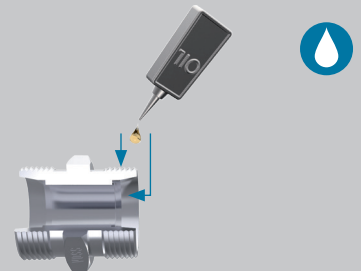


Series	Tube-OD [mm]	Wall thickness [mm]							
		0.5	0.75	1	1.5	2	2.5	3	
L	6	•	•						
L	8	•	•						
L	10	•	•						
L	12	•	•	•					
L	15	•	•	•					
L	18	•	•	•	•				
L	22	•	•	•	•	•			
L	28	•	•	•	•	•	•		
L	35	•	•	•	•	•	•	•	
L	42	•	•	•	•	•	•	•	
S	6	•	•						
S	8	•	•						
S	10	•	•						
S	12	•	•	•					
S	14	•	•	•					
S	16	•	•	•	•				
S	20	•	•	•	•	•			
S	25	•	•	•	•	•	•		
S	30	•	•	•	•	•	•	•	
S	38	•	•	•	•	•	•	•	•

### 3

#### Assembly preparation

**3.1** Lightly lubricate the thread, the cutting ring, the tube end and the taper of the coupling connecting piece and/or the manual pre-assembly mandrel (e.g. using mineral-oil based hydraulic oil HLP32 or, with stainless steel, assembly paste MPE).

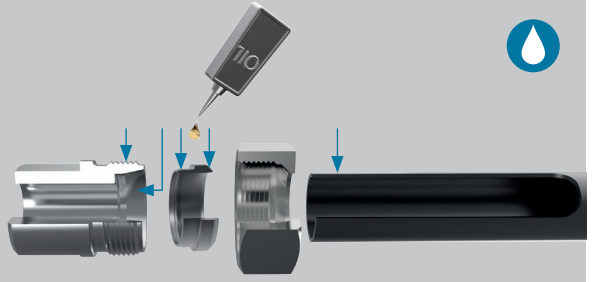


## VOSSRing<sup>M</sup>

**3.2** Put the union nut and the VOSSRing<sup>M</sup> on the tube end one after the other. The cutting edges of the VOSSRing<sup>M</sup> point towards the tube end.

**Attention!**

Make sure that the VOSSRing<sup>M</sup> is in the right position!



## 4

### Pre-assembly

VOSSRing<sup>M</sup> can be pre-assembled directly in the coupling connecting piece or with a hardened universal pre-assembly stud.

Hardened pre-assembly studs in steel are low-wear and enable uniform assembly results. Approximately every 50 pre-assemblies, accuracy to gauge must be checked.

Pre-assembly studs in heavy duty steel have up to 20x longer service life and a "wear inspection". If the usage limit is reached, the front end of the stud breaks off.

**Attention!**

Universal pre-assembly studs that are not true to gauge or damaged in the cone area must be replaced!

When mounting these directly in the coupling connecting piece, this may be used only once for pre-assembly!

All given assembly instructions must be strictly adhered to! Otherwise the coupling could leak or the tube may be torn out of the coupling!

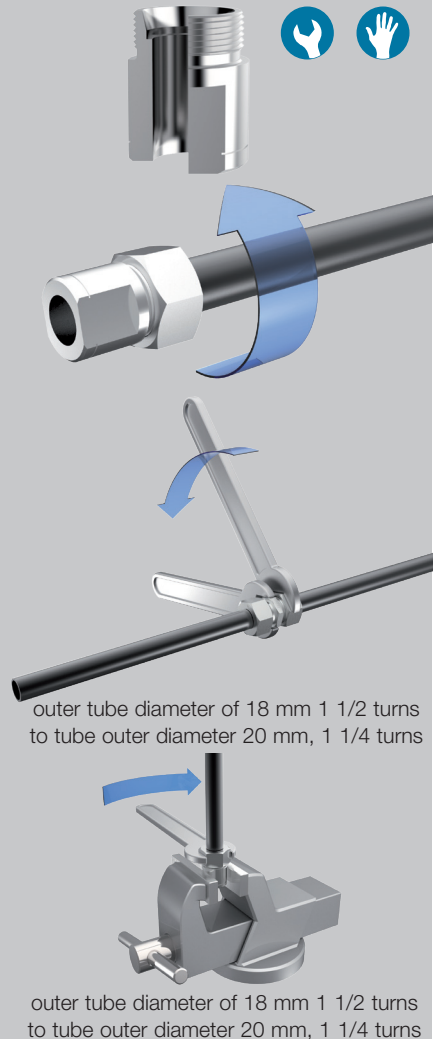
**4.1** Insert the tube end into the 24° taper as far as it will go and press on it. The tube must be held in as far as it can go during the assembly process in order to avoid faulty assembly.

**4.2** Tighten the union nut until it is hand tight.

**4.3** Tighten the union nut with a wrench to an outer tube.

- diameter of 18  
**1 1/2 turns**
- to 20 mm.  
**1 1/4 turns**

For assembly into the tube hold the coupling connecting piece in place with a wrench. For compliance with the specified number of turns marking lines are recommended on the union nut and tube.





## VOSSRing<sup>M</sup>

### 5

#### Assembly inspection

Loosen the nut and check the shoulder throw-up. The shoulder throw-up should cover approximately 80 % of the cutting-edge front face. With thin-walled tubes and stainless steel tubes the shoulder throw-up has shown to be as markedly less.

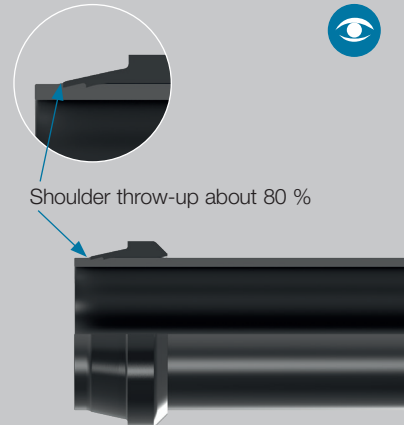
In this position, it is still permissible for the cutting ring to turn on the tube. Any dirt must be removed.

#### Attention!

If not enough tube material has been raised, the procedure must be repeated using more force. The result must be rechecked.

#### Note:

We recommend the use of the VOSS gauge to check the correct axial position of the cutting ring.



### 6

#### Final assembly

**6.1** Lightly lubricate the thread, the pre-assembled tube end and the taper of the coupling connecting piece easily with lubricant (e.g. using mineral-oil based hydraulic oil HLP32 or, with stainless steel, assembly paste MPE).

**6.2** Carefully insert the pre-assembled tube end into the coupling connecting piece. Then tighten the union nut until it is hand tight.

#### Attention!

If the VOSSRing<sup>M</sup> was pre-assembled in the coupling connecting piece, the same coupling connecting piece used for the direct assembly must be used again for the final assembly.

**6.3** Tighten the nut with a wrench until there is a noticeable force increase. As a result, the coupling components are elastically stressed.

Then tighten another 1/4 turn.

#### Attention!

When tightening up the coupling connecting piece for the final time, always hold it in wrench or clamp it in a vise.



### 7

#### Repeat assembly

For repeated assembly, the union nut is tightened with the same force as during the initial assembly.



8

### Coupling surface

VOSS coat corrosion protection is based on a zinc-nickel base coat, passivating and as a rule a sealing.

9

### Tube type

Seamless, normalized precision steel tubes as per DIN EN 10305-4, material E235+N, material number 1.0308+N or E355, material number 1.0580. Please order the tubes by the external diameter and interior diameter.

Thin-walled steel tubes are provided with reinforcing sleeves to stabilize the connection.

10

### Approved operating temperature range

The permissible ambient temperature ranges from -20°C to +60°C.

11

### Scope of application

Ideal for gases as per DVGW Worksheet G 260.

## Assembly instructions for ES-4 cutting ring system

### 1 Notes

Before starting the assembly work, read the general notes in the latest VOSS catalogue and check that your assembly instructions are up to date

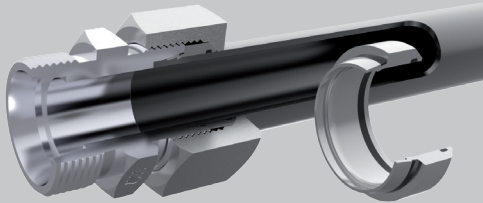
These assembly instructions describe the possible assembly options provided for in the German standard DIN 3859 Part 2.

We recommend that VOSS pre-assembly devices and tools are used for assembly at all times.

For use with steel tubes in accordance with VOSS specifications (see introduction to assembly instructions).

**Attention!**  
Please note the recommendation on the use of tube supports for thin-walled steel tubes and soft tubes made of non-ferrous metals.

This cutting ring is not suitable for stainless-steel tube assemblies. For these, cutting rings of types VOSSRing<sup>M</sup>, 2SVA or ES-4VA must be used!



### 2 Tube preparation

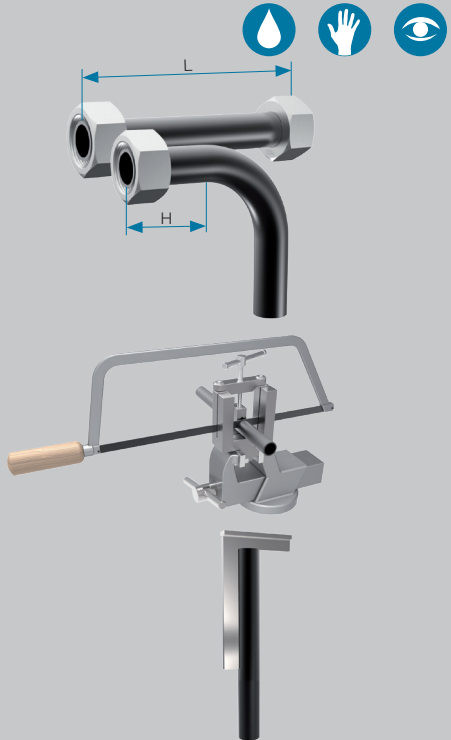
**2.1** The minimum dimensions of the straight tube ends must be taken into account for determining the tube lengths.

Series	Tube OD [mm]	H [mm]	L [mm]
L	6/8	31	39
L	10/12	33	42
L	15	36	45
L	18	38	48
L	22/28	42	53
L	35/42	48	60

Series	Tube OD [mm]	H [mm]	L [mm]
S	6/8	35	44
S	10/12	37	47
S	14/16	43	54
S	20	50	63
S	25	54	68
S	30	58	72
S	38	65	82

With machine pre-assembly, the minimum lengths are contained in the respective operating instructions of the pre-assembly devices.



## ES-4

**2.2** Saw tube off at right angles. An angle tolerance of  $\pm 1^\circ$  is permissible. Do not use a rotary grinder or tube cutter.

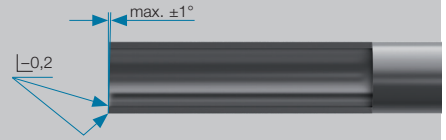
**2.3** Slightly deburr tube ends inside and outside. Clean the tube.

### Attention!

If tubes are not cut off squarely or are not properly deburred, this may reduce the service life and leak-tightness of the couplings. Burrs on the tube outer diameter can damage the inner O-ring.

### 2.4 Assembly of VOSS reinforcing sleeves

1. Lubricate the outside surface of the sleeve lightly (e.g. using mineral-oil based hydraulic fluid HLP32). Then insert the sleeve into the tube up to the knurled section.
2. Use a hammer (plastic or hard rubber) to drive the sleeve in totally. In doing so, the knurled section is pressed against the inner wall of the tube and prevents the sleeve from being displaced or from falling out.



Series	Tube OD [mm]	Wall thickness [mm]						
		0.5	0.75	1	1.5	2	2.5	3
L	6	•	•					
L	8	•	•					
L	10	•	•					
L	12	•	•	•				
L	15	•	•	•				
L	18	•	•	•	•			
L	22	•	•	•	•	•		
L	28	•	•	•	•	•	•	
L	35	•	•	•	•	•	•	•
L	42	•	•	•	•	•	•	•
S	6	•	•					
S	8	•	•					
S	10	•	•					
S	12	•	•	•				
S	14	•	•	•				
S	16	•	•	•	•			
S	20	•	•	•	•	•		
S	25	•	•	•	•	•	•	
S	30	•	•	•	•	•	•	•
S	38	•	•	•	•	•	•	•

## ES-4

### 3

#### Assembly preparation

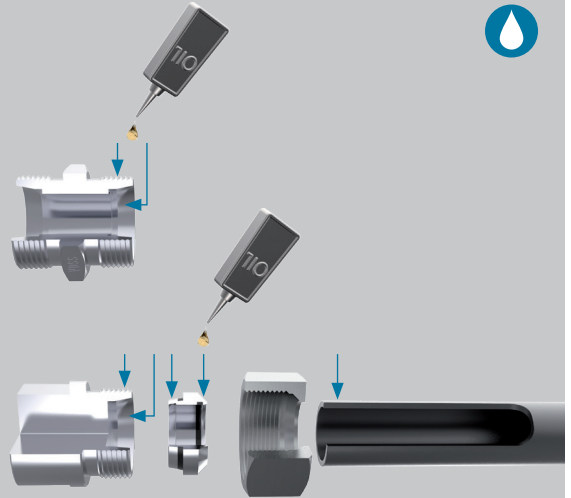
**3.1** Lubricate the thread, the cutting ring, the tube end and the taper of the coupling connecting piece and/or of the manual pre-assembly stud lightly (e.g. using mineral-oil based hydraulic fluid HLP32).

Wetting the tube end with lubricant makes it easier to push the ES-4 cutting ring onto the tube.

**3.2** Put the union nut and the ES-4 cutting ring on the tube end, one after the other. The cutting edges of the ES-4 cutting ring point towards the tube end.

**Attention!**

Make sure that the ES-4 cutting ring is in the right position.



### 4

#### Assembly instructions

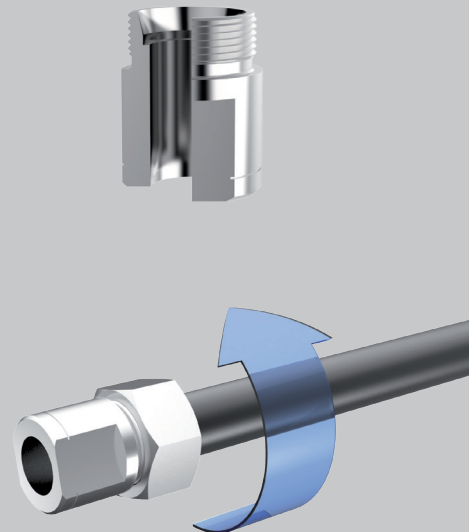
VOSS ES-4 cutting rings can be pre-assembled directly in the coupling connecting piece or using a hardened pre-assembly die.

Hardened pre-assembly dies are wear-resistant, thus achieving consistent pre-assembly results. They have to be checked after approx. every 50 pre-assemblies for trueness of gauge.

**Attention!**

Pre-assembly studs that are not true to gauge or that are damaged in the tapered section must be replaced on all accounts. When mounting them directly in the coupling connecting piece, this may be used only once for pre-assembly.

All specified assembly distances must be adhered to. Otherwise there is a danger that the coupling will leak or that the tube will tear out of the coupling.



5

## ES-4

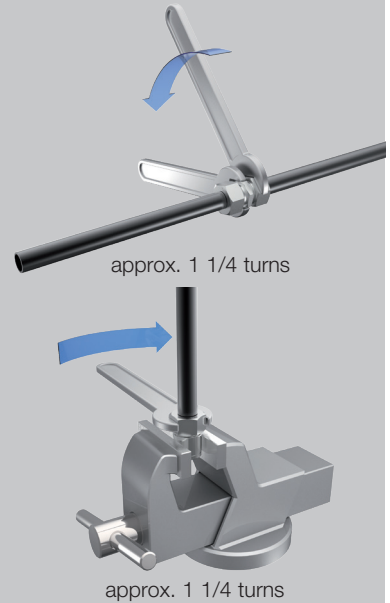
**4.1** Insert the tube end into the 24° taper as far as it will go and press on it. The tube must be held in as far as it will go during the entire assembly process in order to avoid faulty assembly.

**4.2** Turn the union nut until it is hand-tight.

**4.3** Tighten the union nut by approx. **1 1/4 turns** (min. 1 to max. 1 1/2 turns). This pushes the ES-4 cutting ring against the end face of the stud.

**Notes:**

When installing couplings in piping systems, always hold the coupling connecting piece in a spanner. Marking a stroke on the union nut and the tube makes it easier to achieve the correct number of turns.



## 5

### Check results

**5.1** Loosen the nut and check the shoulder throw-up and the moulded seal. The shoulder throw-up should cover approximate 80 % of the cutting-edge front face.

In this position, it is still permissible for the cutting ring to turn on the tube.

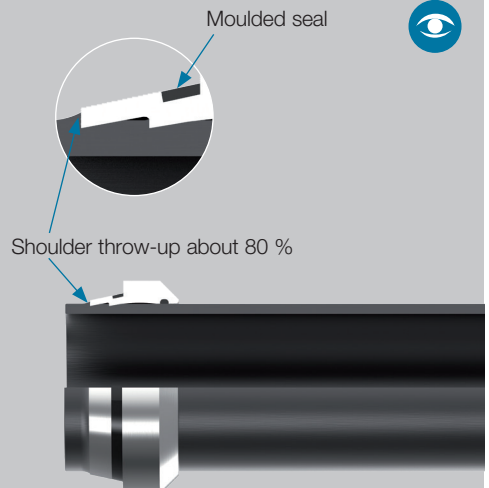
**Attention!**

The moulded seal must be undamaged. Remove possible soiling and replace the moulded seal if necessary.

If an inadequate amount of material is raised, repeat assembly with a higher torque. The results must be re-checked!

**Note:**

We recommend the use of the VOSS gauge to check the correct axial position of the cutting ring.



## ES-4

### 6

#### Final assembly

**6.1** Lubricate the thread, the pre-assembled tube end and the taper of the coupling connecting piece lightly (e.g. using mineral-oil based hydraulic fluid HLP32).

**6.2** Insert the pre-assembled tube end carefully into the coupling connecting piece, making sure that the moulded seal is not damaged and is seated in the seal groove correctly. Then turn the union nut until it is hand-tight.

**Attention!**

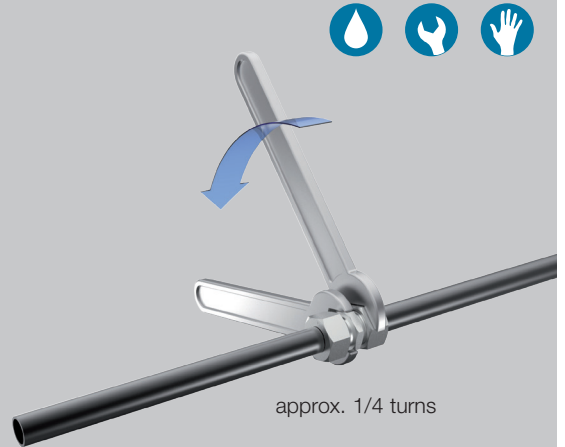
If the cutting ring was pre-assembled in the coupling connecting piece, the same coupling connecting piece used to pre-assemble the tube and cutting ring must be used again for final assembly.

**6.3** Use a spanner to tighten the union nut until there is a noticeable force increase.

**6.4** Tighten up further by approximately **1/4 turns**.

**Attention!**

When finally tightening up the coupling connecting piece, always hold it in a spanner or clamp it in a vise.



approx. 1/4 turns

5

### 7

#### Repeat assembly

**7.1** Each time the tube coupling is unscrewed, the moulded seal must be checked for damage and replaced if necessary.

**7.2** For repeat assembly, the union nut must be tightened again with the same amount of force as during initial assembly.



## ES-4

8

### Coupling surface

VOSS coat corrosion protection is based on a zinc-nickel base coat, passivating and as a rule a sealing.

9

### Tube type

Seamless, normalized precision steel tubes as per DIN EN 10305-4, material E235+N, material number 1.0308+N or E355, material number 1.0580. Please order the tubes by the external diameter and interior diameter.

Thin-walled steel tubes are provided with reinforcing sleeves to stabilize the connection.

10

### Approved operating temperature range

The permissible ambient temperature ranges from  $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ .

11

### Scope of application

Ideal for gases as per DVGW Worksheet G 260.



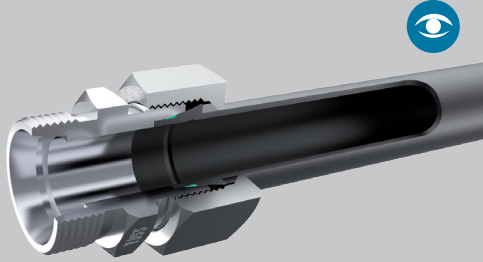
## Assembly instructions for VOSSForm<sup>SQR</sup> tube forming system

### 1 Notes

Before starting the assembly work, read and observe the general notes in the up-to-date VOSS catalogue and check that your assembly instructions are up to date.

These assembly instructions describe the tube forming and the final assembly of VOSSForm<sup>SQR</sup>.

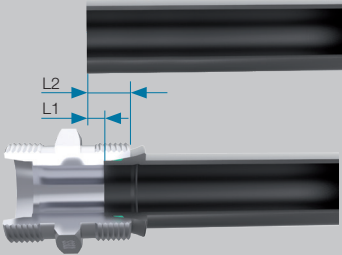
These assembly instructions are not a substitute for the detailed operating instructions of the forming device used. They only describe the basic tube preparation, forming and final assembly steps.



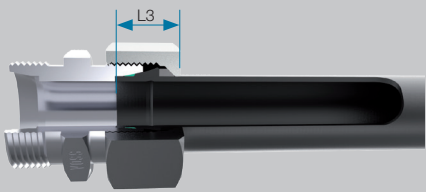
### 2 Tube preparation

**2.1** When determining the tube lengths to be used, dimensions L1 and L2 have to be taken into consideration. The forming process compresses the tube and shortens it by the length L1.

In addition, the minimum lengths A1, A2 and B1, B2 required for clamping the tube ends have to be taken into consideration.

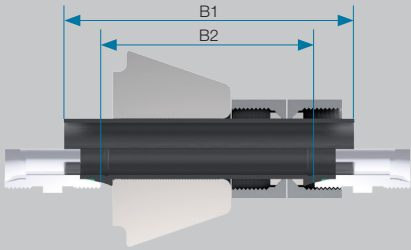


Height of the completely assembled VOSSForm<sup>SQR</sup> connection.

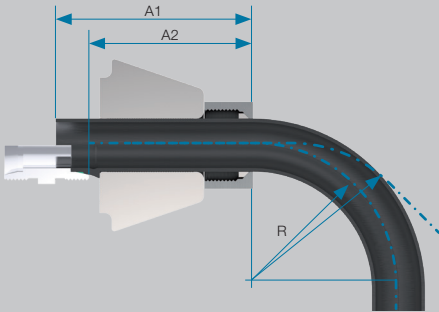


Series	Tube OD [mm]	s [mm]	L1 [mm]	L2 [mm]	L3 approx [mm]	A1 [mm]		A2 [mm]		B1 [mm]	B2 [mm]
						$\alpha \leq 45^\circ$	$\alpha \leq 90^\circ$	$\alpha \leq 45^\circ$	$\alpha \leq 90^\circ$		
L	6	1	5.6	12.6	15.5	60	69	47	56	82	56
		1.5	6.0	13.0	16.0						
		2	5.3	12.3	16.0						
L	8	1	5.0	12.0	15.5	60	64	47	51	82	56
		1.5	5.7	12.7	16.0						
		2	5.2	12.2	16.0						
		2.5	4.4	11.4	16.0						
L	10	1	5.2	12.2	15.5	60	60	47	47	83	57
		1.5	5.8	12.8	16.0						
		2	5.1	12.1	16.0						
L	12	1	5.1	12.1	15.5	60	60	47	47	83	57
		1.5	5.8	12.8	16.0						
		2	4.9	11.9	16.0						
L	15	1.5	6.0	13.0	17.5	70	70	56	56	96	68
		2	5.6	12.6	17.5						
		2.5	5.3	12.3	17.5						
L	18	1.5	5.9	13.4	18.5	75	75	61	61	101	73
		2	5.3	12.8	18.5						
		2.5	5.1	12.6	18.5						
		3	5.1	12.6	18.5						
L	22	1.5	6.5	14.0	20.0	85	85	70	70	113	83
		2	5.6	13.1	20.0						
		2.5	5.4	12.9	20.0						
		3	5.3	12.8	20.0						
L	28	2	5.6	13.1	20.0	93	93	79	79	120	92
		2.5	5.4	12.9	20.0						
		3	5.5	13.0	20.0						
L	35	2	7.6	18.1	24.0	107	107	87	87	142	102
		2.5	7.0	17.5	24.0						
		3	7.5	18.0	25.0						
		4	7.2	17.7	25.0						
L	42	2	7.6	18.6	24.5	117	117	97	97	152	112
		2.5	7.0	18.0	24.5						
		3	7.4	18.4	25.5						
		4	7.0	18.0	25.5						

Minimum lengths for clamping in straight tubes.

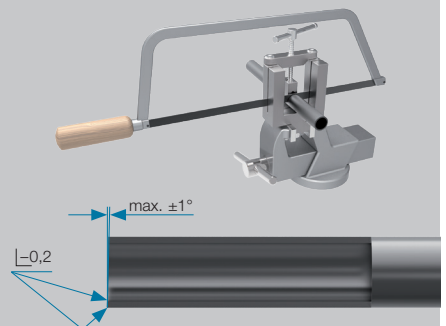


Minimum lengths for clamping in curved tubes ( $R \geq 3x$  Tube OD).



Series	Tube OD [mm]	s [mm]	L1 [mm]	L2 [mm]	L3 approx. [mm]	A1 [mm]		A2 [mm]		B1 [mm]	B2 [mm]
						$R \geq 3x DN$	$\alpha \leq 90^\circ$	$R \geq 3x DN$	$\alpha \leq 90^\circ$		
S	6	1	5.6	12.6	16.0	62	69	49	56	85	59
		1.5	6.0	13.0	16.5						
		2	5.3	12.3	16.5						
S	8	1	5.0	12.0	16.0	62	64	49	51	85	59
		1.5	5.7	12.7	16.5						
		2	5.2	12.2	16.5						
S	10	1.5	6.5	14.0	18.5	64	64	50	50	90	62
		2	5.9	13.4	18.5						
		2.5	5.2	12.7	18.5						
S	12	1.5	6.4	13.9	18.5	64	64	50	50	90	62
		2	5.7	13.2	18.5						
		2.5	5.2	12.7	18.5						
S	14	1.5	6.7	14.7	20.5	72	72	57	57	101	71
		2	6.3	14.3	20.5						
		2.5	5.8	13.8	20.5						
S	16	1.5	6.9	15.4	21.0	77	77	61	61	107	75
		2	6.1	14.6	21.0						
		2.5	5.7	14.2	21.0						
S	20	2	8.1	18.6	25.0	88	88	69	69	122	84
		2.5	7.2	17.7	25.0						
		3	6.8	17.3	25.0						
S	25	3.5	6.6	17.1	25.0						
		4	6.4	16.9	25.0						
		4	6.4	16.9	25.0						
S	30	2	7.7	19.7	28.0	103	103	82	82	140	98
		2.5	7.3	19.3	28.0						
		3	7.0	19.0	28.0						
S	38	4	6.6	18.6	28.0						
		2	7.9	21.4	30.5	114	114	92	92	155	111
		2.5	7.3	20.8	30.5						
S	38	3	8.1	21.6	31.5						
		4	7.6	21.1	31.5						
		5	7.3	20.8	31.5						
S	38	6	7.0	20.5	32.0						
		2.5	10.4	26.4	34.5	134	134	108	108	180	128
		3	9.1	25.1	34.5						
S	38	4	9.2	25.2	35.5						
		5	9.1	25.1	35.5						
		6	9.0	25.0	35.5						
S	38	7	9.0	25.0	36.0						

**2.2** Cut tubes at right angles. An angle tolerance of  $\pm 1^\circ$  is permissible. Do not use tube cutters or angle grinders to cut tubes.



**2.3** Slightly deburr tube ends inside and outside.  
Clean the tube.

**Attention!**

Burrs on the outer and inner edges of the tube end can impair the forming process. Tubes which are not cut off squarely and correctly deburred reduce the service life and leak-tightness of the couplings.



### 3

#### Lubricating tools and steel tubes

After every tool change and after roughly 100 forming procedures, the outer surfaces of the clamping jaws at the tapered section should be lightly lubricated using hydraulic fluid or a non-resinous lubricant containing MoS<sub>2</sub>.

**Attention!**

Ensure that no oil is applied to the teeth of the clamping jaw, otherwise the gripping function may be impaired.

**Lubricating phosphate-treated steel tubes:**

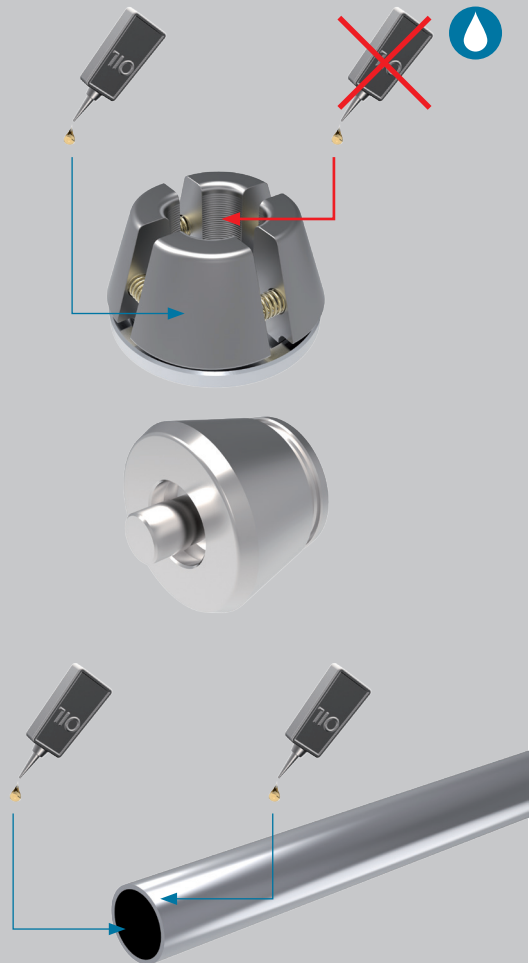
in order to reduce tool wear, on every tenth tube being processed, apply a thin film of hydraulic fluid to the internal and external surfaces of the tube section to be formed.

**Lubricating zinc-plated steel tubes:**

in order to reduce tool wear, on every tenth tube being processed, apply a thin film of hydraulic fluid to the internal and external surfaces of the tube section to be formed.

**Attention!**

If the lubricant film on the outer perimeter of the tubing is too thick, it will be trapped by the forming process and lead to inaccurate contours.



## 4

### Notes on tube forming

**4.1** Prepare the tube forming device as described in the operating instructions and insert the tools.

**4.2** Push the SQR-function nut onto the prepared tube end.

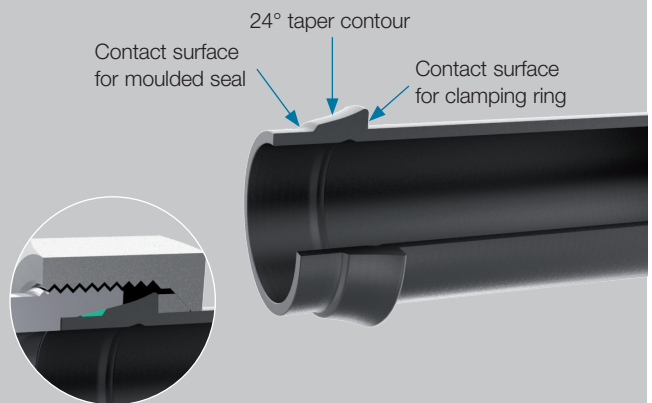
**4.3** Form the tube as described in the operating instructions.



## 5

### Check the results

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



## VOSSForm<sup>SQR</sup>

### 6

#### Final assembly

**6.1** Install the moulded seal, ensuring that it is not twisted or damaged.

Push the pre-assembled tube end straight into the taper of the coupling connecting piece.

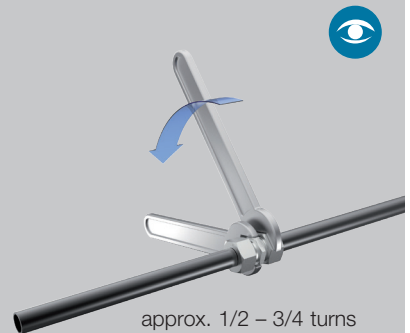
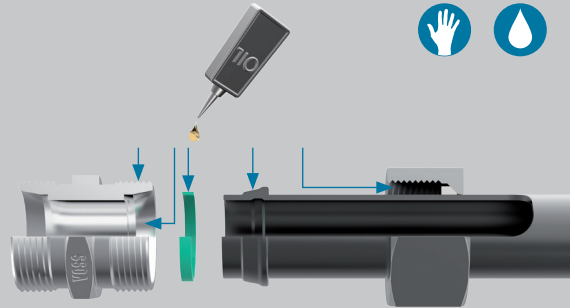
**6.2** Lubricate the threads, the formed tube end and the moulded seal lightly (e.g. using mineral-oil based hydraulic fluid HLP32).

**6.3** Turn union nut until it is hand-tight.

To achieve the final tightening torque, turn the SQR special function nut by approx. **1/2 to 3/4 of a turn**.

If the coupling is being installed on an already-installed piping system, hold the coupling connecting piece with a spanner when tightening the coupling.

Marking a stroke on the SQR special function nut and the tube makes it easier to achieve the correct number of turns when tightening the coupling.



### 7

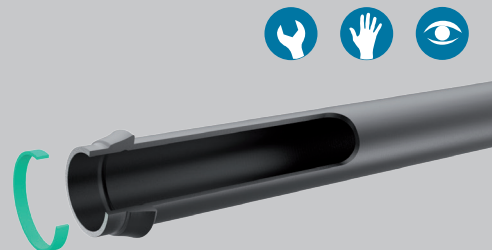
#### Re-assembly of couplings

**7.1** Every time the coupling is taken apart, the moulded seal must be checked for damage and, if necessary, replaced.

**7.2** For the second and all ensuing re-assembly processes, the SQR-function nut must be tightened by only **1/4 to 1/2 turns** after it has been hand-tightened.

#### Attention!

Fore re-assembling the coupling, the 24° taper contour, the moulded seal contact surfaces and the clamping ring must be checked for damage (see 5: Checking results).



# 8

## Tightening torques

**8.1** As an alternative to achieving pre-assembly and final assembly states by distance dependent assembly, the tightening torques can be applied directly. The stated tightening torques are guideline values which have been determined under the following conditions:

- tube specifications as given in the general notes
- VOSS coat surface finish on all coupling components, and additional wax coating on the SQR-function nut.

Series	Tube OD [mm]	Tightening torque in Nm ± 5 %
L	6	20
L	8	30
L	10	40
L	12	50
L	15	70
L	18	90
L	22	120
L	28	160
L	35	250
L	42	380
S	6	25
S	8	40
S	10	50
S	12	60
S	14	75
S	16	85
S	20	140
S	25	190
S	30	270
S	38	400

# 9

## Coupling surface

VOSS coat corrosion protection is based on a zinc-nickel base coat, passivating and as a rule a sealing.

# 10

## Tube type

Seamless, normalized precision steel tubes as per DIN EN 10305-4, material E235+N, material number 1.0308+N or E355, material number 1.0580. Please order the tubes by the external diameter and interior diameter.

Thin-walled steel tubes are provided with reinforcing sleeves to stabilize the connection.

# 11

## Approved operating temperature range

The permissible ambient temperature ranges from -20°C to +60°C.

## 12

### Scope of application

Ideal for gases as per DVGW Worksheet G 260.

# Assembly instructions for taper (DKO)

1

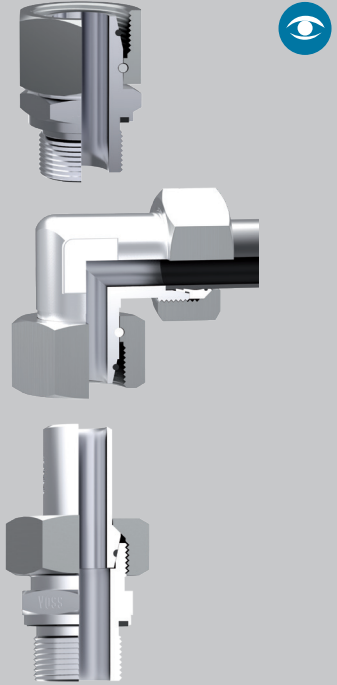
## Notes

Before starting the assembly work, read and observe the general notes in the up-to-date VOSS catalogue and check that your assembly instructions are up to date.

These assembly instructions describe the assembly of VOSS couplings and coupling parts with taper coupling (DKO) according to ISO-8434-1.

### Attention!

When the tube coupling is being connected, the DKO coupling must always be held with a spanner to counter tightening torques.



2

## Assembly of taper coupling

### Assembly procedure

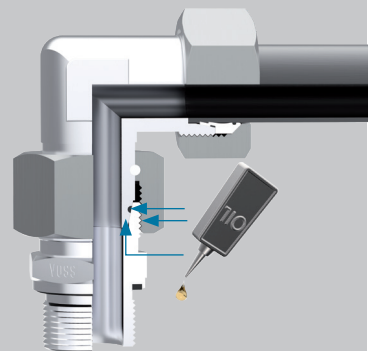
1. Check that the O-ring is not twisted and that is bedded correctly in the groove of the taper.
2. Lubricate the threads, the cone surface and the O-ring lightly (e.g. using mineral-oil based hydraulic fluid HLP32).
3. Keeping the taper aligned, insert it into the cone and press it in firmly.

### Attention!

After this step, no further alignment correction is possible.

4. Turn the union nut until it is hand-tight.
5. Then use a spanner to finally tighten up the coupling by the required angle or number of turns.

Marking a stroke on the DKO union nut and the coupling connecting piece makes it easier to achieve the correct number of turns when tightening the coupling.

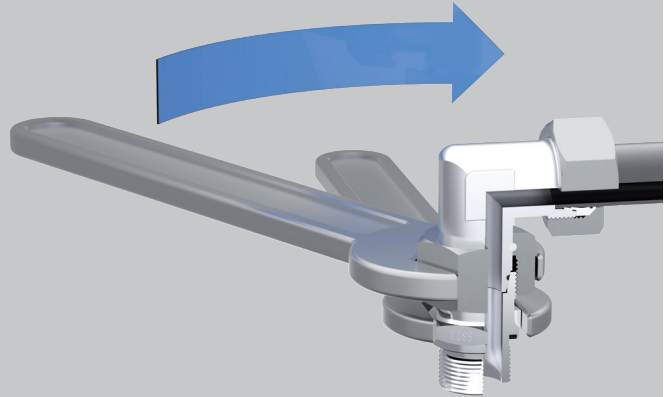




## DKO

### Attention!

The DKO coupling must be tightened by turning the union nut, not the counter connecting piece.



## 3

### Assembly parameters

As an alternative to achieving pre-assembly and final assembly states by distance dependent assembly, the tightening torques can be applied directly. The stated tightening torques are guideline values which have been determined under the following conditions:

Series	Tube OD [mm]	Union nut thread	Number of turns, first assembly	Number of turns, re-assembly	Tightening torque [Nm] ± 5 %
L	6	M 12 x 1.5	approx. 2/3	approx. 1/3	20
L	8	M 14 x 1.5	approx. 2/3	approx. 1/3	30
L	10	M 16 x 1.5	approx. 2/3	approx. 1/3	40
L	12	M 18 x 1.5	approx. 2/3	approx. 1/3	50
L	15	M 22 x 1.5	approx. 2/3	approx. 1/3	70
L	18	M 26 x 1.5	approx. 1/2	approx. 1/3	90
L	22	M 30 x 2	approx. 1/2	approx. 1/3	120
L	28	M 36 x 2	approx. 1/3	approx. 1/3	160
L	35	M 45 x 2	approx. 1/3	approx. 1/3	250
L	42	M 52 x 2	approx. 1/3	approx. 1/4	380
S	6	M 14 x 1.5	approx. 2/3	approx. 1/3	25
S	8	M 16 x 1.5	approx. 2/3	approx. 1/3	40
S	10	M 18 x 1.5	approx. 2/3	approx. 1/3	50
S	12	M 20 x 1.5	approx. 2/3	approx. 1/3	60
S	16	M 24 x 1.5	approx. 1/2	approx. 1/3	85
S	20	M 30 x 2	approx. 1/2	approx. 1/3	140
S	25	M 36 x 2	approx. 1/3	approx. 1/4	190
S	30	M 42 x 2	approx. 1/3	approx. 1/4	270
S	38	M 52 x 2	approx. 1/3	approx. 1/4	400

### 4

#### Coupling surface

VOSS coat corrosion protection is based on a zinc-nickel base coat, passivating and as a rule a sealing.

### 5

#### Tube type

Seamless, normalized precision steel tubes as per DIN EN 10305-4, material E235+N, material number 1.0308+N or E355, material number 1.0580. Please order the tubes by the external diameter and interior diameter.

Thin-walled steel tubes are provided with reinforcing sleeves to stabilize the connection.

### 6

#### Approved operating temperature range

The permissible ambient temperature ranges from  $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ .

### 7

#### Scope of application

Ideal for gases as per DVGW Worksheet G 260.

## General technical notes

Content	Type/Page
Additional lengths when designing tube assemblies	P.175
Calculating the equivalent straight tube length	P.176
VOSS coat	P.177
VOSS fittings' resistance to aggressive media	P.183
Preventing faults and correcting malfunctions	<i>VOSSRing<sup>M</sup></i> ES-4 <i>VOSSForm</i> DKO    24° couplings P.185    P.188    P.191    P.192    P.193



## Additional lengths when designing tube assemblies

The following must be taken into consideration when calculating the length of tubing required for a given assembly length:

- minimum lengths of straight tube sections and of tube elbows\*
- additional dimensions in the coupling connector
- additional tube sections (flaring, bend radii, elbow lengths, straight sections)

In addition, we recommend that in case of doubt some extra length be added when designing the ends of the tubes. This allows the tube length to be adjusted before commencing pre-assembly for the VOSS coupling system, if necessary.

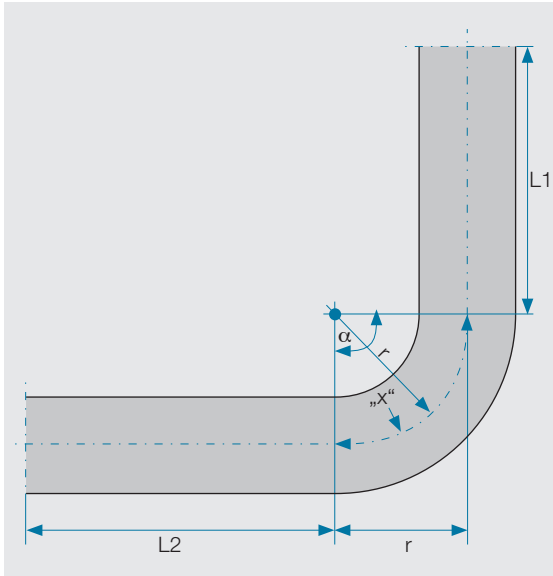
### Dimension inside coupling connecting piece

tube OD	Length up to stop inside connector [mm]
L 6	7
L 8	7
L 10	7
L 12	7
L 15	7
L 18	7.5
L 22	7.5
L 28	7.5
L 35	10.5
L 42	11
S 6	7
S 8	7
S 10	7.5
S 12	7.5
S 14	8
S 16	8.5
S 20	10.5
S 25	12
S 30	13.5
S 38	16



\* Depends on the coupling system and pre-assembly system used.

## Calculating the equivalent straight tube length



$L$  = total equivalent straight tube length

$x$  = equivalent tube length of elbow

$\alpha$  = bend angle

$r$  = radius

$$x = \frac{\alpha \cdot 2 \cdot r \cdot \pi}{360^\circ}$$

$$L = L_1 + L_2 + x$$

Please note that the bend radius is determined by the bend template of the device.

Conceived and thought through

## VOSS coat

✓ Corrosion resistance  
in perfection

**Pioneer in zinc-nickel applications since 2007 – and still a clear leader.**

EC directive 2000/53/EC on end-of-life vehicles was amended in 2007, partially banning the use of hexavalent chromium in materials and vehicles components. For us, this meant that the era of yellow chromate corrosion protection coatings had come to an end. The technological characteristics of available alternatives – using zinc as a base coat with thick-film passivation – fell a great deal short of VOSS quality requirements, and were clearly a step in the wrong direction. This move was and still is unacceptable to VOSS, since we always strive to increase the benefits for customers in our products and solutions.

Our solution: VOSS zinc-nickel surface finishes. The relevant characteristics of these coatings even surpass those of yellow-chromate finishes. Users were especially delighted by their corrosion resistance – 10 times better than before. In 2007, this was a huge leap forward in the hydraulic coupling technology market.

The steel is given three coats to provide optimum corrosion protection: a zinc-nickel base coat, a passivation layer and a sealing coat. In 2009, we set up our own electroplating competence center in which we produce and enhance our surface finishes.

**Features we provide as standard are options elsewhere.**

Our surface finishes have set the benchmark for corrosion resistance in all market sectors and have been used in our entire product range all around the world since 2007, at high availability levels. For you, as a customer, this means maximum process reliability for your applications, homogeneous selection of parts, no danger of confusing items. Suitable for use in hydraulic presses, plant construction, agricultural and construction machinery, conveyor engineering as well as for injection-molding machines and machine tools.

After comparative testing in a salt-spray chamber for 720 hours



VOSS Zink-Nickel

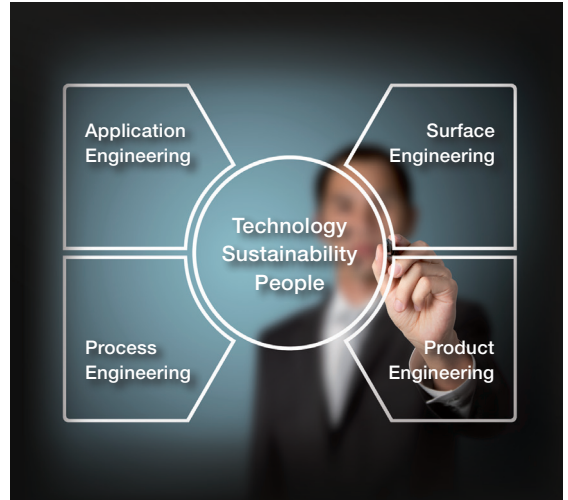


Zinc + passivation + sealing coat

**The trade mark for corrosion protection.**

Our surface finish is much more than just a simple coating. This is why we have made it a trademark: VOSS coat. VOSS coat is synonymous with corrosion protection in perfection, focussing on technology, sustainability and human health and safety.

VOSS coat is the result of continuous improvement – for example of friction coefficients, layer thickness relationships and visual impression. These are the result of many years of experience in production processes and with customer applications furthered by our own research and development work. Only VOSS unites this comprehensive know-how under one roof – operating a proprietary VOSS coat competence center including an electroplating test line. In this way we make sure that our corrosion protection meets your strictest standards. To achieve a measurable technological lead for you.



**A technological lead, achieved by hard work**

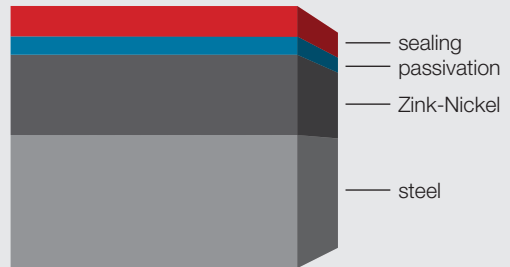
VOSS coat is the outcome of many years of in-house engineering that considers all the factors leading to increased benefits for the customers. Not only have we achieved an extremely high level of corrosion protection but also user-friendly handling in practical applications.

■ **1,000 hours corrosion resistance in productive applications following shipping, handling and assembly.**

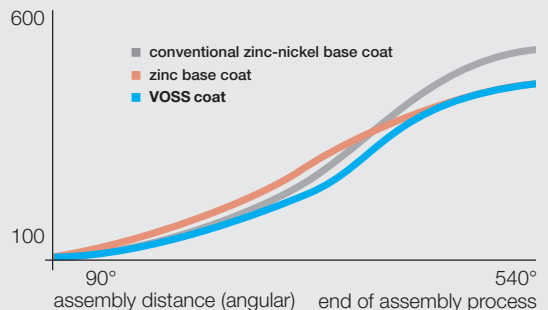
Tested using random samples in the assembled state taken from series production. In view of the microscopic lesions which can occur during assembly, this is the only way of obtaining a reliable estimate of the service life to be expected in the customer's applications. Under laboratory conditions, the service life of unassembled parts exceeds 2,000 hours. After this, red rust starts to develop, whereas white rust only appears in the form of a light grey film. In addition, samples for our own quality assurance tests are taken from all production lots.

■ **Assembly testing of cutting ring coupling (size S30)**  
VOSS coat ensures optimum assembly torques.

VOSS coat finish cross-section



Assembly torque, in Nm





- **Perfect assembly torques – not too high and not too low**

How to avoid assemblies being too tight or too slack – thanks to our consistent quality – in all tube connections. Our own research, development and production have enabled us to continually improve the friction coefficient of VOSS coat to equal the best zinc surface finishes and have reached a value considerably lower than that of other zinc-nickel coatings.

- **Best possible process reliability thanks to a modern in-house electroplating plant with online sensors and analysis systems**

This plant is designed exclusively for tube couplings – a unique feature. This is where we work to enhance our electroplating processes – in the electroplating test laboratory for chemical components, and in the engineering department for production procedures. In series of tests, the 12 program parameters are adjusted individually for each one of our 6,600 articles in order to optimize processes for all geometries and sizes. We have developed the racks and baskets used to move the articles through the plant ourselves and are continually improving these to achieve a degree of specialization impossible with outsourced processing. We conform without exception to the European Community Regulation on chemicals and their safe use (REACH), of course.



Individual plant control programs: a separate program for controlling 12 parameters is compiled for each of our 6,600 articles.

VOSS electroplating test laboratory: where VOSS coat is being permanently improved



**Sustainability: only achievable from scratch if everything is under our control.**

Since 2009, we have been operating the VOSS coat competence center, with a floor area of 5,000 m<sup>2</sup>, at our headquarters. To provide the best possible working conditions, the facility has two storeys: on the ground floor, all goods are transported and the test batches are fed to the racks and drums for the electroplating plant, then a lift system conveys them to the second floor. The actual electroplating process is carried out there and no workers are required on this floor. We can control all process steps in the plant and optimize them to suit our requirements, sustainably and without compromises.

■ **Energy-efficient production:**

Alone the sophisticated energy optimization measures (e. g. heat recovery installations) installed when the facility was built bring annual energy savings of more than 490 MWh. This is the annual electric energy consumption of approximately 160 domestic dwellings

■ **Emission reductions (air pollution, water and noise):**

Extract air is drawn directly from the space above the baths and is cleaned by an air scrubber. This brings pollutant levels in the exhaust air down to values exceeding the lower limits by a factor of more than 250. The same principle applies to our responsible use of water: instead of using valuable drinking-quality water, we use process water. Waste water is cleaned and its pH value neutralized by sophisticated processes at our own treatment plant. And our electroplating plant fulfils the strictest noise emission regulations for mixed-utilization urban areas as well.

■ **Reduction of potential environmental hazards:**

We use environment-friendly materials.

■ **Raw-material efficiency and recycling:**

The online analysis process optimizes the useful life of baths to achieve low resource consumption. Metal residues are reprocessed and thus returned to the raw-material cycle.



Process chemistry – the essence of VOSS coat. Thanks to automated concentration correction in baths, process parameters remain within tight tolerances.



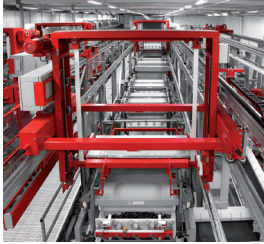
Our plant technology is specifically designed to prevent damage to threads.



The entire plant operation is controlled from the ground floor. All process steps and parameters are displayed and indicated in real time on control monitors.



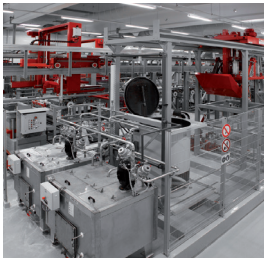
All bath parameters are continuously monitored. Chemicals are added in a fully automatic process to maintain the correct concentration.



Process optimization has led to shorter product immersion times at our facility than in other electroplating plants. This means even less stress on the material.



After electroplating, each production lot is subjected to quality control inspection of both the thickness and the chemical composition of the coating. The results of the inspections are documented.



Our flexible plant controls allow customer-specific post-processing.



Extract air is drawn directly from the space above the baths and scrubbed before being exhausted. Heat energy is recovered and recycled.

## The individual: at the focus of all our activities.

Technology improves products. Sustainability ensures efficiency and conservation of resources. But only by combining these two factors do we really benefit the human beings involved. VOSS coat benefits everyone, now and in the future – staff and our customers alike.

### ■ Productive working conditions for our staff:

Employees and chemicals are separated by construction measures. Since concentration-adjustment dosing of the process baths is fully automated and requires no manual work, contact to chemicals is avoided. Ergonomical workplaces, eliminating lifting movements, for example, prevent fatigue and the errors associated with this.

### ■ Process stability in the interest of our customers

Our good process stability, in conjunction with excellent component assembly characteristics, virtually eliminates faults which might occur due to excessively tight or slack assemblies. Coating processes specifically developed for our products ensure consistently high corrosion protection – at all times – for the entire product range.

### ■ Nickel release:

Our nickel release rate is more than 50 times lower than the limit values defined in EC regulation 1907/2006 for the release of nickel by objects coming into direct and prolonged contact with human skin.



# VOSS coat



## Corrosion resistance in perfection

### VOSS coat: in a class of its own.

Corrosion protection is only as good as the weakest component. So it is best not to have any weakest component. VOSS coat sets the standard when it comes to improving corrosion protection in your entire system. Safety which improves your products and impresses your customers.

### Reliability:

- 1,000 hours corrosion resistance under practical conditions.
- A technological leader among surfaces, thanks to many years of experience, research and development.
- Sustainable production in our own VOSS coat competence centre.
- 455 million couplings have been delivered since 2007.
- More than 30 % of all users in Germany choose VOSS coat.
- High availability and delivery readiness: lean, rapid supply chains.
- Image enhancement and a high resale value for your machinery and plant, thanks to uncompromisingly high-quality components.
- Enhanced customer satisfaction due to minimum risk of complaint.
- Application engineering: customer specifications can be realized by our own employees (e.g. in the case of prototypes).
- Assuring the future through our own research and cooperation with universities and other higher education institutions.

## VOSS couplings resistance to aggressive media

The VOSS coat surface finish is compatible with all normal hydraulic fluids. However, as VOSS Fluid products are used in a wide range of applications, they will also come into contact with other media such as newly-developed synthetic hydraulic fluids, fuels, cleansing agents, lubricants, gases or corrosive alkaline or acid liquids. If you are planning to use media which cannot be described as a hydraulic oil commonly used in mechanical engineering

applications, we recommend that you examine their suitability prior to use. Please note that not only their stability when used with VOSS Fluid surface coatings has to be taken into consideration, but also their compatibility with elastomers and other hydraulic components as well. An overview is given in the following table, which is only meant to serve as a guide:

Medium	Coupling material		Seal material		
	Steel	Stainless steel 1.4571	NBR	FPM/FKM	EPDM
Acetone	■	■	■	■	■
Ethanol (ethyl alcohol)	■	■	■	■	■
Ether	■	■	■	■	■
ASTM – oil No. 1	■	■	■	■	■
ASTM – oil No. 2	■	■	■	■	■
ASTM – oil No. 3	■	■	■	■	■
ASTM – oil No. 4	■	■	■	■	■
Brake fluid	■	■	■	■	■
Gasolene (petrol)	■	■	■	■	■
Benzene	■	■	■	■	■
Steam	■	■	■	■	■
Diesel fuel	■	■	■	■	■
Compressed air (dry)	■	■	■	■	■
Natural gas	■	■	■	■	■
Petroleum oil	■	■	■	■	■
Liquid propane (LPG)	■	■	■	■	■
Transmission oil	■	■	■	■	■
Glycol (ethylene glycol)	■	■	■	■	■
Fuel oil	■	■	■	■	■
Hydraulic fluids (petroleum-based) HL/HLP	■	■	■	■	■
Hydraulic fluids (polyglycol-based) HEPG	■	■	■	■*	■
Hydraulic oils (bio-oil based) HEES	■	■	■*	■	■
Hydraulic fluids (synthet. ester) HEES	■	■	■*	■	■
Hydraulic fluids HFC	■	■	■	■	■
Carbon dioxide	■	■	■	■	■
Carbon monoxide	■	■	■	■	■
Methane	■	■	■	■	■
Methanol (methyl alcohol)	■	■	■	■	■
Mineral oils	■	■	■	■	■
Unprocessed natural gas	■	■**	■	■	■
Kerosene	■	■	■	■	■
Crude petroleum oil	■	■	■	■	■
Soap solution	■	■	■	■	■
Shell Naturelle, HF-E-46	■	■	■	■	■
Silicone oils	■	■	■	■	■
Skydrol 500	■	■	■	■	■
Skydrol 7000	■	■	■	■	■
Turpentine	■	■	■	■	■
Water	■	■	■	■	■
Sea water	■	■	■	■	■

■ resistant      ■ resistant under certain conditions      ■ not resistant  
 \* resistance depends on temperature      \*\* our gas requires reduction of material hardness when stainless steel is used  
 Please note that any material's resistance to aggressive media depends on the temperature of the media when used.



## Preventing faults and correcting malfunctions

All VOSS Fluid products have been carefully designed, taking into account ease of assembly, user-friendliness and the product's ability to reliably fulfil the intended purpose.

In order to ensure these qualities while the products are in use, the careful choice of hydraulic coupling systems along with their correct assembly and installation are of tremendous importance.

Almost 85 % of all failures are due to assembly or installation faults, leading to impaired sealing functions or even complete failure of the coupling or connection.

### Distribution of causes of assembly faults:

- approx. 55 % too slack assembly for tube OD 20–42 mm.
- approx. 40 % over-tightening for tube OD 6 – 18 mm.
- approx. 5 % other assembly/installation faults

Faulty hydraulic lines not only lead to immense re-working costs and image loss, they can also have serious consequences such as accidents, fire hazards and environmental damage.

On the following pages, you will find system-related notes which will help you identify potential faults causes and take preventive action.

**You must on all accounts observe the notes in this catalogue as well as the assembly and operating instructions for VOSS tube connection systems, tools and pre-assembly devices.**

In addition, we recommend regular user training and assembly auditing by our qualified staff.



## VOSS Ring<sup>M</sup> cutting ring couplings



### Problem: "leaks"

Characteristic	Preventive measures
Inadequate penetration of cutting ring / not enough tube material raised in front of first cutting edge.	<p>Observe the specified tightening paths (number of turns) when manually pre-assembling the coupling.</p> <ul style="list-style-type: none"> <li>■ Mark strokes on parts to allow visual control of the rotation angle.</li> <li>■ Use lubricants to reduce the assembly forces required.</li> </ul> <p>Use pre-assembly devices and VOSS tools.</p> <p>Observe the specified pre-assembly device parameter settings</p> <ul style="list-style-type: none"> <li>■ Inspect and check the pre-assembly devices regularly</li> </ul> <p>Select tubes as specified in DIN EN 10305-4.</p> <p>Do not use rotary grinder or tube cutter</p> <p>Only de-burr tube edges internally and externally, do not sharpen them. Check de-burring tool regularly.</p> <p>Cut tubes at right angles.</p> <p>Ensure that the area where the tube was cut is free of contamination, metal chips and paint.</p>
No visibly raised tube material in front of the first cutting edge / cutting ring is jammed on the tube.	<p>The tube must be pushed firmly against the stop in the stud.</p> <ul style="list-style-type: none"> <li>■ Ensure that the assembly is not subject to stress during installation</li> </ul> <p>Use pre-assembly devices and VOSS tools.</p>
Tube has been pressed away from under the cutting ring / the tube bulges	<p>For thin-walled tubes, use suitable reinforcing supports.</p>
Constriction behind the cutting ring / damaged thread / after being slackened, the nut cannot be unscrewed any further by hand / the nut bulges / damage to the hex spanner surfaces	<p>Observe the specified tightening paths when manually assembling the coupling.</p> <ul style="list-style-type: none"> <li>■ Mark strokes on parts to allow visual control of the rotation angle.</li> <li>■ Use lubricants to reduce the required assembly forces.</li> </ul> <p>Use pre-assembly devices and VOSS tools.</p> <p>Observe the specified pre-assembly device parameter settings</p> <ul style="list-style-type: none"> <li>■ Inspect and check the pre-assembly devices regularly</li> </ul> <p>Select tubes as specified in DIN EN 10305-4.</p> <p>Avoid frequent re-tightening of the coupling after assembly.</p> <p>Avoid using extenders for small tubes and couplings.</p>
Cutting ring is obviously too near the tube end / stud connector has expanded	<p>Inspect and check the pre-assembly devices regularly.</p> <ul style="list-style-type: none"> <li>■ Use taper gauges.</li> </ul> <p>Do not re-use screw coupling parts more than once.</p> <p>Use pre-assembly dies, "high-strength material" version.</p> <p>Use VOSS test gauges to check cutting-ring positions.</p>

## VOSS Ring<sup>M</sup> cutting ring couplings



### Problem: “leaks”

Characteristic	Preventive measures
Damage found on cutting ring after pre-assembly	<p>Inspect and check the pre-assembly devices regularly.</p> <ul style="list-style-type: none"> <li>■ Inspect internal cone surfaces for damage and/or contamination.</li> </ul> <p>Using suitable lubricants increases tool service life.</p>
Cutting ring leaks repeatedly	<p>Select the suitable system for the respective application (depending on temperature, pressure and type of load).</p> <p>Use a soft sealing system (ES-4 / VOSSForm<sup>SOFT</sup> / BV-10)</p> <p>Avoid duplicate dimension notations; take expansion loops into consideration to permit stress-free installation.</p> <p>Use tube saddles or clamps.</p> <p>Provide specified minimum length of straight tube leading to elbow.</p>
Cutting ring has penetrated unevenly	<p>Provide specified minimum length of straight tube leading to elbow.</p> <p>Select tubes as specified in DIN EN 10305-4.</p>
Slight oil film around the coupling	<p>Only apply a small amount of lubricant to the components during assembly.</p> <p>Degrease the components after assembly.</p>
Components bind at surfaces in contact with one another.	<p>Use suitable stainless-steel assembly paste.</p> <p>Apply sufficient lubricant to the contact surfaces.</p> <p>Only use hardened pre-assembly dies for manual pre-assembly work.</p> <p>Use pre-assembly devices and VOSS tools.</p>





## Problem: “tube rupture”

Characteristic	Preventive measures
Tube breaks off directly behind union nut	<p>Use tube saddles or clamps.</p> <p>Ensure that components are not subject to stresses in installed condition, avoid shear loads.</p> <p>Select the most suitable system for the respective application ( depending on temperature, pressure and type of load)</p>
Tube breaks off directly behind the cutting ring	<p>Stop tightening as soon as the cutting ring has reached the block.</p> <p>Avoid using extenders for small tubes and couplings.</p>



## Problem “tube pulled out of coupling”

Characteristic	Preventive measures
Cutting ring peels material off end of tube due to too shallow incision.	<p>Before every final assembly, check the amount of tube material raised by the first cutting edge.</p> <p>Re-assemble and tighten up cutting-ring couplings which were inadequately tightened.</p>
No visibly raised tube material in front of the first cutting edge / cutting ring is jammed on the tube.	Before every final assembly, check the amount of tube material raised by the first cutting edge.
Cutting ring has been placed on tube the wrong way around	Check that the cutting ring faces the correct direction.

## VOSS ES-4 cutting ring couplings



### Problem: “leaks”

Characteristic	Preventive measures
Inadequate penetration of cutting ring / not enough tube material raised in front of first cutting edge.	<p>Observe the specified tightening paths (number of turns) when manually pre-assembling the coupling.</p> <ul style="list-style-type: none"> <li>■ Mark strokes on parts to allow visual control of the rotation angle.</li> <li>■ Use lubricants to reduce the required assembly forces.</li> </ul> <p>Use pre-assembly devices and VOSS tools.</p> <p>Observe the specified pre-assembly device parameter settings</p> <ul style="list-style-type: none"> <li>■ Inspect and check the pre-assembly devices regularly</li> </ul> <p>Select tubes as specified in DIN EN 10305-4.</p> <p>Do not use rotary grinder or tube cutter</p> <p>Only de-burr tube edges internally and externally, do not sharpen them. Check de-burring tool regularly.</p> <p>Cut tubes at right angles.</p> <p>Ensure that the area where the tube was cut is free of contamination, metal chips and paint.</p>
No visibly raised tube material in front of the first cutting edge / cutting ring is jammed on the tube.	<p>The tube must be pushed firmly against the stop in the stud.</p> <ul style="list-style-type: none"> <li>■ Ensure that the assembly is not subject to stress during installation</li> </ul> <p>Use pre-assembly devices and VOSS tools.</p>
Tube has been pressed away from under the cutting ring / the tube bulges	<p>For thin-walled tubes, use suitable reinforcing supports.</p> <p>Avoid frequent re-tightening of the coupling after assembly.</p>
Cutting ring is obviously too near to the tube end / stud connector has expanded	<p>Inspect and check the pre-assembly devices regularly.</p> <ul style="list-style-type: none"> <li>■ Use taper gauges.</li> </ul> <p>Do not re-use screw coupling parts repeatedly.</p> <p>Use pre-assembly dies, “high-strength material” version.</p> <p>Use VOSS test gauges to check cutting-ring positions.</p>
Damage found on cutting ring after pre-assembly	<p>Inspect and check the pre-assembly devices regularly.</p> <ul style="list-style-type: none"> <li>■ Inspect internal cone surfaces for damage and/or contamination.</li> </ul> <p>Using suitable lubricants increases tool service life.</p>
Sweating of liquid at tube end	<p>In order to prevent the soft seal from being damaged, it is essential to apply a lubricant to the tube before installing the cutting ring during the pre-assembly process.</p> <p>Deburr the inner and outer edges of the tube end lightly.</p> <p>Check de-burring tool regularly.</p>

Characteristic	Preventive measures
Sweating of liquid at stud connector end	<p>To prevent damage to the soft seals, lubricant must be applied to all soft seals of the cutting- ring before assembling the coupling.</p> <p>Check soft seals for damage before assembling the coupling, replace seals if necessary.</p>
Missing soft seals	<p>Check that all components are in place before assembling the coupling.</p> <p>Replace soft seal.</p>
Cutting ring leaks repeatedly	<p>Select the most suitable system for the application (depending on temperatures, pressure and type of load and stress)</p> <p>Avoid duplicate dimension notations; take expansion loops into account to permit stress-free installation.</p> <p>Use tube saddles or clamps.</p> <p>Observe minimum lengths specified for straight tubes following elbows.</p>
Cutting ring has penetrated unevenly	<p>Provide specified minimum length of straight tube leading to elbow.</p> <p>Select tubes as specified in DIN EN 10305-4.</p>
Very little or no material raised by the first cutting edge	<p>Stainless-steel cutting rings must be used for stainless-steel tubes.</p>
Components bind at surfaces in contact with one another.	<p>Use suitable stainless-steel assembly paste.</p> <p>Apply sufficient amount of lubricant to the contact surfaces.</p> <p>Only use hardened pre-assembly dies for manual pre-assembly work.</p> <p>Use pre-assembly devices and VOSS tools.</p>

## VOSS ES-4 cutting ring couplings



### Problem: “tube rupture”

Characteristic	Preventive measures
Tube breaks off directly behind union nut	<p>Use tube saddles or clamps.</p> <p>Ensure that components are not subject to stresses in installed condition, avoid shear loads.</p> <p>Select the most suitable system for the application (depending on temperature, pressure and type of load)</p>
Tube breaks off directly behind the cutting ring	<p>Stop tightening as soon as the cutting ring has reached the block.</p> <p>Avoid using extenders for small tubes and couplings.</p>



### Problem “tube pulled out of coupling”

Characteristic	Preventive measures
Cutting ring peels material off end of tube due to too shallow incision.	<p>Before every final assembly, check the amount of tube material raised by the first cutting edge.</p> <p>Re-assemble and tighten up cutting-ring couplings which were inadequately tightened.</p>
No visibly raised tube material in front of the first cutting edge / cutting ring is jammed on the tube.	Before every final assembly, check the amount of tube material raised by the first cutting edge.
Cutting ring has been placed on tube the wrong way around	Check that the cutting ring faces in the correct direction.

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



### Problem: “leaks”

Characteristic	Preventive measures
Nut comes loose during operation	<p>Observe the specified tightening paths (number of turns) when finally assembling the coupling.</p> <ul style="list-style-type: none"> <li>■ Mark strokes on parts to allow visual control of the rotation angle.</li> <li>■ Use lubricants to reduce the required assembly forces and to reduce soft-seal wear.</li> </ul> <p>Observe specified tightening torque where this is the assembly criterion.</p>
No moulded seal	<p>Check that all components are in place before assembling the coupling.</p> <p>Install the soft seal.</p>
No clamping ring in the nut	<p>Check that all components are in place before assembling the coupling.</p> <p>Store DIN union nuts and SQR function nuts separately in order to prevent mistakes.</p> <p>Only use SQR function nuts.</p>
VOSSForm <sup>SQR</sup> contour is not created correctly	<p>Check and inspect tools and machines regularly.</p> <p>Check the contour after every forming operation.</p> <p>Apply a thin film of lubricant only to the inner and outer tube surfaces, not to the end face, as oil on the end face can falsify the forming process results.</p> <p>Tube must be pushed against the stop plate during the forming process.</p> <p>Clean tools regularly.</p>
Slight oil film around the coupling	<p>Only apply a small amount of lubricant to the components during assembly.</p> <p>Degrease the components after assembly.</p>
Material surface binds during tube forming / tool breakage	<p>Only stainless-steel tools (marked VA for stainless-steel use) may be used for forming stainless-steel tubes.</p> <p>Use special fine-cutting oil (Feinschneideöl FOE).</p>
Components bind at surfaces in contact with one another.	<p>Use suitable stainless-steel assembly paste.</p> <p>Apply sufficient lubricant to the contact surfaces.</p>
Couplings leak repeatedly	<p>Select the most suitable system for the application (depending on temperature, pressure and type of load and stress)</p>



### Problem: “tube rupture”

Characteristic	Preventive measures
Tube breaks off directly behind union nut	<p>Tube breaks off directly behind union nut</p> <p>Ensure that components are not subject to stresses in installed condition, avoid shear loads.</p>

## VOSS taper seal couplings (DKO)



### Problem: “leaks”

Characteristic	Preventive measures
Nut comes loose during operation	<p>Observe the specified tightening paths (number of turns) when finally assembling the coupling.</p> <ul style="list-style-type: none"> <li>■ Mark strokes on parts to allow visual control of the rotation angle.</li> <li>■ Use lubricants to reduce the required assembly forces.</li> </ul> <p>Observe specified tightening torque where this is the assembly criterion.</p>
Damaged thread / after being slackened, the nut cannot be unscrewed any further by hand / the nut bulges / damage to the hex spanner surfaces / wire pin has come out of the groove	<p>Observe the specified tightening paths (number of turns) when finally assembling the coupling.</p> <ul style="list-style-type: none"> <li>■ Mark strokes on parts to allow visual control of the rotation angle.</li> <li>■ Use lubricants to reduce the required assembly forces.</li> </ul> <p>Avoid using extenders for small tubes and couplings.</p>
Missing O-ring	<p>Check that all components are in place before assembling the coupling.</p> <p>Install the soft seal.</p>
Slight oil film around the coupling	<p>Only apply a small amount of lubricant to the components during assembly.</p> <p>Degrease the components after assembly.</p>
Damaged O-ring	<p>Align DKO coupling properly before tightening it by hand. Hold the connecting piece body with a spanner to counter tightening torque when finally tightening up the connection.</p> <p>Use lubricants to reduce the assembly forces required and to reduce soft-seal wear.</p> <p>Ensure that components are not subject to stresses in installed condition, avoid shear loads.</p>
Couplings leak repeatedly	<p>Select the most suitable system for the application depending on temperature, pressure and type of load and stress)</p>



### Problem: “tube rupture”

Characteristic	Preventive measures
DKO coupling cracks open radially along the groove for the wire pin	<p>Install the connected tubes and hoses in such a way that no additional shear loads will act on the coupling.</p> <p>Ensure that the components are not subjected to stresses in the installed state.</p>

## VOSS 24° couplings



### Problem: “leaks”

Characteristic	Preventive measures
Screwed connection pulls out of the threads	Observe all specified tightening torques ■ Use lubricants
Damaged thread / damage to the hex spanner surfaces	Observe all specified tightening torques ■ Use lubricants Avoid frequent re-tightening of the coupling after assembly. Avoid using extenders for small tubes and couplings.
Thread tears away	Observe all specified tightening torques Use a spanner to hold the coupling body when assembling the coupling.
Missing seal (PEFLEX or O-ring)	Check that all components are in place before assembling the coupling. Install the soft seal.
Threaded section cannot be screwed into the female part	Check whether the threads are imperial or metric (danger of confusion). ■ Use the VOSS thread gauge board to determine the thread type and size.
Leaks in the threads	Keep sealing surfaces and soft seals clean. Use the correct type of seal for every threaded hole. Avoid screwing conical male stud connectors into cylindrical threaded holes. ■ Use components with adjustable screw connections as an alternative.
Leakage at recesses	When re-assembling used components, especially male stud connectors with a sealing edge (form B), renew the recess every time. Use the correct type of seal for every threaded hole.
Damaged thread / hairline cracks in the male stud connector	Correct handling and transportation. Inspect and check coupling components before assembly. Check that the DKO cone has a stop to prevent over-tightening of the connection.
Slight oil film around the coupling	Only apply a small amount of lubricant to the components during assembly. Degrease the components after assembly.

Characteristic	Preventive measures
Components bind at surfaces in contact with one another.	Use suitable stainless-steel assembly paste. Apply sufficient lubricant to the contact surfaces.
Male stud connectors cannot be unscrewed manually after being initially slackened	Observe the tightening torques specified for the respective mating materials. Use suitable lubricants.
Metal chips in the threaded hole	Clean the threads.



## Services

- Lower process costs
- Reduce throughput times
- Increase process reliability by applying individual logistics solutions

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Value Added Solutions

Corrosion protection specialists

Intelligent logistics systems

Solutions for highest efficiency



The high value which VOSS Fluid products and services add to the customer's own products and systems offer sustained technical and economic advantages. This added value is defined in terms of core skills in the three fields: development and production, long-term corrosion protection, availability and services.

Permanent critical observation of our own processes, ongoing investments and the employment of qualified skilled staff are constantly opening up new improvement potential for our customers.

## Values added by VOSS Fluid

### Solutions for highest efficiency

... improve the economic advantages wherever tube couplings are used in your company.

The high quality and user-friendliness of VOSS Fluid product solutions ensure sustained leak-tightness at all times with no negative effect on overall system costs.

- High process safety in assembly / installation processes
- Short assembly/installation times / high productivity
- No reworking required
- Permanently leak-tight connections
- Use of optimum components and systems
- **Improved product quality**
- **Reduction of production costs**

### Corrosion protection specialists

... protect your machinery and plants against corrosion for their entire service life!

Corrosion protection by VOSS coat as a standard feature, and VOSS's own electroplating plant ensure sustained process reliability and stability.

- Best available corrosion protection in hydraulic connection engineering
- System selection assistance
- Optimum matching of VOSS components, allowing ease of assembly and installation
- In-house electroplating processes optimized to avoid thread damage
- Constant further development of surface treatments to reduce corrosion and increase ease of assembly
- **Optimization of your corrosion protection measures**
- **Improved customer satisfaction**

### Intelligent logistics systems

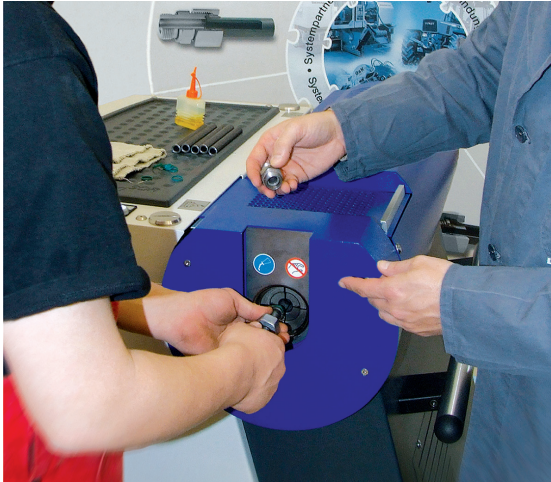
... provide intelligent logistics, specially tailored to your needs!

Maximum possible regional availability and wide range of services optimize the supply chain at the customer's end.

- Delivery service performance level > 99 %
- Reduction of your stock volumes and re-stocking times
- No special materials management needed
- Complete support for introduction of KANBAN
- Analysis and documentation of consumption
- Web-KANBAN for online monitoring of your entire fluid coupling logistics
- **Simplification / automation of your supply chain**
- **Reduction of your material management costs**

## Maintain safety through adequate training

### 'VOSS-quality' assembly training and audits



Leakages are the worst enemy of hydraulic systems. There are many potential causes of faults, but human error is usually the key factor. Only highly-qualified staff can detect error potential at an early stage and thus avoid errors. VOSS offers regular training courses, both at our Wipperfurth facilities and at the customer's own premises, anywhere in the world. In our assembly audits, we watch your staff at work, analyze processes, inspect assembly workplaces and equipment and then work out tailor-made training measures to enhance your company's sustainable productivity. Less faults, faster results, lower costs.

- Assembly training courses to qualify staff, including both theory and practical training
- Assembly audits for process safety and reliability: inspection of all assembly processes, including checking pre-assembly devices and tools on site

## Lower costs by C-parts management

### Savings potential

Only a fraction of the costs of hydraulic coupling components are caused by the actual product.

Logistics make up a disproportionately high share of the costs, since these components belong to the C-parts range. However, if any of these components is missing, the assembly process is disrupted just as much as if an A-part is missing.

### C-parts management

“VOSS Fluid” is aware of its customers’ specific needs and has logistics systems and solutions in place which save process costs, reduce throughput times and ensure high process reliability. The key to this solution is called “individuality”.

In cooperation with the customer, VOSS develops and implements logistics solutions based on the individual application case. The following examples show how VOSS Fluid has rationalized logistics processes by the use of C-part management.

- Card Kanban
- 2-bin Kanban
- Web KANBAN
- Kit service
- Immediate service
- EDI

Further information upon request.

Total costs “Hydraulic connection”		
Product	Price	15–25 %
Logistics	Identification of needs	
	Purchasing administration	
	Incoming goods receipt	
	Packaging and disposal	
	Quality management and testing costs	
	Warehousing and logistics	
	Inventory costs	
	Transportation	
	Assembly line supply	
	Down-time costs	75–85 %
Total		100 %

## Certification and approvals

VOSS Fluid has been certified by TÜV Rheinland in accordance with DIN EN ISO 9001 and DIN EN ISO 14001.

The most common VOSS tube couplings are approved by all major certification companies.

- DNV • GL
- Lloyds Register of Shipping
- Bureau Veritas
- American Bureau of Shipping
- US Coast Guard
- ABS
- Russian Maritime Register of Shipping
- DVGW
- Deutsche Bundeswehr (German armed forces)
- Technical committee "Maschinenbau, Hebezeuge, Hütten- und Walzwerksanlagen" (MHHW) of the HVBG-BGZ [umbrella organization of German trade associations]

We are happy to inform you of further certifications upon request.

## Approvals for gas applications in accordance with DVGW\*

The following VOSS Fluid tube couplings have been approved by the DVGW for gas applications (gas transport, plant construction, natural gas filling stations, gas-fuelled vehicles, liquid gas systems):

- VOSSRing<sup>M</sup> cutting ring couplings
- VOSS ES-4 cutting ring couplings
- VOSSForm<sup>SQR</sup> tube couplings
- DKO

Gases approved in accordance with DVGW-Arbeitsblatt (DVGW Code of practice) G 260:

- compressed air
- natural gas
- liquid petroleum gas

(Generally, all combustible gases supplied by public gas supply utilities in Germany are approved).

### Operating pressure:

A maximum operating pressure (MOP) of up to 250 bar is permitted for the heavy-duty coupling series.

A MOP of 250 bar is permitted for couplings of the light-weight series with tubes of outer diameters up to 18 mm. For tube outer diameters of 22 mm and more, the MOP is limited to 160 bar.

### Operating temperature:

Between - 20 °C and +60 °C

### Attention!

Approvals have been obtained for specific products and models, applications and operating conditions. Since approvals are only granted for a specific limited period, VOSS renews these as soon as they are due to expire. Detailed information is given in the respective approval certificate.

Please request the up-to-date versions of approval certificates from us. We are happy to advise you on all matters concerning certification and approvals.

# Hydraulic coupling technology

## Designation directory

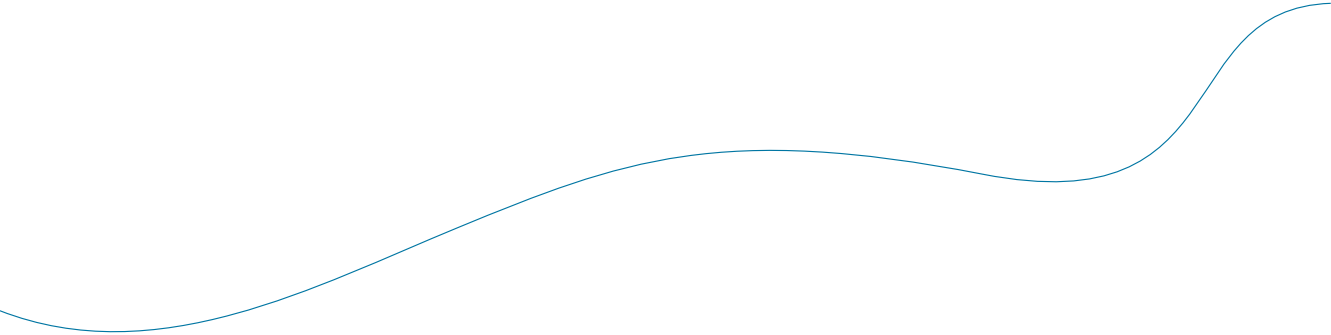
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# VOSS



VOSS Fluid GmbH  
P.O. Box 15 40  
51679 Wipperfürth

Lüdenscheider Straße 52–54  
51688 Wipperfürth  
Germany

Tel.: +49 2267 63-0  
Fax: +49 2267 63-5621  
+49 2267 63-5622  
+49 2267 63-5623

fluid@voss.net  
www.voss.net