

# SERTO®



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# a success story

**SERTO, a Swiss-based group with several subsidiaries worldwide, is a successful manufacturer and international supplier of tube union systems. SERTO is also the brand name for a radially mounted compression ferrule union with a flat metal-to-metal seal, developed back in 1956.**

From simple tube unions to complex system solutions, SERTO has been using the latest technology to develop and manufacture products in its own laboratories and production facilities for over 60 years. Over the years, this has given rise to a comprehensive range of tube unions, valves, couplings, tubes, hoses and accessories for transporting, distributing and regulating of all sorts of media.

The SERTO union is a compression ferrule union with a flat metal-to-metal seal which enables radial assembly and disassembly. It was developed and patented by SERTO in 1956. Since then it has been used in a wide variety of industries and for an enormous variety of applications across the globe. The unique radial system makes installation and removal impressively easy and rapid.

In addition to this clever system, plus a wide product range and extensive know-how, SERTO also offers outstanding product availability and efficient logistics. SERTO consistently plans, optimises and manufactures assemblies and tubes with a strong customer

focus and guarantees that products will be delivered on time in excellent condition. SERTO's complete commitment to quality and implementing quality standards throughout the group is reflected in the testimony of a whole host of customers and the fact that it has industry-standard certification. As a manufacturer, SERTO knows exactly how its products can be used. Because of this firm technological basis, it can provide rapid advice about potential applications.

SERTO has its own production facilities in Switzerland, the Czech Republic, Italy and the USA, guaranteeing a high level of transparency at every stage of production – making it possible to continuously monitor and evaluate the progress not just of production orders but also of technical innovation.

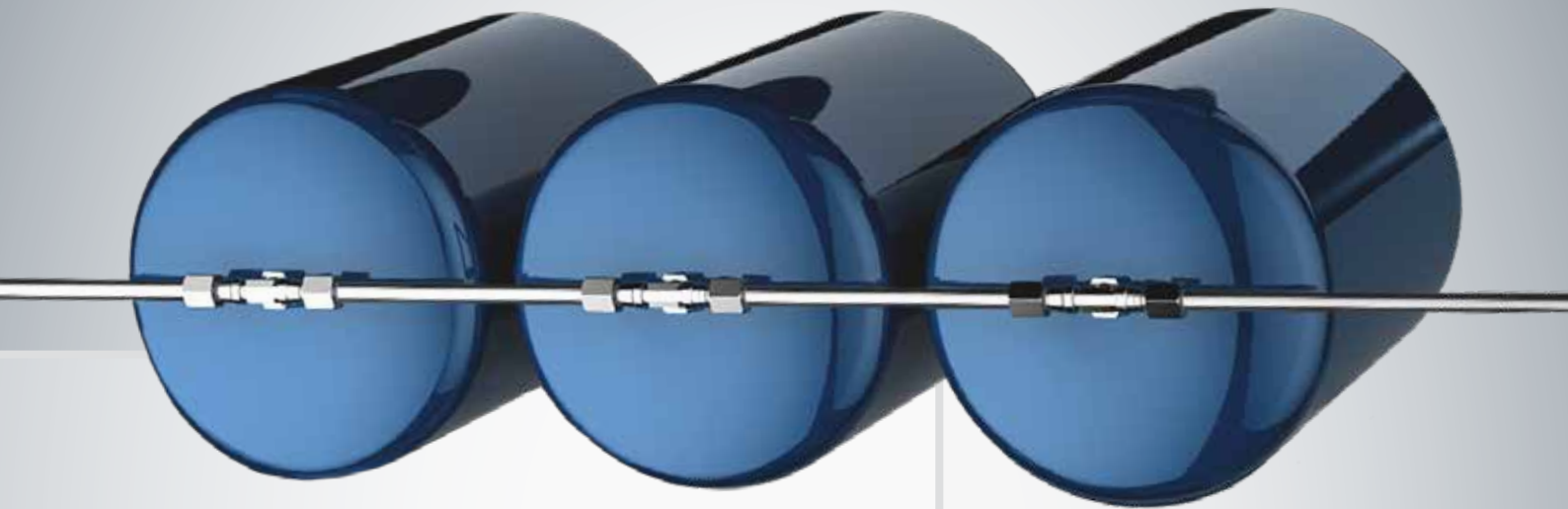
Sales companies in Switzerland, Germany, France, Italy, the USA and China form a global and efficient distribution network, along with over 40 distribution partners. This ensures that customers are provided with the best possible advice and support by local staff.



## Your benefit

- Safety with proven and tested products and reliable technology
- A partner with extensive knowledge of practical applications
- A high level of commitment to quality, proven by the company's industry-standard certification
- A one-stop shop: a complete range of unions, valves and couplings in six different materials

# Radial (dis)assembly



① Removable tube system with SERTO fittings.

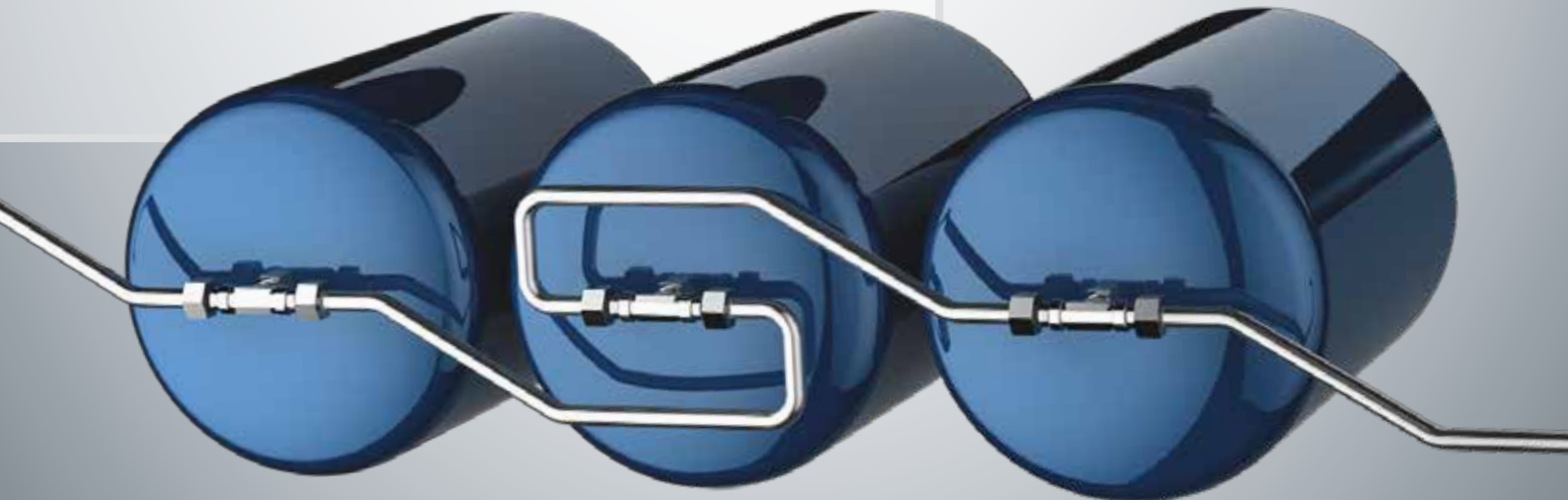
Your benefit:

- shortest possible connection
- minimum costs
- optimum KV value

② Removable tube system with conical fittings.

Disadvantages:

- costs for tube bending
- longer tubes
- reduced KV value



# for efficient applications

**SERTO compression ferrule unions enable radial assembly and disassembly, making them easier for you to install and maintain. There is no need to bend out or cut through tubes, and both the tubes and unions can be reused. This saves you time and money.**

With other common tube unions, the tube is inserted into the fitting body and is sealed with a cone-shaped compression ferrule/cutting ring. The fundamental difference with the radial SERTO compression ferrule union is that the cone is located in the nut instead (Fig. 3). This offers the crucial advantage that the sealing surface between the compression ferrule and the base of the union body is level. Unions and valves which are integrated into a tubing system in this manner can thus be removed from or installed in it radially.

For dismantling, all that is required is to loosen the nuts of the relevant union. The component can be removed without having to bend the tube or loosen other sealing points. This means that SERTO can save you an enormous amount of time. Production processes are interrupted for a much shorter amount of time when exchanging a filter or valve, for example. SERTO components and tubes can also be reused, which saves you money. In contrast, with conical unions, the tubes are inserted into the union body, which prevents easy radial removal. It is necessary either to open several sealing points which will later have to be tightened and sealed again, or to bend or cut the tubes.

To speed up the assembly, the nut and ferrule can be pre-mounted on the tube and then inserted radially into the pipe network. This is also not possible with a conical union.

The differences are particularly striking when it comes to connecting containers in a multi-tank system: with the SERTO union, they can be connected as directly as possible, with straight tubes (Fig. 1). This means shorter tubes, no bending work involved and better flow rates. It is also a lot easier to acquire a replacement length of straight tubing than a more complex bent tube. If the same containers are connected with cone unions, individual tubes can only be removed if they are bent multiple times (Fig. 2).

The greatest saving can be achieved if design engineers already consider the advantages of the radial system during the planning phase. 3D models of the products are available to download free of charge from the SERTO CAD library.

## Your benefit

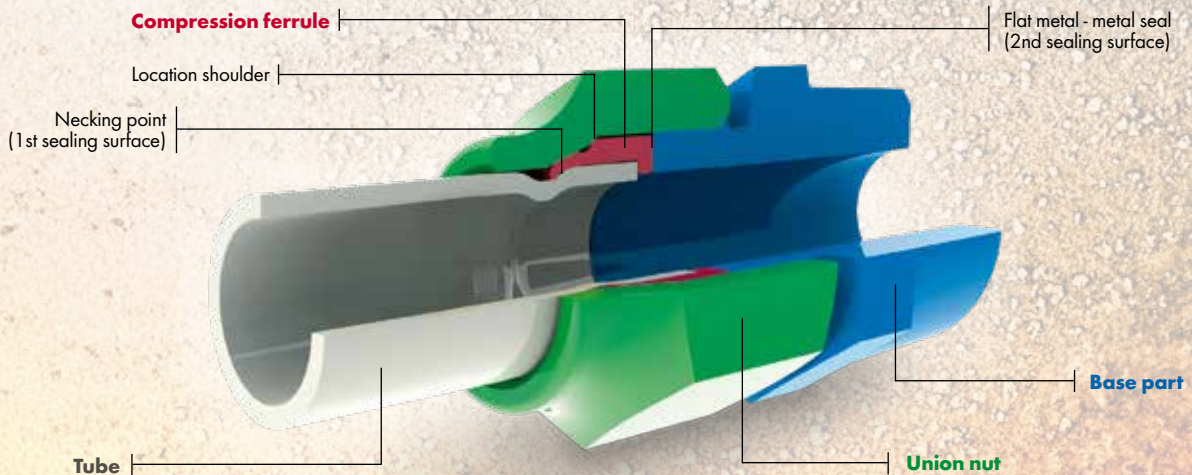
- Save time by using unions which can be removed radially
- Reduced maintenance costs: no need to bend and replace tubes for reinstallation
- Increased safety, fewer sealing points have to be opened
- Simplified design thanks to the free 3D CAD library



# Metal to metal sealing



SERTO unions in applications with extreme temperatures



# for extreme applications

**Unions which operate with metal-to-metal sealing reduce the risk of leaks: SERTO does not use any sealing materials which degrade or become porous – this maximises the safety and long-term functionality of your tube connections.**

SERTO provides a metal-to-metal seal when connecting tubes, whatever material they are made of. SERTO unions reduce leak rates to an extremely low level no matter what temperature and media are involved, as they do not use elastomeric sealing materials which can harden or are subject to creep. This is a particular advantage over longer periods. SERTO unions are therefore the correct choice for many applications.

The metallic compression ferrule is deformed when the nut is tightened and grips the tube firmly with equal pressure over the entire circumference. The deforming force is distributed by the cone in the nut. In the constricted area, the radial (circular) component guarantees that the tube is ideally press-fitted (1st sealing surface). As it cannot be tightened any further than the front face of the compression ferrule, the axial component creates a tight metal-to-metal seal at the face of the compression ferrule and the fitting body (2nd sealing surface).

The SERTO union can be assembled and disassembled an almost indefinite number of times as the deformation of the compression ferrule is complete with the first installation and does not deform any further when re-assembled. The ability of the SERTO union to provide a fully functioning seal even after

being installed and uninstalled a number of times is due to the elastic behaviour of the compression ferrule. This makes the unions resistant to fluctuations in vibration, the temperature and pressure, as can be seen from examples of their use in extreme conditions:

- Temperature sensors on engines or exhaust pipes have to be capable of resisting a wide range of media and temperature cycles. Temperatures of up to +950°C are not uncommon.
- In cryogenic systems, which are commonly used for research, medical technology or pharmaceuticals, all the components are subjected to extremely low temperatures as low as -196°C.

The metal-to-metal seal of the SERTO unions really comes into its own in both of these applications. Standard industrial tightness is defined as a leak rate of  $10^{-6}$  mbar l/s. All of SERTO's metallic products achieve a much higher level of  $10^{-8}$  mbar l/s. When all of the individual components are perfectly matched and tubes are properly processed, handled and installed in accordance with instructions, SERTO unions can achieve seal tightness of up to  $10^{-9}$  mbar l/s, exceeding the required industrial tightness by a factor of 1000.

## Your benefit

- Increased safety due to lack of high-wear seals; removes the risk of not having replacement seals available or using the wrong material
- Increased safety due to vibration resistance; tubes are not damaged
- High reliability, tight seal, especially over longer periods
- High resistance to temperature and media
- Cost savings because the union can be reinstalled

# A smaller width across flats





# for applications in tight spaces

**SERTO unions with radial assembly have a smaller width across flats than competing products. This means that more tubes will fit in the same tight area without changing the dimensions – giving you clarity and space.**

A lot of technical products are developing quickly, providing users with an increasing number of additional options:

- Modern coffee machines can be used for cappuccinos, latte macchiatos and espressos, unlike older models which were limited to plain coffee. This means the choice is a lot wider than it used to be. Each speciality has its own feed tube which has to be fitted into the device.
- If you look under the bonnet of a 30-year-old car and compare it to a modern one, it is clear that the number of systems has increased. New options with lines and sensors mean that space is so tight underneath the bonnet that even changing a bulb has to be done by a specialist.

Both of these examples show that options are expanding even though the amount of space available is not. All of the additional lines have to be accommodated into the existing area in a manner enabling them to be installed and removed again for servicing. This increase in functionality has affected the products of most of SERTO's customers.

This is where the advantages of using SERTO come into full effect: SERTO unions are one or two spanner sizes smaller than the competition. It's not just the unions that are smaller; the tools required to install them are smaller as well. You need a 10 mm spanner with an outer width (B) of 22 mm to install a 6 mm SERTO union, while you would need a 14 mm spanner with an outer width (B) of 31.5 mm to install a similar union from one of our competitors. That means they take up 50 % more space!

Even the fitting bodies of SERTO unions are smaller than those of cone unions because tubes do not go into the fitting body of a SERTO union; they stop before it instead. As a result, the nuts are also smaller. Saving just a few millimetres can make a big difference, and can be particularly important in cramped conditions. This means that more tubes can be installed together in the same space.

In addition to the dimensions, weight often plays an important role. Smaller unions are lighter. This creates a significant advantage for applications involving acceleration, e.g. robotics.

## Your benefit

- Save space due to smaller product dimensions
- More tubes in the same space
- Lower weight, lower costs
- Unions are easier to access when performing maintenance on existing pipe systems

SERTO Unions

# Easy installation



# for safe applications

**SERTO unions are easy to install and do not require any specialised tools. All that you need is a spanner, or the SERTOtool or SERTOspeed pre-assembly equipment for work in series – this increases your efficiency and ensures that all unions are installed with the same level of quality.**

All unions provide an outstanding seal if installed properly. SERTO delivers its unions preassembled and ready for installation. The tube is cut to size, fed into the union until it reaches the stop and tightened for 1 ¾ rotations with a standard spanner – ready to go! Installers will be able to feel when the required number of rotations has been reached without having to count along. Pre-assembly is especially valuable when space is at a premium, e.g. using assembly studs in a vice. The union is then installed at the final location.

The fine thread of the union nut minimises torque during assembly. Excessively long spanners or extensions are not required.

Because the front faces of the tube ends are not directly involved in the seal, they do not need to be completely flat. They can simply be cut at right angles and deburred.

All SERTO plastic and metal unions are assembled the same way, regardless of the size: 1 ¾ rotations of the union nut. The fact that this is the only work required simplifies the process for the user and, most importantly, provides safety. Simple assembly instructions are included in every package, and an animated version is available on the SERTO website.

The SERTO pre-assembly equipment allows you to create safe connections quickly and easily: finely tuned parameters are used for an optimal press fit between the tube and the compression ferrule. The advantages are clear: a product that is safe and easy to use, short production cycles even when large quantities are required and consistent quality make pre-assembly equipment quick and valuable helpers wherever they are used. SERTO offers two different devices:

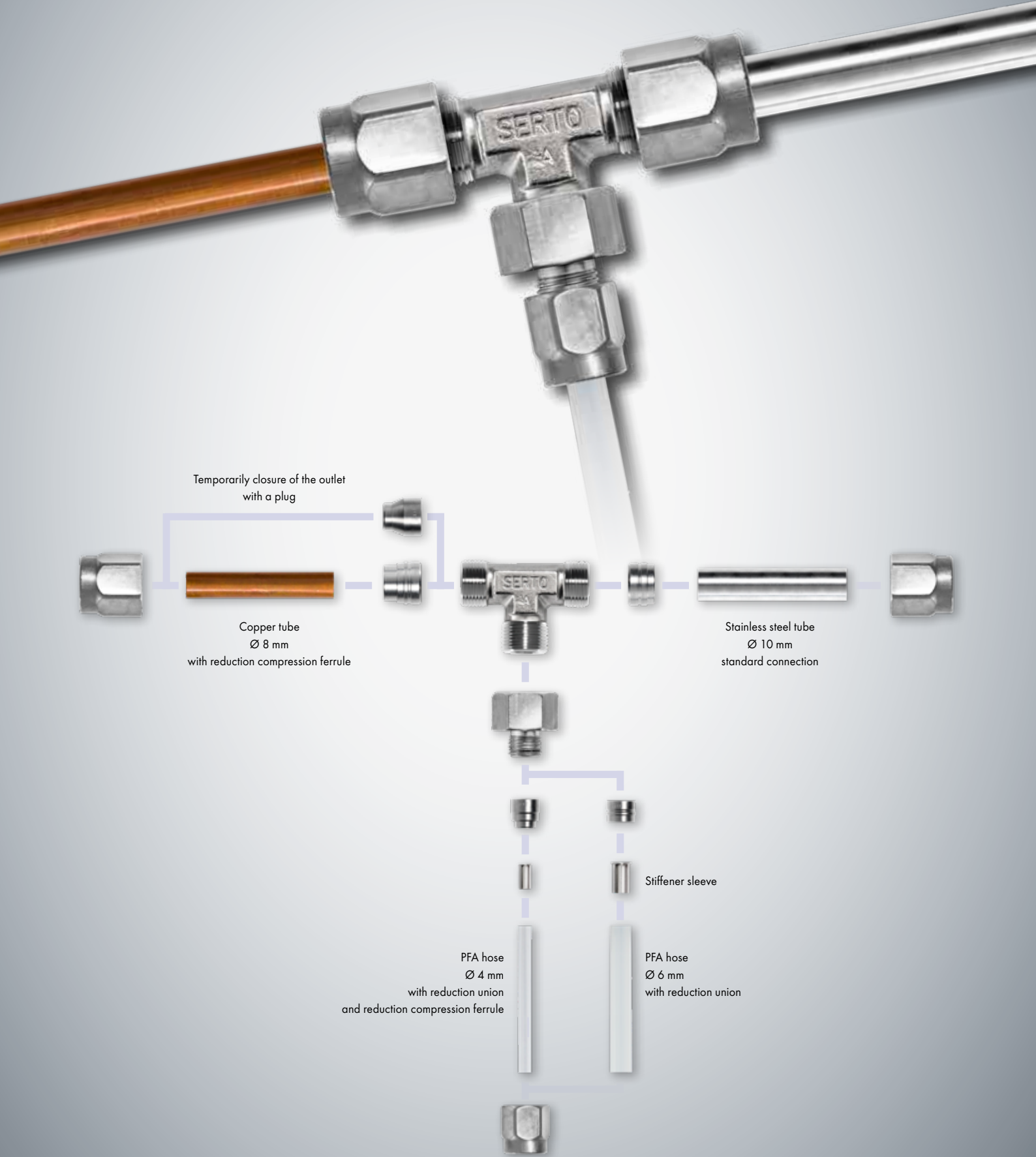
- The SERTOtool for tube diameters of up to 10 mm uses compressed air and can be set up pretty much anywhere due to its small footprint and lightweight design. This is a cost-effective solution because all of the necessary tools are included in the package.
- We recommend using the SERTOspeed pre-assembly device with an electrohydraulic pump for tube diameters of between 10 and 35 mm.

Both of these devices can also be rented for up to three months.

## Your benefit

- Easy assembly with a normal spanner, no special tools required
- ONE easily understood set of assembly instructions for all ranges and sizes included in every pack
- Increased efficiency through the use of the SERTOtool/SERTOspeed pre-assembly equipment
- On-site assembly training

# Flexible with SERTO



# different tube dimensions

## **Do you want to connect tubes with different diameters? Or a metal tube with a plastic hose? Or install a measuring line temporarily? – No problem with the SERTO modular system.**

A tee union usually connects three tubes of identical sizes to one another. What alternative connection options do you have? Our competitors' products deal with size differences by using special parts or combining multiple unions. SERTO provides safe, cost-effective solutions which save space:

The standard compression ferrule in the nut can be exchanged for a reduction compression ferrule so that you can connect tubes with a smaller diameter using the existing union. This makes it easy to switch a 10-10-10 tee union to 10-8-10, 8-10-8 or 8-8-10. The installation dimensions are identical to the standard union. Compared to the alternative, which uses additional unions, the solution with the reduction compression ferrule has some other advantages: it involves fewer sealing points and takes up much less space.

SERTO also provides a reduction union to create a metal-to-metal seal with tubes with even smaller diameters. And if you fit this with another reduction compression ferrule, you can use the tee union with dimensions of 10-8-4. The smallest line could be used as an intake for a measurement instrument.

A plug can be inserted into any union instead of a compression ferrule of the same size to close off the outlet in question. This is particularly useful if lines are only going to be used for a limited amount of time, e.g. for cleaning or measuring purposes.

SERTO unions sit securely on metal tubes because the compression ferrule gently grips the tube when press-fitted without damaging it. Stiffener sleeves stabilise the inner wall of thin tubes and plastic hoses to provide enough resistance to pressure.

The SERTO modular system provides an extremely flexible range of solutions which only require a small number of parts. Instead of three different complete fittings, all you need are a few reduction compression ferrules. This results in extremely low storage costs and does not use up much space, e.g. in a service vehicle.

## Your benefit

- A high level of flexibility when connecting tubes of different diameters together using reduction compression ferrules
- A reduced number of sealing points and reduced costs and space requirements through the use of a single union
- Easy and quick to assemble
- Standard parts are readily available from SERTO and storage costs are low for users

SERTO Modular system

# Flexible with SERTO



# different threads and directions

**Are you building a prototype or revising your existing tube system? Do you need a wide range of threaded connections? Or are you looking for the most efficient way to connect branches going in different directions while saving space? No problem with the SERTO modular system.**

The bodies of SERTO unions have metric cylindrical threads. What alternative connection options do you have?

SERTO provides a wide range of female and male adaptors to combine a variety of thread types. These are available in threads measured in inches, NPT and metric and are screwed on instead of nuts to form a metal-to-metal seal without PTFE tape or other sealing materials. These adaptors provide the advantages of SERTO unions (the metal-to-metal seal, the radial system and the reduction options) and the same benefits (lower costs and space requirements, optimised storage and no loss of stability compared to the standard union).

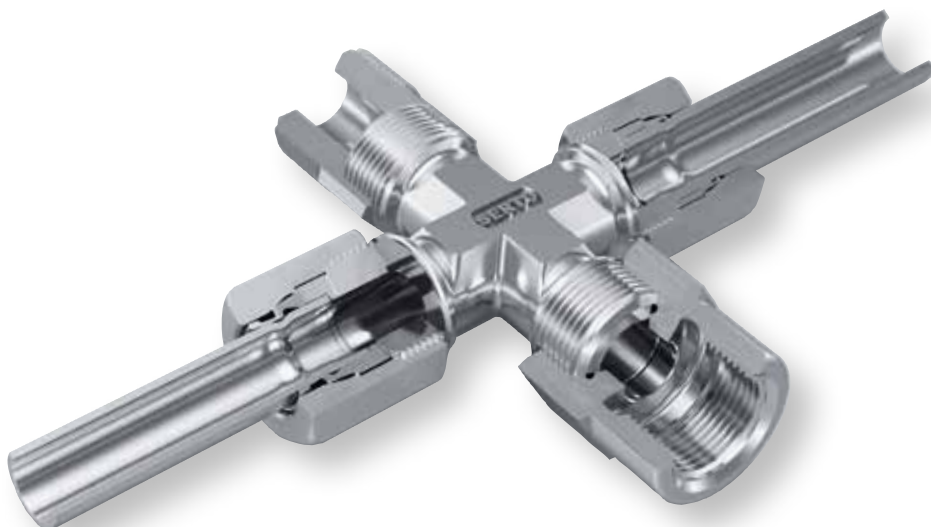
SERTO provides connection options which are not available anywhere else, such as a cross union with four different connections: one inch-based female thread, one NPT external thread, one metric tube connection and one reduced inch-based tube connection. This cost-effective combination is available directly from SERTO.

Need to lay rigid tubes at a variety of individually adjustable angles? Need to make unions go around corners?

An adjustable male adaptor with a plug function is like an extremely short connection with an adjustable direction. When screwed into a component, it can be used to align the installed union.

Tube stubs are the shortest possible connection between two unions and can be used instead of a tube that has been cut to size. When combined with a standard elbow union, they provide a connection which can be realigned.

Another option that is even more efficient than the one above, is to use adjustable unions which are characterised by a tube stud. These are available in a number of different dimensions.



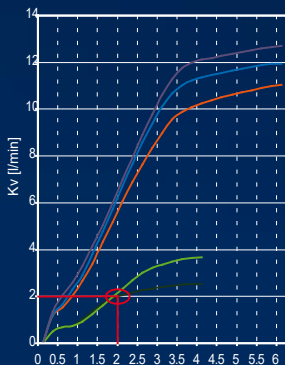
## Your benefit

- Flexibility for unique combinations of threads and dimensions
- High level of product availability and lower storage costs
- Fewer sealing points, and moreover space-saving
- Adaptor function creates a metal-to-metal seal without using additional sealing materials

# The right valve



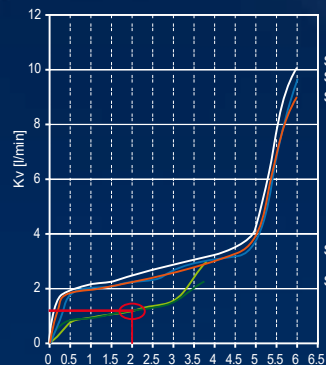
**SO NV 51A21**



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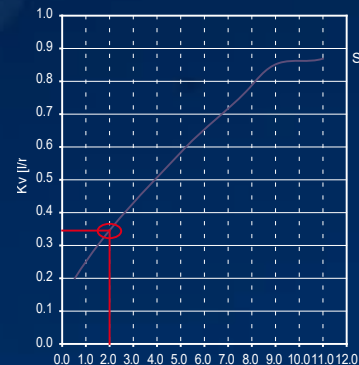
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SO NV 51C21-10

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SO NV 51C21-4/5/6

**SO NV 51D21**



SO NV 51D21

Spindelumdrehungen / Tour de broche / Giro spilla / Spindle turns



# for every application

**SERTO offers a wide range of standard products with different valves: non-return valves, regulating or needle valves, fine regulating valves and metering valves; straight, elbow and panel-mounted valves, in metal or plastic, with tube connections or threaded. Not to mention stopcocks.**

When flow rates are regulated, a valve is used; if the flow has to be interrupted, that requires a stopcock. For valves and stopcocks, the direction of flow of the medium is specified; the valve body geometry is asymmetrical. The appropriate markings must be observed during installation.

The Cv value is important to determine performance and for comparing valves. This is a measure of the flow rate with a pressure drop of 1 bar and is stated in l/m or m<sup>3</sup>/h.

#### **Regulating valves or needle valves**

Regulating valves are available with various degrees of precision: depending on the size, with 2 turns of the hand wheel a "normal" regulating valve achieves a Cv value of between 2 and 7 l/min; a fine regulating valve between 1 and 3 l/min and an ultra-fine regulating valve or metering valve achieves a Cv value of considerably less than 0.5 l/min. These graduated metering sensitivities result from the various geometries of the spindle heads.

SERTO supplies regulating valves in all materials, with a tube connection, with female or male threads, with adjusting stubs including elbow and bulkhead versions, and also with a separate flange mount. Coloured valve cap plates (for metal valves) or marking rings (for plastic valves) help identify the media.

#### **Non-return valves**

The alternative name "backflow preventer" describes the function of these valves. With a spring and internal taper or ball, they open above a defined pressure and enable flow in one direction, but close again if the pressure drops and therefore prevent the return flow of the medium. Due to tolerances in the production dimensions and flow behaviour, the opening and closing pressure is now stated as a value range ( $\pm 20\%$ ).

As with other products, our range features a wide variety of non-return valves; different opening pressures, spring materials and sealing materials are available as options.

#### **Ball valves or stopcocks**

Stopcocks open and close a line and can be recognised by their turning handle. A ball with a hole is used as the closing element.

The small, compact SERTO ball valves are available in various materials and with different connections, corresponding to the range of our tube unions.

The SERTO sales team will be very happy to help you with any questions about options or the precise area of application.

## Your benefit

- Different versions for different applications
- Colour markings for the safe use of different media
- Radial assembly and disassembly and metal-to-metal seal for simple installation
- Options available upon request for different seals or opening pressures for non-return valves

# Not just clean



# but pure

**In the semiconductor industry especially, for applications with pure oxygen, paints and lacquers, tube unions must be free of oil and grease. To ensure this, the components pass through a cleaning system and are assembled and individually packed in the SERTO ISO Class 8 clean room.**

Some fields of application for SERTO tube unions and valves are subject to strict cleanliness requirements. For many years, SERTO has provided the options US (cleaned with ultrasound and not lubricated), OX (for use in oxygen systems) and SI (silicone-free for use in combination with paints and lacquers).

#### **The SERTO cleaning system**

To achieve the high level of cleanliness required of surfaces which are in contact with media, SERTO developed a multi-stage process in cooperation with specialists. The components which are to be cleaned are placed in special baskets, adapted to their size. This ensures that the cleaning and rinsing media drain away cleanly.

In total, the cleaning plant consists of 9 sections, which include an ultrasound cleaning bath with alkali, with acid and with deionised water. These are separated by rinsing baths with osmotic water and rounded off by two drying sections. Over the last sections, a system known as an air curtain prevents the cleaned components from being contaminated by dirt from the air. The 600 l of rinsing water is continuously treated in our cleaning plant. Every week we use about 25 kg of regenerating salt for this purpose. The slight loss of water is continuously replenished with tap water. The material – brass or stainless

steel – determines the sequence of the baths which are passed through. The quality is monitored in line with ASTM (American Society for Testing and Materials) standards and each cleaning order is documented.

#### **The SERTO clean room**

To ensure that components are not subsequently contaminated after cleaning, the individual components are assembled and packed into separate bags in an air-conditioned clean room directly next to the cleaning plant. The SERTO clean room complies with ISO Class 8, which means that a specified number of particles in the air must not be exceeded.

People are the largest source of particles and other contamination. Therefore, suitable work clothes (hoods, galoshes and an airlock for changing clothes), special equipment and tools (lint-free cleaning cloths) as well as appropriate working methods are prescribed. Our clean room has a 3-stage pressure cascade system with an excess pressure of 30 Pa so that no dust can enter the room when the door is opened.

The cleaned US components form the basis of SERTO options with special lubricants (OX and SI) and are also the right solution for customers who use their own lubricants.

## Your benefit

- Union components, including cleaning process and packaging in an ISO 8 clean room, all from the same provider
- Advice and expertise to help you use unions securely with extreme media, e.g. oxygen
- Third-party components can be cleaned under contract

SERTO Production

# SERTO Italiana S.r.l.



<b>Materials</b>	Brass alloys	CW617N, CW614N, CW602N, CW510L, CW511L, CW724R/Ecobrass®
	Aluminium	AW6082
<b>Dimensions</b>	Ø: 2 to 50 mm (max. SW 43), round and hexagonal profile Length: max. 240 mm Tolerances: up to +/- 0.01 mm	
<b>Lot sizes</b>	from 50 items	
<b>Additional treatments</b>	Cleaning and heat treatment Bending Surface coating or finishing Labelling via automatic rotary machine Small assemblies	



# expertise from Italy

**For almost 20 years, the Italian production facility has been the main supplier for turned brass parts. Since 2014 it has been part of the SERTO Group. Investments in the machine pool resulted in significantly higher productivity and flexibility. The attractive product range, combined with the customary high SERTO quality standards, speaks for itself.**

The company in Northern Italy, at the Brembate di Sopra location, has been producing turned brass parts for decades and possesses a very high level of expertise in production and processing. It has been the main supplier for precision-machined SERTO brass parts since 2002, it has been part of the SERTO Group since May 2014, and since 2017, it has also manufactured parts for the SERTO aluminium product range.

SERTO has invested a great deal in the machine pool in the past few years. Ten CNC automatic lathes, a highly productive, fully automatic 6-spindle CNC lathe for diameters of up to 25 mm and a highly productive, mechanical 6-spindle automatic lathe for diameters up to 38 mm provide an incredible level of flexibility, even for very complex geometries with narrow tolerances. Thanks to the fully automatic bar loading and rotary plate to hold and transport the produced components, the CNC machines run 24 hours a day, and at night without an operator. 12 high-performance, cam-controlled 6-spindle lathes guarantee consistent quality for large numbers of simple, rotationally symmetrical parts. Today, SERTO Italiana processes 500 tonnes of bar materials per year to produce around 15 million turned parts, a large proportion of which are delivered to SERTO AG in Frauenfeld, while other go to customers all over Europe.

The range of services provided by the turning shop is expanding, making it of interest for new applications and customers. Our modern machine pool and the continuous professional development offered to our employees mean that SERTO is today in a position to be able to manufacture even highly complex parts with very good value for money. Some examples of our particular fields of expertise include

inclined boreholes, crossholes and eccentric boreholes, complex contours with very narrow tolerances, the simultaneous turning of Allen keys and hexagonal sockets and much more. Deliveries are very much to schedule due to the well-established and coordinated processes, and an initial sample inspection report can also be supplied upon request. The modern testing laboratory can measure the precision of even highly complex parts. The approximately 500 measurement instruments (e.g. devices such as contourgraphs or laser measuring devices, gauges for threads, contours etc.) are managed and regularly calibrated using special software.

The well-equipped production facilities enable supplementary processes to be mostly carried out in-house, for example heat treatments in four furnaces, labelling or the fitting of small assemblies. For surface treatments such as coatings, pickling, nickel plating, bright nickel plating, chrome plating or anodising of aluminium parts, SERTO can rely upon a network of long-term partners that undergo an internal supplier evaluation every year and are classified accordingly. Before further processing, the components pass through a semi-automatic washing system that removes the oil and lubricant residues in four wash cycles. The washed out oils and the alcohol used for the process are collected, filtered and reused.

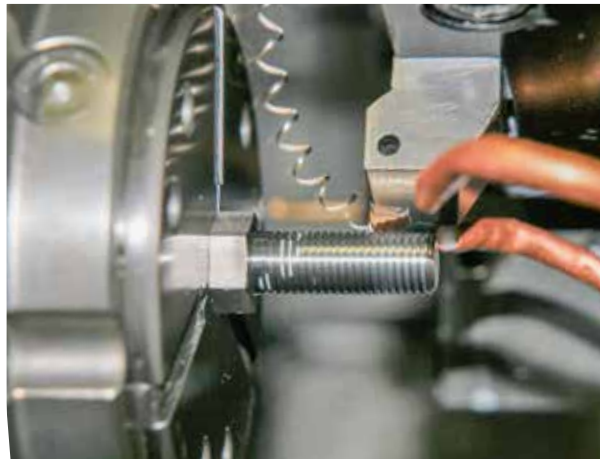
SERTO Italiana offers several advantages: The location benefits from perfect conditions with regard to raw material procurement. A lean organisation and optimum use of the modern machines have a positive impact on the cost structure. As is customary across the whole SERTO Group, production in Italy is also ISO 9001 and ISO 14001 certified.

## Your benefit

- Many years of expertise in the processing of brass and aluminium
- Of interest for both small and large series, and for complex and simple parts
- The modern machine pool ensures optimised costs
- Safety and a high level of quality in the process, as everything comes from just one source

# SERTO CZ s.r.o.

<b>Materials</b>	Stainless steel alloys 1.4571, 1.4401, 1.4301, 1.4305 Special alloys Monel®, Hastelloy®, Inconel®, Incolloy®
<b>Dimensions</b>	5 to 100 mm, round and hexagonal profile
<b>Lot sizes</b>	50 to 10'000 pcs
<b>Additional treatments</b>	Various heat treatments and surface coatings Electro-polishing Labelling via laser or needle embossing Optional parts cleaning in line with the ASTM standard



# expertise from the Czech Republic

**What started out as a long-time reliable partner became part of the SERTO Group in 2008: the SERTO production site in the Czech Republic. Ultra-modern CNC turning centres run around the clock, making union components for SERTO and EXMAR. Investments help safeguard the competitiveness.**

## **Decades of experience in stainless steel processing**

The plant in Klatovy, Czech Republic, was established in the 1990s and became part of the SERTO Group in 2008. Over the course of these three decades, they have built up the level of expertise needed to machine demanding stainless steel CNC turnings. Whatever the order volume may be, customers are guaranteed the same high level of quality. A wide range of high-alloy stainless steels is processed, whereby the parts are turned from bars, sawn bar sections or forged blanks. With an annual consumption of approx. 800 tonnes of stainless steel in all kinds of dimensions, the large warehouse area and high warehouse stock ensure material availability at short notice. Each year, the production facilities turn out approx. 2.5 million premium turned parts and equally high-quality elbows, tee unions and cross pieces, as well as valve bodies from forged blanks.

## **Sustainable investments**

Since 2008, continuous investments have been made in new high-performance CNC machining centres, and the capacity has been significantly increased in the last two years in particular.

There have also been investments in new, spacious staff rooms, in a new warehouse holding stainless steel rods and moulded parts ready for use, and in a photovoltaic system which generates part of the electricity requirements of the site. All of the CNC turning centres are also connected to a central

extraction system, so much of the waste heat can be used – in winter for heating buildings and generating hot water, in summer to reduce the temperature in the production hall.

## **Additional processes**

In addition to the actual CNC turning processes, SERTO CZ also offers options for other, additional machining stages, including various heat treatments and surface coatings, electro-polishing, labelling via laser or needle embossing, or optional parts cleaning in line with the ASTM standard. A new electro-chemical deburring system optimises burr removal at the transitions between the bores of elbow and tee unions, thus significantly reducing the flow resistance. To meet the high requirements with regards to complying with the narrow dimensional tolerances and the surface qualities demanded, SERTO CZ possesses a 3D measuring machine and a CNC contourgraph which can be used to measure even complex inner contours and surface roughness very precisely. SERTO CZ is also the SERTO competence centre for hose fittings and the production of Jacoflon PTFE hoses in batch sizes from 1 to 1000 items.

For all of these processes, there is sufficient capacity available to be able to respond to customer requirements in an individual, prompt and flexible manner.

The production site in the Czech Republic is ISO-certified and is subject to the same quality requirements as the entire SERTO Group.

## **Your benefit**

- Many years of expertise in the processing of stainless steel of different qualities
- Ultra-modern CNC processing centres ensure fast, cost-optimised processing
- Downstream steps such as heat treatment, labelling etc. are available in-house for quick implementation featuring reliable processes

# SERTO AG





# expertise from Switzerland

**SERTO's skills in the production department start out with the purchasing and storage of the tubes, and range from the use of optimal processing and bending machines to quality control, the completion of the tubes with unions, or the installation of assemblies – according to the customer's wishes.**

## **1. Smart warehousing**

Over 60 tonnes of untreated, 6-metre-long tubes of stainless steel, aluminium, copper and steel with outer diameters of 1.59 to 60 mm are stored in the SERTO warehouse in Frauenfeld.

## **2. Surface treatment**

Even before they begin to be machined, surfaces can be galvanised, chromed, given a matte/shiny nickel plating, bonded, galvanised or electroplated.

## **3. Cutting to length**

The fully automatic saw cuts the tube sections with a maximum output of 3000 cuts per hour at an accuracy of  $\pm 0.2$  mm. SERTO is also perfectly equipped for longer tube sections.

## **4. Machining steps**

Depending on requirements, machining steps may be carried out for threads, punches, inside threads or side-drilled holes. To make the unions easier to fit, the tube ends are manually or automatically deburred and smoothed at a rate of up to 2000 pcs. per hour.

## **5. Cleaning**

The interior of the tube is cleaned before bending, using a foam projectile. If needed, tubes can be treated in cleaning baths to make sure they have an oil-free surface.

## **6. Bending**

SERTO has its own well-equipped fleet of machines for the bending of tubes. The fully automatic CNC-controlled bending machines are optimally set up for diameter ranges up to 60 mm. The production of 6-metre-long tubes requires a large operating range, for which the spacious production facilities in Frauenfeld are perfectly suited. SERTO has its own facilities for the production of tools, equipment and jigs for challenging bending geometries.

## **7. Surface refining**

SERTO is able to galvanise, nickel plate or chrome bent tubes. Powder coating or corrosion protection with paint are also on offer, as well as soldering and welding of the tubes.

## **8. Quality assurance**

Our bending competency revolves around the non-contact measuring system, with an accuracy of 0.1 mm. It can also measure unusually long bent tubes. The system is used for first sampling, as well as for series production monitoring. The measurements and geometric data are automatically translated into machine commands. Thus, the bending machines can also be realigned during production.

## **9. Assembly mounting**

The bent tubes are usually built into assemblies and are delivered as a kit; they work with both SERTO components and those purchased elsewhere.

## **Your benefit**

- Many years of expertise related to planning and manufacturing customised, tailor-made pipe sections which are ready for installation
- Assemblies are tested for safety
- Optimisation of pipe routing in cooperation with the customer
- Cost savings thanks to significantly simplified planning, logistics and warehouse management

# Modules



# made by SERTO

**SERTO manufactures and supplies products ranging from individual components to complete piping systems. Frauenfeld is not only home to an extensive warehouse and tube bending facility, but also to dedicated teams of project managers, designers and machine operators. They make the impossible possible.**

## **The right resources**

All of the resources required for successful project work are concentrated at the headquarters in Frauenfeld, Switzerland: a large warehouse for the entire catalogue range and for commonly used tubes and hoses, a tube bending facility, the assembly department for the unions, as well as a complete engineering and technical team who carry out planning work for customers. This starts with the basic development of special components, continues with the modification and optimisation of existing solutions and goes as far as drawing up complete systems. The modules leave the factory tested and ready for installation, at precisely the time when they are required in the customer's production flow.

## **The right expertise**

The project managers are the link between SERTO and the customers. They are not only fully familiar with the technical and commercial processes, but also have many years of practical experience ranging from simple to complex piping systems. They understand the customer's requirements, but also spot potential means of optimising products, and have already accompanied numerous successful projects all the way to delivery. In the project teams, they receive active support from technicians and machine operators.

A wide range of production expertise is available on site. If required, SERTO can also rely on external partners of many years' standing. Trends in the market and in customer requirements are observed precisely so that the range can be continually extended. The latest example is the new know-how in the field of orbital welding. Up to now, this welding work was carried out externally. Due to investments made in facilities and in the further training of employees, this work step can now also be carried out efficiently in-house. Investments have also been made in the cleaning facility: small tube diameters for capillary or measurement lines are now cleaned in-house with a forced flow of distilled water or water mixed with a cleaning agent.

## **The right logistics**

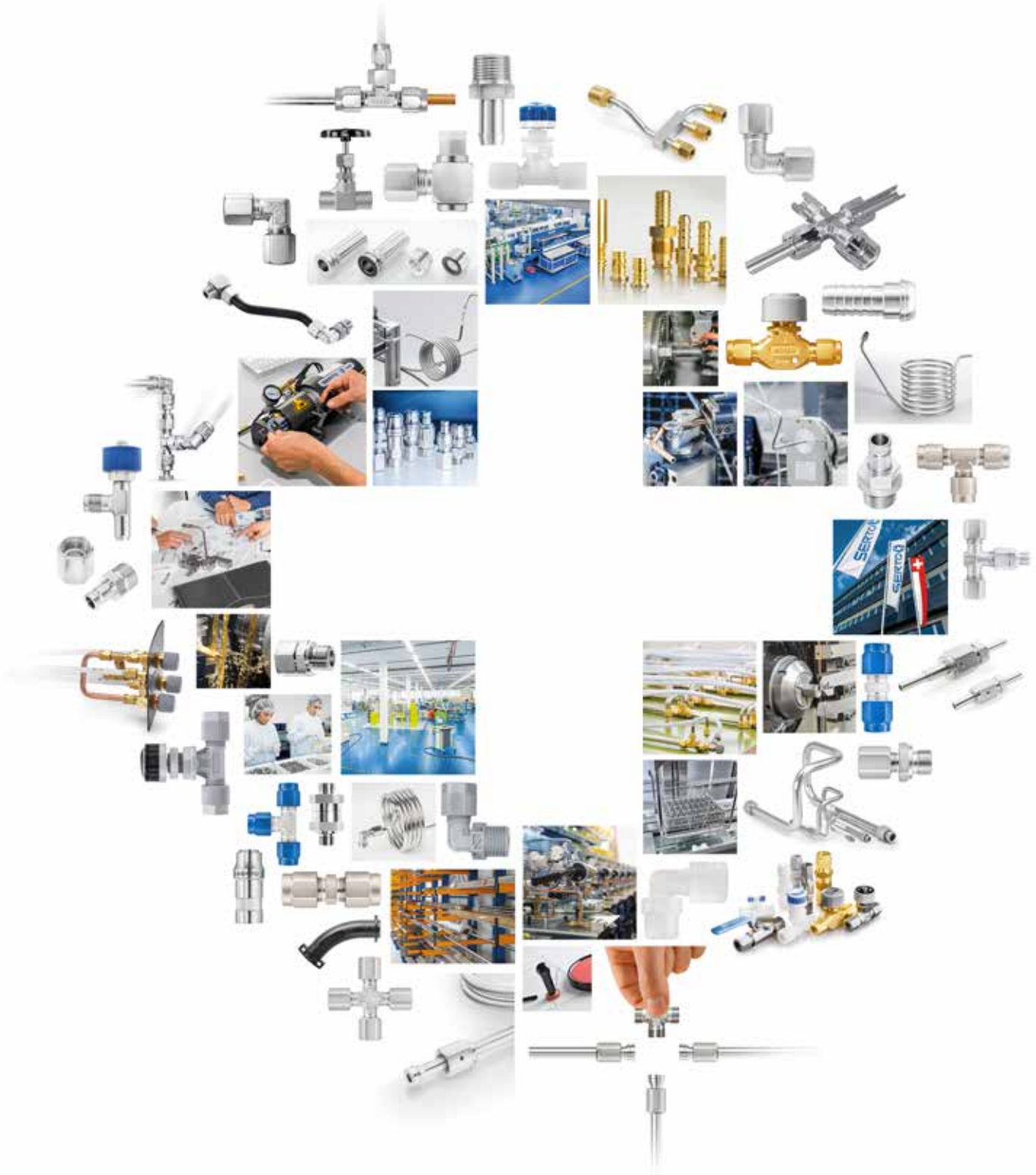
Optimum batch sizes in SERTO production are not necessarily identical with the optimum batch sizes for processing by the customers. In this case, SERTO offers delivery schedule agreements. Production takes place at an economical quantity, at attractive prices, and small on-call deliveries are made as per the customer's wishes. Remaining goods are placed in stock. The small quantities or kits leave the factory on schedule and as specified in order to enter the production process at the customer's site.

## **Your benefit**

- An experienced project team will develop the ideal solution to any challenge
- A high level of process reliability for all work steps thanks to the in-house expertise
- Tailor-made logistics solutions and just-in-time deliveries for an optimal production flow at the customer's site



# SERTO®



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