FUTURISTIC CREATION FOR YOUR HOME

www.rhinoxusa.com

Double Press Catalogue
& Technical Manual

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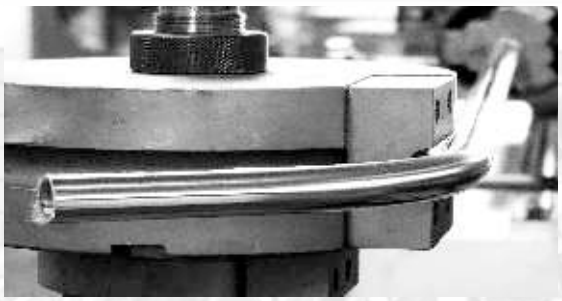
Company Overview

American Pacific Manufactures Inc. Rhinox Pipes and Press fittings are trusted and quality solutions for an integrated piping system. Engineered in Washington USA, we have more than 40 years of industry experience in design and production. Today, Rhinox products are used all over the world.



Connecting Flow To Purity:

Specialized in Quality and Innovation

American Pacific Manufacturing inc. is the world's leading manufacturer and exporter of pipes & fittings. We offer top quality pipes, fittings, valves, flanges such as pipes, press fittings, push fittings, thread fittings, ball valve, flange ball valve, etc.

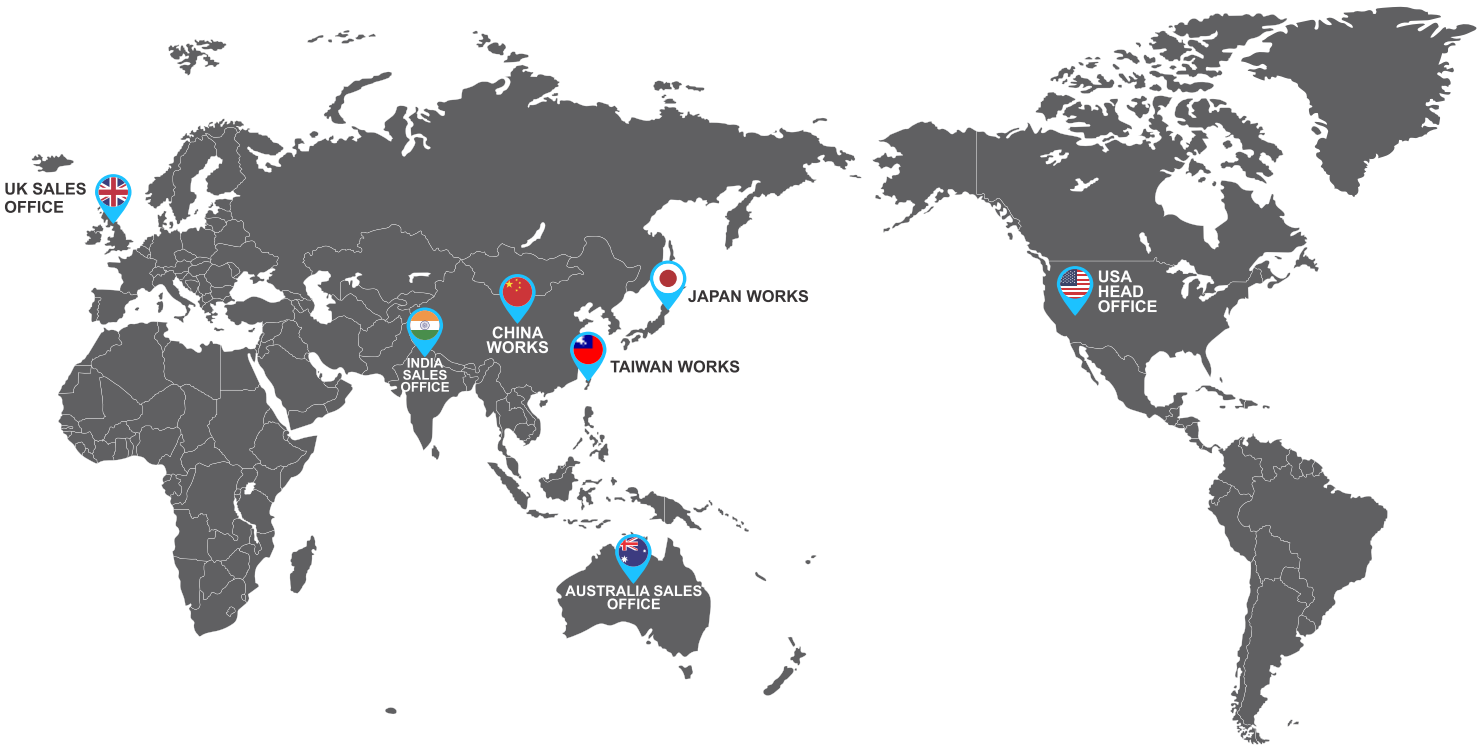
We provide all kinds of pipe fittings to suit all your specific requirements and needs. The quality of our products stands out from our competitors. Except for top quality, we also have competitive prices. Being passionate about offering 100% satisfying customer service, our main goal is to help our targeted market find excellent products at an incredible place.

Regardless of the application, whether fluid, air, or gas transfer, all our pipe fittings, and other products are easy to use, flexible, and versatile without a doubt. Despite the complex competition, we remain on top. Many people in aerospace, biopharmaceutical, medical equipment, HVAC, and environmental water treatment industries stay loyal to us.

All the achievements we gained for the past few years guarantees the high quality of service, amazing customer satisfaction, and affordable prices. But it is normal to hold back working with us. To give you peace of mind, below are the other reasons you should choose our press fittings over the others.


ENJOY THE
ESSENCE
OF PURE WATER

Development of Stainless Steel Pipe Fitting all over the World.



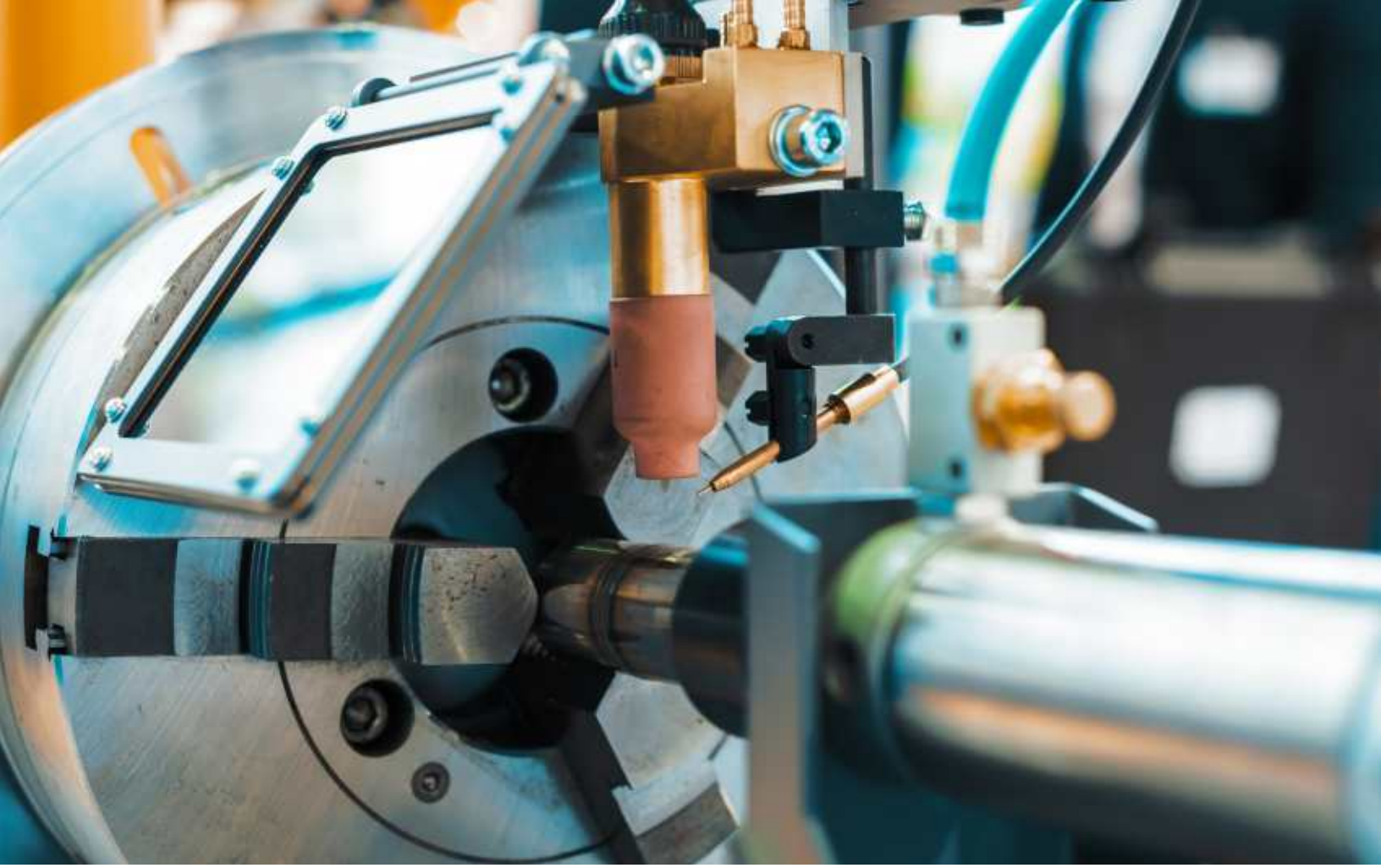
We all know that water is the lifeline. With the improvements in the standard of living and our emphasis on health-related and environmental problems, people started paying attention to the drinking water and its source. The focus was always on the source of water and not on the water distribution network. The water distribution network has always been considered a secondary problem. History is a witness that the development of materials of water supplying has contributed to the well being of humans. As per experts, the upcoming era will be the era of stainless steel pipes. Most of the developed nations have already resorted to stainless steel water pipes.

In the year 1996, congress passed a law in the united states to use only stainless steel pipes for purification of water. Japanese were aware of this back in the 1970s and resorted to using water supply systems made of thin-walled stainless steel.

In the year 1982, Japan water supply Association set((WWAG116) as a standard and stopped using thin-walled stainless steel pipes. For the supply of water and gas, the country now uses thin walls. The levels of penetration on steel pipe is known to have reached as much as 90 percent. In Tokyo, where over 85% of households have spared the opportunity to dismantle the original copper pipes and various plastic water pipes and replace them with stainless steel water pipes in the year 2002. In the 1970s, European countries used thin-walled stainless steel pipes for water supply systems and formed relevant national standards and industry standards. It is a matter to decorate stainless steel pipes in houses; in Switzerland, the main pipes of large-diameter tap water buried under the roads also change the stainless steel water pipe. Compared to foreign

countries, mainland China now chooses to be in the state of copper pipes, plastic pipes and stainless steel pipes. The water pipes that have been eliminated in other countries are still widely publicized and widely used throughout the World. According to the small percentage of users who install stainless steel water pipes, there is still a marginal difference between our existing world and the upcoming era of stainless steel water pipes.

Because of the unique shape of the pipe, only stainless steel can meet people's health, pollution-free, environmental protection, high mechanical strength, low water leakage rate, convenient construction, and other requirements. Therefore, with the sustained and rapid development of world's economy and the continuous improvement of people's living standards and health awareness, stainless steel water pipes are entering the households, and are getting closer to the “stainless steel water pipe era”



Press Fitting Systems in water, heating and cooling Installation

Press fittings made of steel and copper were developed in the world at the end of the fifties and have enjoyed an increasingly large share in the markets of Europe & America during the eighties. This connection technique is still considered to be innovative, since the tried-and-trusted simple 'cold' mounting technique allows the fast, solid and permanent connection of tubing, especially in domestic water, gas and heating installations. In the meantime, the connection technique in the form of press fittings has spread to include not only all types of metal, carbon steel, stainless steel, copper, red bronze, etc., also plastic and plastic composite tubing, and is in Europe the leading connection technique. American Pacific Manufacturing Inc. has further developed carbon steel, stainless steel and nowadays copper/copper-nickel press-fitting range as well.

With the Ampress press fitting system of stainless steel for potable water and gas installations, American Pacific Manufacturing Inc. offers a comprehensive shaped fitting series in the dimension range from 12-108 mm OD, together with piping, pressing tools and accessories. To simplify applications for the fitter, the pressing of the fittings has been so constructed that all the tools approved from the press-fitting systems leading manufacturers, i.e. pressing tools and pressing jaws or collars, are also approved by American Pacific Manufacturing Inc. The planning and installation of potable water and heating systems demand comprehensive expert knowledge, together with knowledge of a multitude of industrial standards and technical guidelines. This technical handbook is intended to provide planners and fitters with essential information to help both size up the field of application and to carry out the professional installation.

Features

The process of making Rhinox stainless steel pipes and fittings starts with the selection of the finest raw materials. Each pipe and fitting is manufactured in an ultra-modern facility where attention to detail guarantees the quality of every item which leaves the factory. Extensive individual testing of each pipe or fitting, including rigorous hydraulic pressure testing, eddy current testing, and annealing of all pipe and fittings to ensure optimal quality standards are consistently met. Rhinox has earned an enviable reputation and is the product of choice for installers due to its high quality, durability and cost competitiveness.

Fast & Easy to Use

Installing Rhinox stainless steel pipe systems has advantages over traditional brazed copper or bonded PVC systems. RHINOX is press-fitted with rubber O rings, which means water doesn't have to be fully drained before making joints, unlike welded systems. Time isn't spent waiting for adhesive bonds to set. And there is no heat or flame, which means no hot works permit. As a result, installing RHINOX is faster, easier, cleaner and safer & a better option.

Push & Stay & Leak Path

Fitting Rhinox stainless steel pipe systems is rapid and simple. Start with hand-fitted joints, which are sufficiently tight to complete the rough-in. With this approach, adjustments can be made to get the right pipe design and placement. Finally, you can complete each joint by pressing. All joints which are not yet pressed will leak (Leak Path), allowing for easy identification of those which are completed and those which are not.

High-Quality 316L Stainless Steel Tube Each Rhinox pipe and fitting is precision manufactured from certified 316L stainless steel. Pipe features include:

High-Quality 316L Stainless Steel Tube

Each Rhinox pipe and fitting is precision manufactured from certified 316L stainless steel. Pipe features include:

- Low carbon (<0.03%) with between 2-3% Molybdenum content ensures even higher corrosion resistance
- Sizes 15–108mm
- AS 5200.053 compliant

Stainless steel press fittings features include:

- 316L material EN 1.4404 (press fittings)
- 316 material EN 1.4408 (precision cast parts)

Press with Ease with RHINOX Tooling

Gearing up to supply and install RHINOX stainless steel pipe systems is easy. If you have previously pressed copper, in many cases an upgrade of jaws will be all that will be required, check your tool's compatibility with your local distributor.

RHINOX tools feature:

- Ergonomic, lightweight design.
- Tools well balanced with one hand operation in most sizes.
- Includes powerful Li-ion batteries.

Press Fittings

The term "press-fit" refers to a joining method for tube systems using fittings, which are mechanically pressed with specific tools. The pressing operation leads to a mechanical joint between the tube and the fitting. Hydraulic tightness is achieved by the O-ring-system. Stainless steel is used for this technique because of its high quality. The fitting geometry and the section of the compressed area vary from one manufacturer to another. Therefore, the (interchangeable) jaws of the power tools must be approved by the manufacturer of the fittings.

Additionally, an elastomer "O" ring is embedded in the fitting. The research was carried out to identify and test the polymers for these sealing components, which should provide durability for the life of stainless steel. The "O" ring must be made of a material that is resistant to the media to be conveyed. For instance, different types of rings are used for water, petroleum products or natural gas.

Benefits

The Most Hygienic Option

Polished stainless steel is free from oil, grease and any other corrosion-inducing materials. Since all RHINOX systems undergo rigorous testing the potential of leaks and contamination is minimized. Stainless Steel pipes are also used for pharmaceutical purposes which need a high degree of purity and also for ANSI/NSF quality drinking water.

A Cost-Effective Solution

A RHINOX stainless steel press-fit system offers a level of quality no other industrial piping method can match. The press-fit system slashes costs by up to 30 percent because specialized labor and gas cylinders are not required for its welding. Faster, cheaper and reliable, modular systems have redefined the industry standard.

Improved Water Delivery.

Rhinox stainless steel pipes and press fittings are resistant to corrosion, rust, chemical leaching and other types of post contamination and deliver fresh water to homes and commercial industries.

Reliability

With the RHINOX pressing tools, components are easier to assemble without sacrificing reliability. Rhinox connections have been tested and are reliable even at pressures over 300 psi, way higher than typical operating pressures in the 100 to 200 psi range. With our joining method, the connection of the pipe will not get separated during temperature fluctuations or trapped air vibrations within a pipe network.

Durability

Stainless steel pipes have low inner surface friction, remain stable at extreme temperatures, and are not affected by sunlight or ultraviolet rays. Moreover, there is no maintenance required after its installation and thus reducing system downtime replacement and maintenance costs. It is designed to last for at least 50 years with no almost zero maintenance cost.

No Leaks during Testing

Each RHINOX press-fit component (up to and including 54mm) features a highly-visible crimp indicator to prevent substandard installations of competitors' products of having to fill the pipes to test, then containing leaks, with subsequent draining fluids and clean-up. With the RHINOX press check sleeves, each joint has a highly visible external indicator, there is no need to fill and pressurize the system with potentially expensive fluid, risk messy leaks, then drain the system and repeat the procedure.

Sustainability

Rhinox thin-walled stainless steel pipe uses less raw material than other Stainless Steel Pipes. Stainless steel pipe limits environmental impact as compared to alternative pipe materials. Its corrosion resistance minimizes the potential for product loss. Stainless steel is not a petroleum product. There is also less energy loss within stainless steel pipe due to it's smooth, low friction interior, and stainless steel pipe is 100% recoverable either through recycling or reuse.

Benefits

How Can Rhinox Press Fittings Help you?

They save "COST"

Following are the reasons:

- Rhinox press fittings can be installed fast and save a lot of money and time.
- The installation can be done by skilled and Non-Skilled manpower.
- There's no welding required, so no need to apply for a hot work permit.
- There's no need for welding rods and wires.
- The fittings can be built on the location, so there is no need for detail schematic drawings.

They save "TIME"

- Because of the following facts:
- It takes only 6-8 seconds to install a Rhinox press-fitting.
- Downtime is reduced.
- Rhinox press fitting system can be constructed on-site, so no need for pre-works at the workshop.
- Do not need to wait for hot work permits.
- No need for preparation and treatment before and after welding.
- Rhinox press fittings allow systems to be fully trial assembled on site before permanent pressing, so give no chance for rework.
- Rhinox press fittings can be modified easily and quickly at any time in the future and can be done by virtually anyone.
- Rhinox press fittings allow more effective work practices in tight spaces where the elbow room and clearance is very restricted.

They Reduce "RISKS"

Because of the following facts:

- No flame on site.
- No smoke.
- No heat.
- No risk of fire or explosion.
- It is much easier to meet OH&S regulations. (OH&S: Occupational Health and Safety Regulations)
- Featured with "sure pressed" technology, unpressured connections will be detected during pressure testing.

Energy saver, Safe, Durable & Environment Friendly.

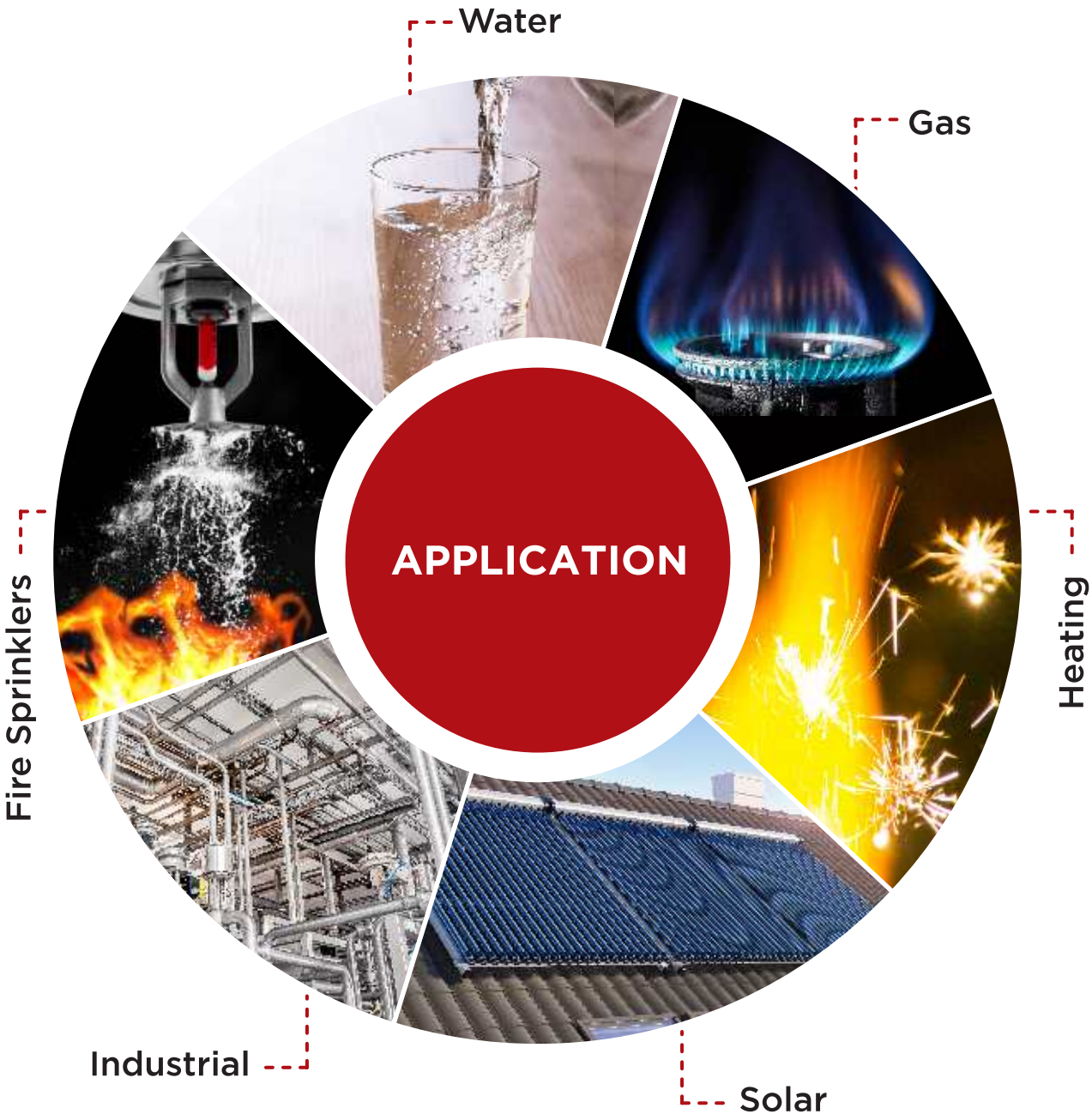
Another advantage of stainless steel is that it can be completely recycled for further use and made into new products when its service life ends.

The cost relating to system service is a major concern for technicians and design engineers. Because stainless steel material can solve the problems of corrosion no matter what is caused by electrolysis or alloy internal stress the concept of “Life Cycle Cost” has been greatly improved.

More and more engineers and manufacturers are choosing pipeline products made of stainless steel material, it helps in environmental protection, and is economic, safe, durable and thus getting worldwide recognition

COMPARISON TABLE OF COMMON DRINKING WATER PIPES PERFORMANCE

Name	316 Stainless Tube	PPR Pipe	Galvanized Tube
			
Life	Can be used more than 50years. No rust, no aging, the service life is the same as building life and It does not require any service after finishing the subject.	12-15years service life, easy aging, hardening, Can have more explosive tube, maintenance and replacement cost is higher	Service life 8-15years, easy aging, easy to rust, easy corrosion, high maintenance and replacement cost.
Strength	High strength material, can with stand instantaneous 89Mpa.	The material is less than one tenth the strength of stainless steel, it is easy to break when you knock hard.	Slightly high strength material
Bearing pressure	Pressure capacity up to 10Mpa pressure, high-Mata pipes are preferred for water.	Low capacity, especially not suitable for high-risewater supply.	Slightly high capacity
Tube deformation	Tube deformation thermal expansion coefficient is small, will not produce deformation	Large coefficient of thermal expansion, easy deformation, easy to bend.	small thermal expansion coefficient, not easy to produce deformation
Environmental protection and health	It will not release toxic substances and will not cause secondary pollution to water quality, environmental protection and health. It is recommended by the state. One of green environmental protection health products.	Easy to release harmful substances, secondary to the water quality. Pollution, "red water", "Plasticizer", The use of plastic tubes has been discouraged.	Inner wall easy to scale, easy to breed bacteria, yellow water, pollution of water quality, pollution sanitary.
Flow influence	Flow affects the inner walls mooth, not easy to scale does not affect the water flow.	The inner wall is relatively rough and easy to scale after years of using. The flow of water decreases	Long use pipe section reduction, increase, cause flow current not.
Installation process	Easy installation, 15 seconds molding. It's easier and safer to connect .	Installation needs to be connected to electricity tools, need to master certain operation as a technique.	Slightly Convenient
Water leakage risk grade problem	The risk of leakage is minimal.	Low bearing capacity, easy to leak	Traditional connections are easy to leak
Grade	Class is high grade, Beautiful and elegant appearance	Low grade, poor appearance	The class is not as good as stainless steel pipes.



The Right Solution For All Applications

Application areas with special requirements call for specific products. Our solutions suit the individual needs of the users - economical, elegant, robust and hygienic.

HOTEL SECTOR

INDUSTRIAL SECTOR

PUBLIC BUILDING

RESIDENTIAL BUILDING

SCHOOL BUILDING

COMMERCIAL BUILDING

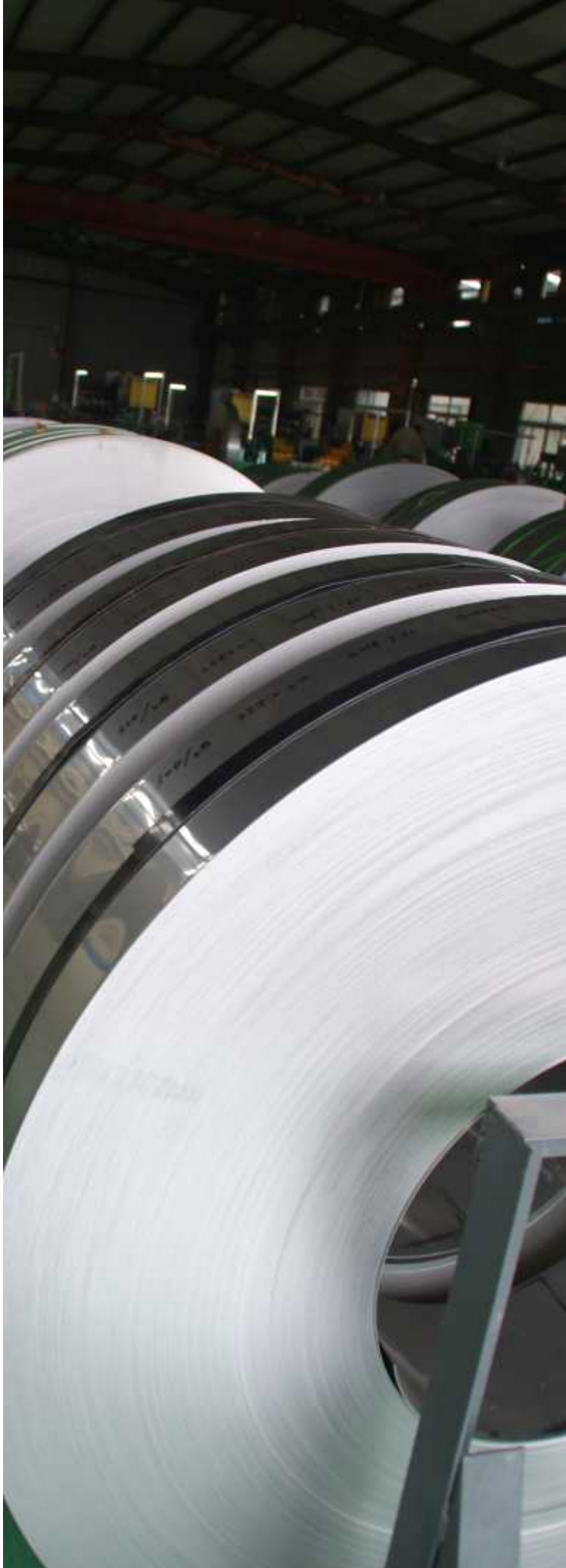
Rhinox Stainless Tubes

Rhinox Stainless tube is 316L grade (EN 1.4404) complying with DIN EN 10088, fabricated according to DIN EN 10312 and DVGW - W 541 and is supplied in straight 3 meter & 6-meter lengths with outside diameters in the range 15mm – 108mm. Rhinox Stainless tubes combine low carbon, at less than 0.03%, with 16%-18% chromium, 10% nickel and more than 2% molybdenum content improved corrosion resistance. Low carbon, austenitic stainless steel is roll-formed and then longitudinally plasma-inert gas-welded to form the tubes precisely. Rhinox Stainless tubes are bright and are treated in heat, thus resulting in a hygienic and highly durable product.

Rhinox Complies with Industry Standards

- 316L pipes are constructed of Austenitic Stainless EN
- 1.4404, complying with DIN EN 10088
- 316L Ti pipes are constructed of Austenitic Stainless EN 1.4571 Cr/Ti complying with DIN EN 10088
- In-house FPC system
- Ti stabilization
- Laser-welded pipes as per DIN EN 10312 (Tab. 2)
- Solution annealed
- Intergranular corrosion resistance
- Deburr cut at an HL of approximately 6000 mm
- Each end closed with a safety plug

Marking: All Rhinox pipes and press fittings are stamped according to standards to indicate the relevant application.`



TUBE SPECIFICATION

Nominal Size	Outside Diameter (mm)	Wall Thickness	Wet Weight kg/m	Volume l/m	Tube Length metre in mm
DN15	15	1.0	0.484	0.133	6000
DN20	22	1.2	0.928	0.302	6000
DN25	28	1.2	1.321	0.515	6000
DN32	35	1.5	2.062	0.804	6000
DN40	42	1.5	2.718	1.195	6000
DN50	54	1.5	4.015	2.043	6000
DN65	76.1	2.0	7.794	4.083	6000
DN80	88.9	2.0	10.58	6.232	6000
DN100	108	2.0	13.81	8.495	6000

Standard Specification
Rhinox EN 1 .4404 and EN 1.4571

These requirements are supplemented internally by our factory production control system. The weld seam, dimensional stability, bending properties, heat treatment, and corrosion resistance satisfies additional requirements. The pipes consist of bare base metal inside and out and have no corrosive substances with no heat tinting. The pipes are tested for leak tightness directly in the welding line.

On the request of the customer and by special arrangement, the pipes can be electromagnetically tested for leak proofing by an inspector in the presence of the customer at a separate testing facility. Each pipe end is closed with a safety plug.

Mechanical values and analysis of EN 1 .4404 according to standard:

Material		Proof stress $Rp_{0,2\%}$ N/mm²	Proof stress $Rp_{1,0\%}$ N/mm²	Tensile strength Rm N/mm²	Hardness
1.4404		**min. 240**	**min.270**	**520**	**<95**
1.4404	C	Cr	Ni	Ti	Mo
min.		16.0	10	0	2
max. %	0.03	18.0	14	0	3

Mechanical values and analysis of EN 1.4571 according to standard:

Material		Proof stress $Rp_{0,2\%}$ N/mm²	Proof stress $Rp_{1,0\%}$ N/mm²	Tensile strength Rm N/mm²	Hardness
1.4571		min. 240	**min.270**	**520**	**<95**
1.4520	C	Cr	Ni	Ti	Mo
min.		16.0	10	0.30	2
max. %	0.08	18.0	14	0.70	3

The titanium content in 1.4571 (Titanium) stabilizes it against intergranular corrosion. The pipes are made using steel strip by longitudinal laser seam welding without filler material and do not have any skelp end welds.

Summary of the tests:

	Test type	Test scope
Mandatory Tests	Melt analysis	Melt analysis of the steel producer
	Tensile test	1 per test unit
	Flaring test	1 per test unit
	Leaktightness test	1 per test unit
	Non-destructive testing of weld seam	each pipe
	Visual inspection	each pipe
	Dimensional check	each pipe
Other Tests	Material identification	each pipe
	Test resistance to intergranular corrosion	per melt

Rhinox Heat- Preserved Tubes

The hot water must be supplied through the tube with the help of a warming device, which old tubes don't have. So the heat preservation treatment is needed at the construction site. Rhinox's PE foam coated and heat persevered stainless steel tube is made from the mother coil of its best stainless steel pipe, and cover with shaped foam coated and low-density LDPE.

For this kind of tube, the outside layer is a protective layer, foam coated layer in the middle, stainless steel tube inside, which short for a stainless foam coated and heat preserved tube. Because the heat preserved layer is integrated with the stainless steel tube it provides a better technique, perfect shape, and a shallow tube hole. Furthermore, the construction becomes very convenient and is fit for hot water tubes and heat preserved tubes.

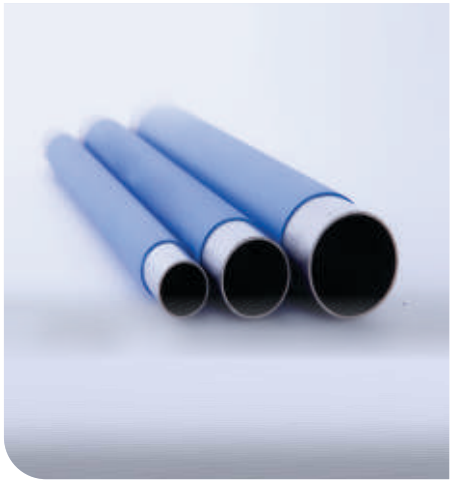
Coated tubes:

Stainless steel tubes.

- The Application scale of LDPE foam coated tube
- Heat preserved tubing for cold and hot water.
- Tubing for refrigerating and air conditioning.
- Tubing for draining and ventilation.
- Tubing for mechanical.

Characteristics:

- Good heat preserved which reduces thermal energy consumption, good heat resistant function.
- Good insulation performance which avoids contacting different metal and bringing out electric rot.
- Tubes that are Heat and cold preserved, wet and dew resistant and reduce the noise of liquid flowing
- Prevent the growth of wall carcinoma and cement aging
- Resistant to corrosion, acids, and bases.



Press Fitting Systems

Perfectly Compatible Press Fitting Technology

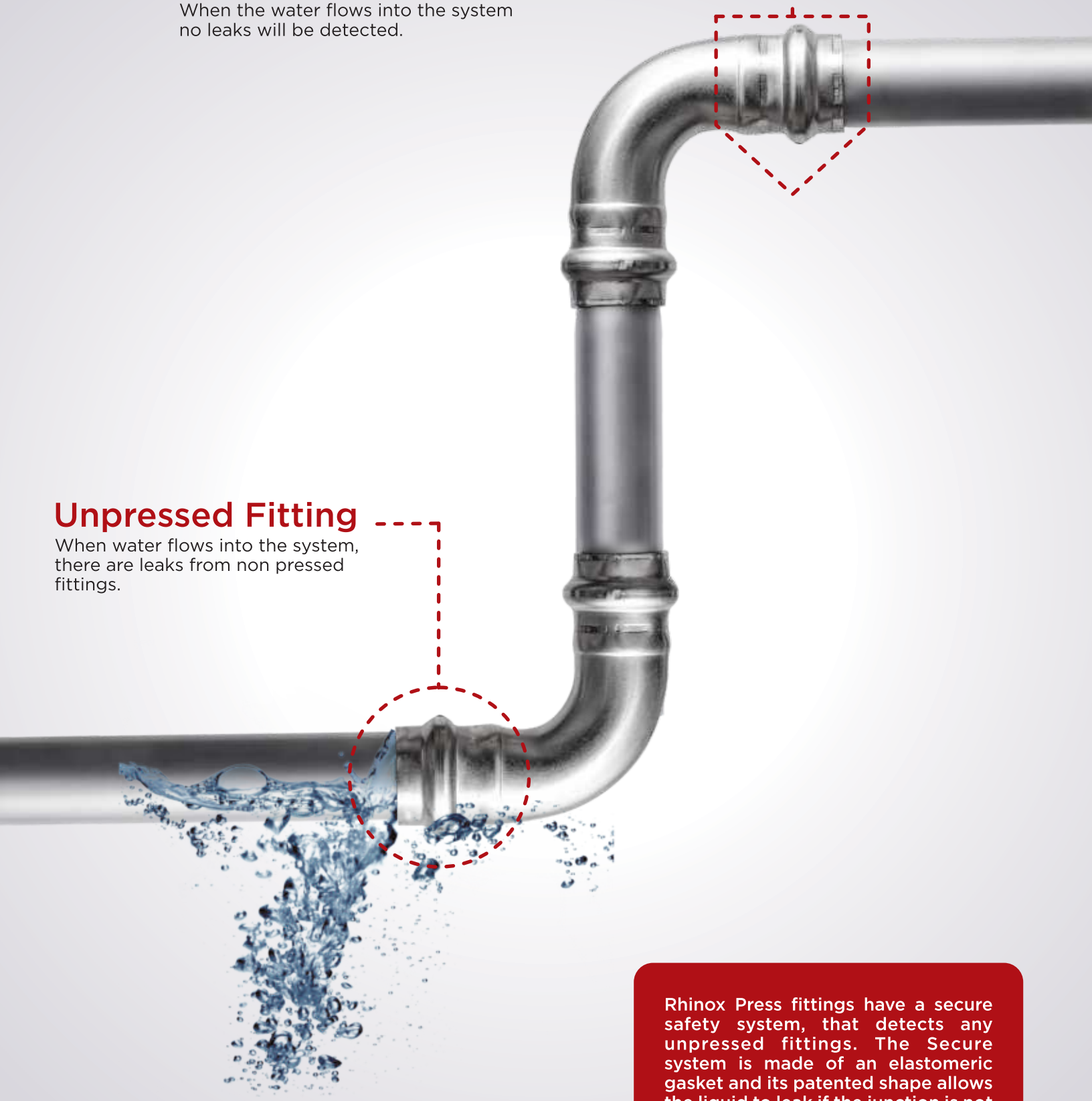
Rhinox stainless steel piping system consists of 1.4404 stainless steel that is designed to ensure the most effective joint formation, achieving the hydraulic structure requirement standards. 'V' profile crimped joint is proved to be an economical step as compared to conventional joining techniques, such as soldering, welding and screwing for more than 50 years. All the components needed for proper connection are part of an integrated system and designed for compatibility as per the W 534 worksheet. Safe, simple and quick, the system has durable stainless steel quality and includes all the benefits of pressing technology.

"Push and Stay" and "Leak Path" Features

Rhinox Stainless press fittings are designed to provide a tight fit when pushed together to allow the rough-in to be completed before pressing. This ensures you have the right design and tube placement and allows you to make adjustments, if required, before pressing. This is especially beneficial for vertical installations. Rhinox Stainless standard fittings, with EPDM O-rings, also feature a built-in leak path so one can get an idea of the leakage before pressing, making the process of checking all joints more efficient. Note: Due to movement between test fitting and pressing, it is important to check that you have a full engagement of your fittings on the tube before pressing.

In an accurately Pressed System

When the water flows into the system no leaks will be detected.



Unpressed Fitting

When water flows into the system, there are leaks from non pressed fittings.

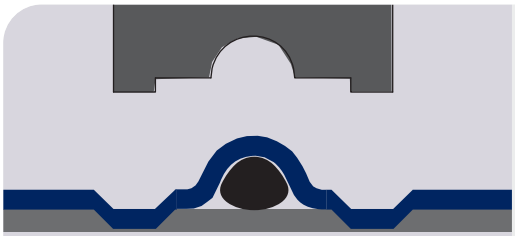
Rhinox Press fittings have a secure safety system, that detects any unpressed fittings. The Secure system is made of an elastomeric gasket and its patented shape allows the liquid to leak if the junction is not pressed properly.

The Secure system helps to detect the point that has not been pressed. It helps in giving it a long life.

Rhinox
V Press Fittings

The Rhinox V press connection system consists of three matched components. The pipes themselves are characterized by their carefully controlled dimensional accuracy and finish. Clear production requirements include complete recrystallization of the metallurgical structure and welds, with defined surface finishes free from edge miss alignment.

With their unique profiled seal ring the press connection fittings, which are subject to equally stringent quality control, form a permanently tight pipe connection, ensure a quick, easy and safe installation.



Seal Deformation

For permanent fittings and a high level of safety

During the pressing operation, the O-ring receives a predefined deformation from the pressing jaws. During this process the gasket absorbs additional energy for a permanent and reliable seal.

Surface of the material

A correct surface finish is necessary for more safety and long-lasting hermetic seal of the system. All the weld seams are aligned perfectly with a mechanical finishing treatment for optimal sliding and perfect positioning of the gasket. Tightness of the system depends upon the roughness coefficients, much lower than the limitations prescribed by the current regulations.

Bead Geometry

Perfect thermal execution of the weld seam

The diameters radius and wall thickness of their beads are constantly monitored in the course of production. By the help of net weld bead, on the contact surface of the gasket its being insured that the whole system is permanently sealed which also reduces the tendency to corrosion.

Mechanical Interlock

Wide range of Applications

With its keen components, Rhinox system is highly resistant. An operating pressure of 2.5 MPa (25 bar) and above can be achieved. Due to its highly mechanize resistant capability, wide range of superior applications are possible that surpass the most common domestic installations.

Pressing Profile

The Rhinox fittings are designed to deliver minimal deformation to the internal shape of the tube they are connecting to, reducing turbulence in the flow of the medium being conveyed. The connection provides a rigid coupling with excellent resistance to torsional forces. This is particularly beneficial when connecting mechanical threaded connections.

Tube Seam

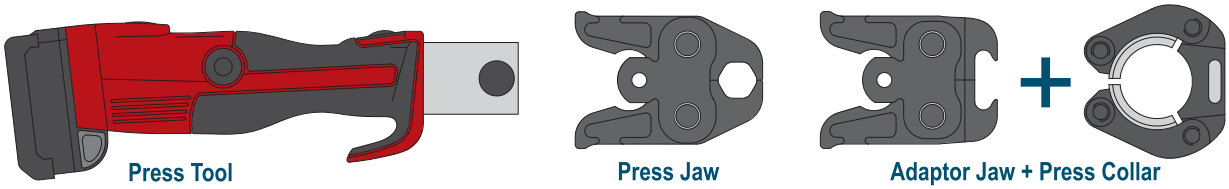
Pipes with a homogeneous material structure

A special thermal treatment creates a homogeneous material structure in the weld seams. The seams are also smoothed mechanically. This results in the pipes and fittings behaving uniformly during the pressing operation.

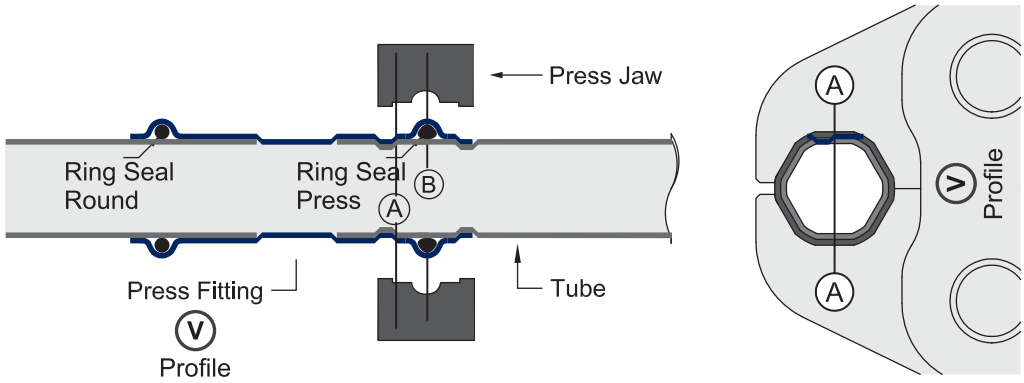
Strength of Press Fitting

The press connection is created by inserting the pipeline into the press-fitting as deep as the marked insertion depth. The link is established by pushing, using an approved pressing device. It represents the long and compression closing aspect of the connection under figures. Press fittings in sizes 12 35 mm must by pressed with jaws, 42-108 mm must by pressed with.

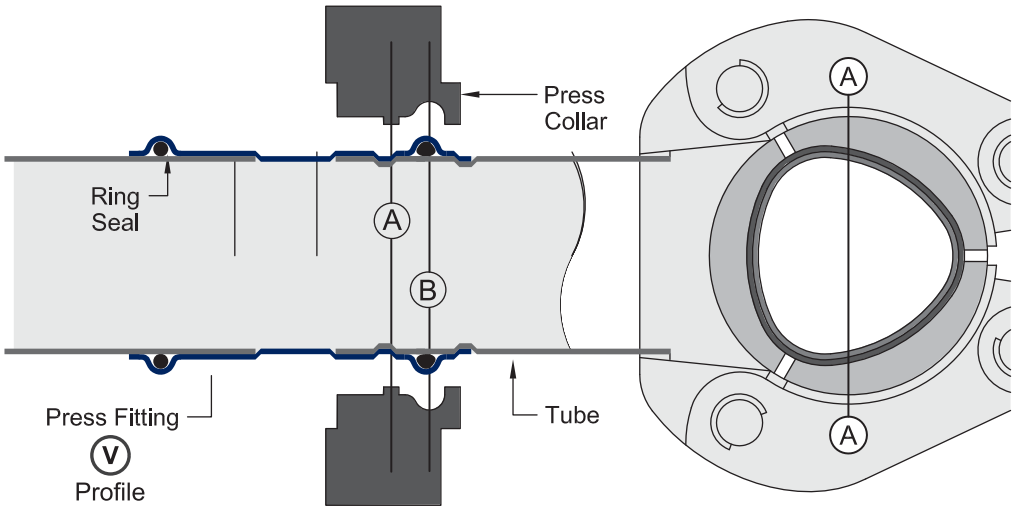
Pressing collars/chains. During the pressing process, deformation takes place on two planes. The first plane creates a permanent connection and provides mechanical strength through the mechanical deformation of the press-fitting and the pipe. On the second plane it deforms the seal ring in its cross-section and through its malleable properties makes a permanent tight joint.



Above: They fit Press Tools with an interchangeable jaw or adaptor jaw and collar combination depending on the fitting material, system diameter and fitting press profile to be pressed. These must match for the press to be successful.



Above: Hexagonal shape section profile - before pressing (Fitting left), after pressing (proper right) & Section A through the pressed join.



Above: Lemon shape section profile - Before pressing (fitting left), after pressing (fitting right) & section A through pressed join.

Rhinox Fitting 'O' Rings

O-ring Choice

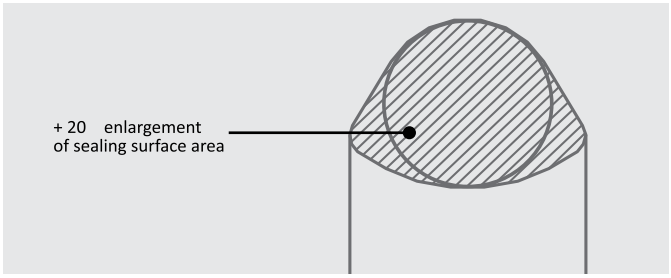
The seal ring is the major highlight of the Rhinox connector. Rhinox O-Ring gets its high quality from the Latest technology and imported rubber of great quality. Every O-ring is made under the severest control and norm, which deals with multiple tests such as aging resistance check, thermal cycle analysis, tensile strength analysis to assure its reliable conduct. It can be employed for water filling, gas and oil transportation, as well as other fields, corresponding to other rubber goods. Rhinox 316L stainless pipe and fittings provide an extensive variety of handling of application due to the material's toughness and corrosion resistance. In respect of establishments, it is necessary to look at the appropriateness of the 316L material in the form and as well as the type of press O-ring required.

Seal Ring Profile

•Traditional press-fitting systems use round sealing rings, which can readily be broken by the careless fitting. RM, on the other hand, uses a patented sealing ring with a lenticular profile which prepares the press crimp groove. This gives the accompanying improvements:

- 20% growth of the sealing surface field;
- Major reduction of the risk of the sealing ring being pushed out or damaged;
- The fit makes the injection of the vessel easier.

The black EPDM sealing ring from 15 to 54 mm is delivered with an added safety feature that during pressure tests will lead to progress in the case of accidentally unpressed connections.

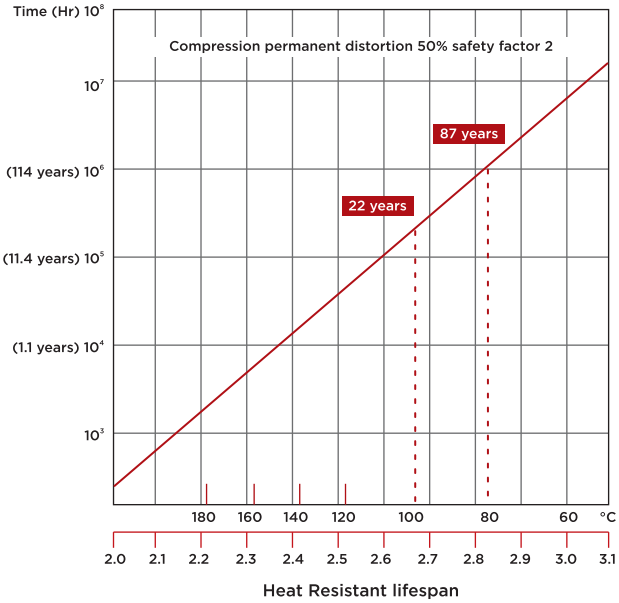


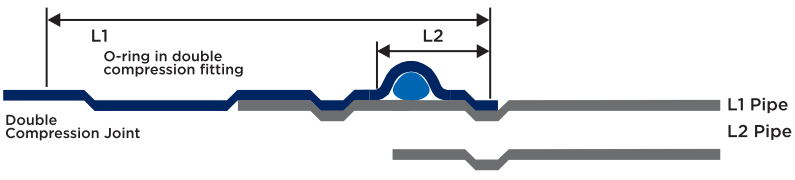
Presumption - Service life of O-ring in double compression fitting

The O-ring of Rhinox water supply double compression fittings is heat-resistant by using hygienic and environmental silicon or IIR synthetic rubber which could tolerate the high-temperature 100C. The prediction of O-ring service life in the high-temperature environment is based on the speed of reflection theory and the accelerated aging tests based on the speed of response formula by Arrhenius are authoritative and widely used in the field.

2.303 logK =-E/RT+C
K: reaction rate parameters
E: Catalyst
R: medium parameters
T: Absolute temperature

Based on the above formula, the rubber aging process was regarded as a short-term response reaction, using K-value which changes in the expansion and taking its value of 100% for a particular value of the presumption of life, that life can be calculated.





L1: Correct inserted state of Pipe.
L2: No leakage inserted state for pipe
If insert shorter than L2, it will
leak in the hydraulic test.

Black Chloramine.
Resist EPDM O ring

Standard press fittings resort to a black EPDM (Ethylene Propylene Diene Monomer) O ring. EPDM possesses great resistance to ozone, sunlight, and weather has extremely good flexibility at low temperatures and excellent chemical resistance, such as too many dilute acids and alkalis and polar solvents.

This O-ring is good for hot and cold potable water applications and some industrial applications. It is not suitable for aromatic hydrocarbons, di - ester-based lubricants, halogenated solvents or petroleum-based oils and lubricants. For applications with temperatures exceeding 120°C and/ or media other than potable water. For Installation or application support Rhinox AMpress.

Red FKM industrial

Industry press fittings utilize an FKM (Fluorocarbon) O-Ring. FKM has excellent resistance to high temperature up to 200° C (depending on the medium), ozone, weather, oxygen, mineral oil, fuels, hydraulic fluids, aromatics, and many organic solvents and chemicals. It is ideal for petroleum products, fuels including those blended with ethanol or methanol, diesel, biodiesel, mineral oils and greases, silicone oils and greases, high vacuum, strong acids, ozone, weather, and very high temperatures.

It isn't suitable for ketones, low molecular weight organic acids (e.g. formic and acetic), superheated steam, low molecular weight esters, and ethers or phosphate-based hydraulic fluids. Industry fittings have a red-colored O-ring and are marked with a distinctive red HT symbol.

Yellow HNBR
Gas Applications

Gas press fittings utilize an HNBR (Hydrogenated NitrileButadiene Rubber) O-ring sealing element. HNBR, compared to standard Nitrile, possesses superior mechanical properties and improved resistance to heat, ozone, and chemicals. HNBR has been used for decades in automotive & industrial applications. It is well suited to propane, butane and natural gas (methane). It is not suitable for drinking water.

Gas press fittings have a yellow O ring and are marked with a distinctive yellow color and the word GAS. Whilst fuel gas standards call for working temperatures of up to 70°C.

Fields of Application

Below is a quick reference guide for the suitability of the Rhinox stainless application and the recommended O-ring change out. Consideration must also be given to match the suitability of any other seals as well in your system (flanges etc).

EPDM Black

- Potable water cold and hot
- Chilled water
- Heating water
- Cooling/process water
- Condenser water
- Rain water harvesting
- Swimming pools
- RO systems

FKM Red

- Solar
- Heating water
- Condenser water
- Compressed air
- Industrial applications
- Chemical dosing
- Non-potable applications

HNBR Yellow

- Gas systems
- Chemical dosing

Manufacturing & Process

Manufacturing

A leading enterprise knows how to develop better products based on consumer demand, whereas a great enterprise knows how to lead and create demands through innovation. Our goal is to fulfill and create consumer demands by our intelligent products, to make life more energy-efficient, comfortable and beautiful.

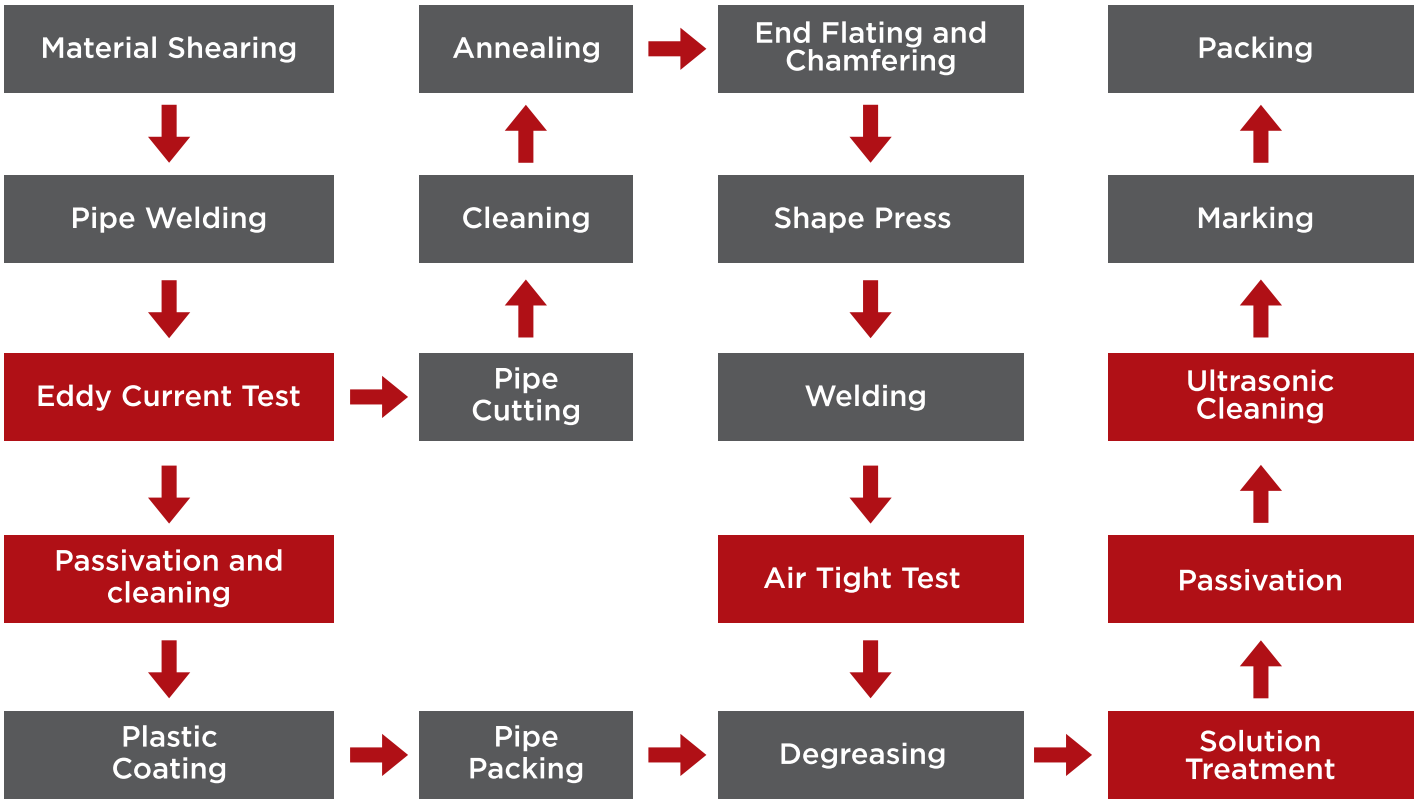
Process

We plan, design & create the products in our own manufacturing plants, from the criteria of setting the benchmarks in the features of the product. In other words, we own the manufacturing process from start to finish. This is the way we control the maximum number of variables and ensure the quality of every product before dispatching it. To introduce better management & hassle-free workflow, the process starts being very methodical about the machines & systems we use; these decisions will have long-lasting effects on the structural flow and the company's cost.

Also, we are disciplined about routine service that we follow in our plant and premises and we run a predictive maintenance program as per the particular departments. We are driven to such measures by our desire for Zero Customer Disappointments, as well as our concern for the safety of our fellow associates.

Rhinox pipe and fitting are finished after 20 precise procedures and checked by 6 strict quality inspection, which features a limited lifetime warranty and 50 year's free-maintenance to be all manufacture defects under normal use.

Pipe and Fitting General Process Chart



Striving for excellence, persistence in pursuit

Gas Shield Welding
Gas Shield Welding by lincoln welding machine to protect the rust-proof performance and original quality of stainless steel.

Tube Laser Cutting
The new 2D laser tube cutting grants precise cutting and make the internal surface of the tube perfectly clean.

Pickling & Passivation
Pickling & Passivation to remove oxide in processing and form passivation film on the steel surface.

Eddy current and airtightness full inspection
Eddy current and airtightness full inspection to detect crack, mini hole, insufficient welding of pipe.

Ultrasonic Cleaning
Ultrasonic Cleaning to wipe off the dirt in the process, make pipe fitting clean.

Control Quality, Improve Health

Quality is at the heart of RHINOX stainless steel pipe systems. From raw materials to sheet stainless steel and finally, to the manufacture of individual pipes and fittings, every process and procedure is rigorously aligned with industry standards and best practices. No items leave the RHINOX factory until they have passed stringent Quality Assurance tests.

RHINOX stainless steel products are certified and are suitable for potable water, reverse osmosis water, process water, glycol, HVAC applications of chilled and heating water, and more. Our end-to-end quality standards mean when RHINOX stainless steel arrives on site, it can be depended upon. Every time.


Hardness
Testing Machine
Tensile Testing
Machine
QUALITY
TESTING
PROCESS
Water
Hammer
Test
Spectro
Analyzer
Go-point
Testing Machine
Air Link
Test

Our Certificates

An added value for our clients and partners

An added value for our clients and partners To the American Pacific Manufacturers Inc., certificates are proof of our responsibility towards the clients, the partners, the community and the territory.

It springs from the awareness that our activity cannot come before the guidelines and the expectations of the stakeholders.

Whoever chooses for Rhinox products, chooses a company which:

Ensures Clarity and Transparency towards the client by explicitly communicating every production and sales detail. This facilitates the operational management of the products (ex. estimates and order confirmations are sent with a detailed description of the product, the delivery date, the transport measure, technical drawings with indications of the different uses, dimension schemes, and other possible details);

Tests every single product. Every product is provided with a Certificate of Conformity and Testing and our quality management system guarantees the precise execution of every process following the defined standards;

Constantly invests in research on innovative solutions and on the improvement of the products' performance, focussing on both quality and cost reduction;

Realizes qualitative products which also positively influence our clients' project;

NSF, USFDA, HACCP certification confirming that the Rhinox products support the integrity and safety of water, foods, and pharma as demanded by industry expectations, legislation, and standards.

Invests in training on subjects such as health, occupational safety and environmental sustainability. Our staff is kept up to date on the binding rules and on how to share best practices;

Assures competency, reliability, and personalized solutions.

We have implemented international management systems and standards that are recognized with numerous certificates.

Certificate for

QUALITY MANAGEMENT 9001:2015

bsi.

Certificate for

HEALTH AND SAFETY 45001:2018

bsi.

Certificate for

DESIGNING AND PRODUCING PRESSURIZED DEVICES

CE

Certificate for

DRINKING WATER APPLICATIONS

NSF

Certificate for

FOOD AND DRUG PHARMA APPLICATIONS

FDA

Registration for

DEUTSCHE GAS AND WATER APPLICATIONS

DVGW

Registration for

FEDERAL UNIFORM PLUMING CODE

UPC

Certificate for

FOOD AND DRUG PHARMA APPLICATIONS

HACCP

Excellent Durability

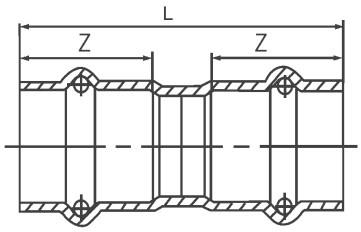
as STAINLESS STEEL is resistant to crevice corrosion and polluted waters

Rhinox stainless press-fit pipe systems are design & precision manufactured from top-grade Taiwanese stainless steel. Rigorous quality control and compliance With applicable industry standards delivers lasting benefits of stainless Steel combined with easy installation.

Rhinox Stainless Press Fittings

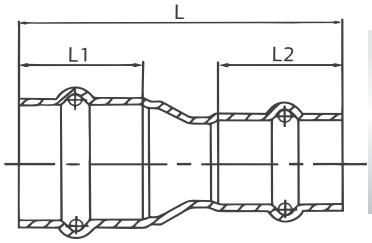
Straight Coupling

DESCRIPTION	SIZE (MM)
Straight Coupling	15
Straight Coupling	22
Straight Coupling	28
Straight Coupling	35
Straight Coupling	42
Straight Coupling	54



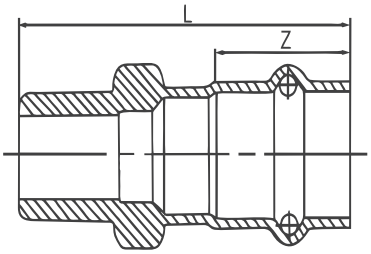
Reducer Coupling with Plain End

DESCRIPTION	SIZE (MM)
Reducer Coupling with Plain End	42 x 35
Reducer Coupling with Plain End	54 x 28
Reducer Coupling with Plain End	54 x 35
Reducer Coupling with Plain End	54 x 42
Reducer Coupling with Plain End	22 x 15
Reducer Coupling with Plain End	22 x 18
Reducer Coupling with Plain End	28 x 15
Reducer Coupling with Plain End	28 x 22
Reducer Coupling with Plain End	35 x 22
Reducer Coupling with Plain End	35 x 28
Reducer Coupling with Plain End	42 x 22



Male Thread Adapter

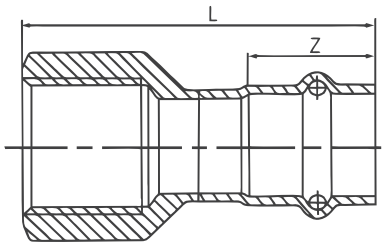
DESCRIPTION	SIZE (MM)
Male Thread Adapter	15 x 1/2
Male Thread Adapter	54 x 2
Male Thread Adapter	42 x 1 1/2
Male Thread Adapter	35 x 1 1/4
Male Thread Adapter	22 x 1/2
Male Thread Adapter	22 x 3/4
Male Thread Adapter	28 x 1



Rhinox Stainless Press Fittings

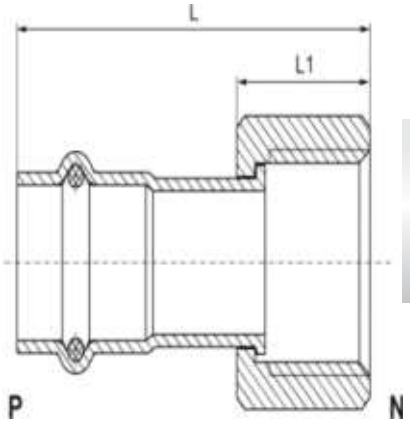
Female Thread Adapter

DESCRIPTION	SIZE (MM)
Female Thread Adapter	15 x 1/2
Female Thread Adapter	15 x 3/4
Female Thread Adapter	22 x 1/2
Female Thread Adapter	54 x 2
Female Thread Adapter	42 x 1 1/2
Female Thread Adapter	54 x 2
Female Thread Adapter	35 x 1 1/4
Female Thread Adapter	28 x 1
Female Thread Adapter	28 x 3/4
Female Thread Adapter	22 x 1
Female Thread Adapter	22 x 3/4



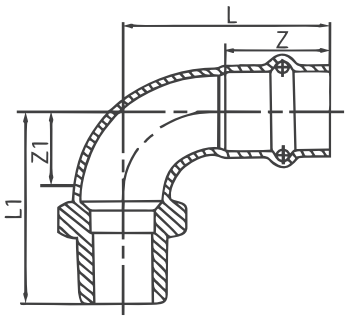
Union Adapter

DESCRIPTION	SIZE (MM)
Union Adaptor	22 x 1
Union Adaptor	28 x 1
Union Adaptor	22 x 1/2
Union Adaptor	22 x 3/4
Union Adaptor	28 x 1 1/4
Union Adaptor	54 x 2
Union Adaptor	54 x 2 3/8
Union Adaptor	35 x 1 1/4
Union Adaptor	42 x 1 1/2
Union Adaptor	42 x 2
Union Adaptor	42 x 1 3/4
Union Adaptor	15 x 1/2
Union Adaptor	15 x 3/4
Union Adaptor	35 x 1 1/2



Male Elbow

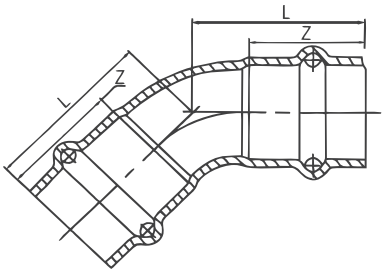
DESCRIPTION	SIZE (MM)
Male Elbow	15 x 1/2
Male Elbow	22 x 3/4
Male Elbow	28 x 1
Male Elbow	35 x 1 1/4
Male Elbow	42 x 1 1/2
Male Elbow	54 x 2



Rhinox Stainless Press Fittings

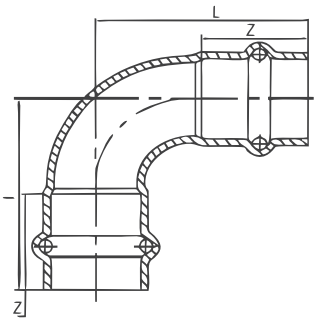
45 Degree Elbow

DESCRIPTION	SIZE (MM)
45 Degree Elbow	54
45 Degree Elbow	42
45 Degree Elbow	35
45 Degree Elbow	28
45 Degree Elbow	22
45 Degree Elbow	15



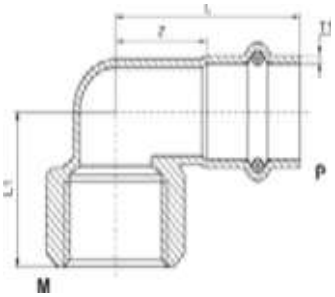
Equal Elbow

DESCRIPTION	SIZE (MM)
Equal Elbow	15
Equal Elbow	22
Equal Elbow	28
Equal Elbow	35
Equal Elbow	42
Equal Elbow	54



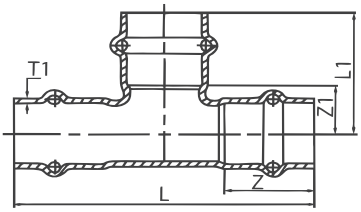
Female Thread Tangent Elbow

DESCRIPTION	SIZE (MM)
Female Thread Tangent Elbow	22 x 3/4
Female Thread Tangent Elbow	22 x 1/2
Female Thread Tangent Elbow	15 x 3/4
Female Thread Tangent Elbow	15 x 1/2



TEE

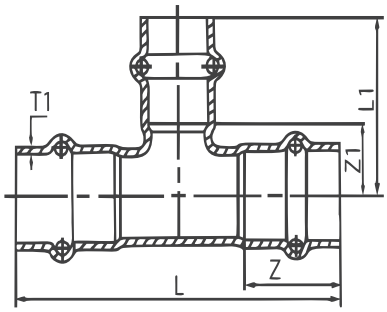
DESCRIPTION	SIZE (MM)
TEE	54
TEE	42
TEE	35
TEE	28
TEE	22
TEE	15



Rhinox Stainless Press Fittings

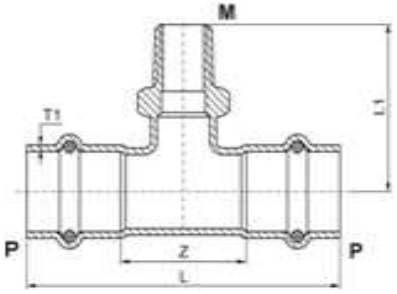
TEE Reducing

DESCRIPTION	SIZE (MM)
TEE Reducing	42 x 35 x 42
TEE Reducing	54 x 22 x 54
TEE Reducing	54 x 28 x 54
TEE Reducing	54 x 35 x 54
TEE Reducing	54 x 42 x 54
TEE Reducing	42 x 28 x 42
TEE Reducing	28 x 22 x 28
TEE Reducing	28 x 15 x 28
TEE Reducing	28 x 22 x 22
TEE Reducing	22 x 15 x 22
TEE Reducing	35 x 15 x 35
TEE Reducing	35 x 22 x 35
TEE Reducing	35 x 28 x 35
TEE Reducing	42 x 22 x 42



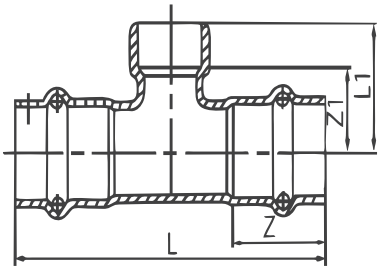
TEE (Male Threaded)

DESCRIPTION	SIZE (MM)
TEE (Male Threaded)	15 x 1/2 x 15
TEE (Male Threaded)	22 x 1/2 x 22
TEE (Male Threaded)	22 x 3/4 x 22
TEE (Male Threaded)	28 x 1 x 28
TEE (Male Threaded)	35 x 1 1/4 x 35
TEE (Male Threaded)	54 x 1 x 54



TEE (Female Threaded)

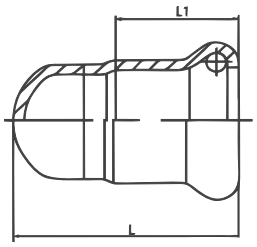
DESCRIPTION	SIZE (MM)
TEE (Female Threaded)	54 x 1/2 x 54
TEE (Female Threaded)	42 x 1/2 x 42
TEE (Female Threaded)	15 x 1/2 x 15
TEE (Female Threaded)	28 x 1 x 28
TEE (Female Threaded)	22 x 1/2 x 22
TEE (Female Threaded)	22 x 3/4 x 22
TEE (Female Threaded)	35 x 1/2 x 35
TEE (Female Threaded)	28 x 3/4 x 28
TEE (Female Threaded)	28 x 1/2 x 28



Rhinox Stainless Press Fittings

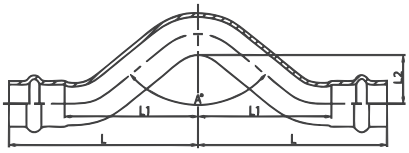
End Cap

DESCRIPTION	SIZE (MM)
End Cap	42
End Cap	35
End Cap	28
End Cap	54
End Cap	22
End Cap	15



Cross Over

DESCRIPTION	SIZE (MM)
Cross Over	15
Cross Over	22
Cross Over	28



AMPress Pipes

DESCRIPTION	SIZE (MM)
AMPress-pipe (Stainless Steel-316)	42 x 1.5
AMPress-pipe (Stainless Steel-316)	35 x 1.5
AMPress-pipe (Stainless Steel-316)	28 x 1.2
AMPress-pipe (Stainless Steel-316)	22 x 1.2
AMPress-pipe (Stainless Steel-316)	15 x 1.2
AMPress-pipe (Stainless Steel-316)	54 x 1.5

Guidelines, Tool Use & Preparation

Cutting: Pipes are cut to length with approved burr-free cutters. Oxyacetylene torches and abrasive cut-o wheels are not suitable. Pipes are cut at right angles to their axis, using a pipe cutter or fine-tooth saw. Measured lengths must take into account the depth of insertion into the fitting.

Deburring:Make sure that the internal and external tube end is free from burrs or sharp edges by using a deburring tool to prevent damage to the O-ring. Then wipe the tube end clean it to avoid damaging the O-ring on tube insertion.

Marking the insertion depth: The tube must be fully inserted into the fitting until it reaches the tube stop to make a perfect joint. Marking the insertion depth will ensure that any tube movement is detected, which is important if the joints are to be pressed at a later time.

Assembling of the joint: To assemble the joint, the tube must be inserted to the depths of the tube stop. (Use the mark on the tube that was made earlier as reference). The pressing operation should only be undertaken when the tube reaches the tube stop.

Press tool & jaw: Press tools are to be equipped with v-shaped profile jaw attachments or a pressing jaw which corresponds to the diameter of the fitting being pressed. Retract the lock pin, position the jaw in the tool head and fully engage the lock pin.

Press joint: Initiate the pressing procedure by pressing the start button for approximately 3 seconds. The pressing procedure will run automatically and should not be interrupted prematurely. This ensures a permanent joint that is sealed and has the required tensional and axial force locking properties. After completing the pressing process, the pressing tool can be removed from the pressed connection by opening the press jaw.

Installation of Press Fittings Systems

Expansion and Contraction

The table below shows the relative longitudinal expansion of 316L stainless steel tubes 'E' based on the difference in temperature between the external environment and the internal media using the formula below.

The corresponding equation to achieve this is:

$$L \times \Delta T \times \alpha = E$$

Tube Length
Length of tube from nearest fixed point (bracket, bend, etc) in metres.

Difference in Temperature
The temperature of the media (eg hot water) minus the ambient temperature (eg external atmosphere) in °C.

Answer
The expected linear expansion or contraction in mm.

Expansion Length, Longitudinal (E)

Example: The Thermal expansion 1mm subjected to a temperature variation of 100°C

L x ΔT x α = E
1 x 100 x 0.0165 = 1.65

Thermal Coefficient (10-6m/mk) different materials have different thermal properties, identified by the expansion coefficients below (between+20 to +100°C)

The larger the number, the greater the material will expand per metre.

Material	
Carbon Steel	0.0117
Stainless Steel (2205)	0.0137
Stainless Steel (316L)	0.0165
Stainless Steel (304L)	0.0166
Copper (Cu)	0.0168
Copper Nickle (CuNiFe)	0.017
PEX	0.018
Aluminum	0.0231
PP-RP	0.035
PVC-U	0.0504
ABS	0.063
HDPE	0.12
PE	0.15

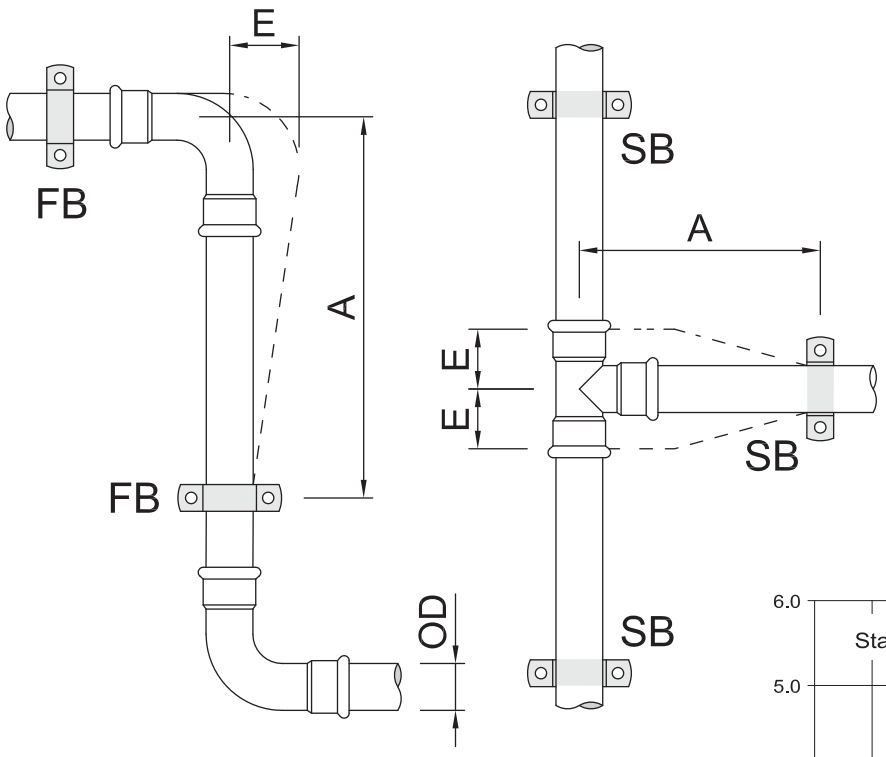
Note: Confirm product specific coefficient with manufacturer.

L (m)	10	20	30	40	50	60	70	80	90	100
1	0,17	0,33	0,50	0,70	0,82	1,00	1,15	1,32	1,50	1,65
2	0,33	0,66	1,00	1,32	1,65	2,00	2,31	2,4	3,00	3,30
3	0,50	1,00	1,50	2,00	2,50	3,00	3,50	4,00	4,50	5,00
4	0,66	1,32	2,00	2,64	3,30	4,00	4,62	5,30	6,00	6,60
5	0,82	1,65	2,50	3,30	4,12	5,00	5,77	6,60	7,42	8,25
6	1,00	2,00	3,00	4,00	5,00	6,00	7,00	8,00	9,00	10,00
7	1,15	2,31	3,50	4,62	5,78	7,00	8,09	9,24	10,40	11,55
8	1,32	2,64	4,00	5,28	6,60	8,00	9,24	10,56	11,90	13,20
9	1,48	3,00	4,50	6,00	7,50	9,00	10,50	12,00	13,50	15,00
10	1,65	3,30	5,00	6,60	8,25	10,00	11,55	13,20	14,85	16,50
12	2,00	4,00	6,00	8,00	10,00	12,00	14,00	16,00	18,00	20,00
14	2,31	4,62	7,00	9,25	11,55	14,00	16,20	18,50	20,80	23,10
16	2,64	5,28	8,00	10,56	13,20	15,84	18,48	21,12	23,76	26,40
18	3,00	6,00	9,00	12,00	15,00	18,00	21,00	24,00	27,00	30,00
20	3,30	6,60	9,90	13,20	16,50	19,80	23,10	26,40	29,70	33,00

Stainless steel tubes above 28mm can be compensated with the use of stainless bellows. These are corrugated, extendable, and compensate for expansion.

Note: Ensure that the bellow installed allows for the expansion required within the pipe run and that it is within deflection tolerances.

Thermal Expansion



The formula for calculating expansion bend length independently is as follows.

$$A=0.045 \times \sqrt{(\text{Tube OD} \times E)}$$

Above: 'Z & T' shape arrangements, Can also be achieved with cold bending the tube (up to 35mm). Use the chart below to calculate measurement 'A' based on the diameter.

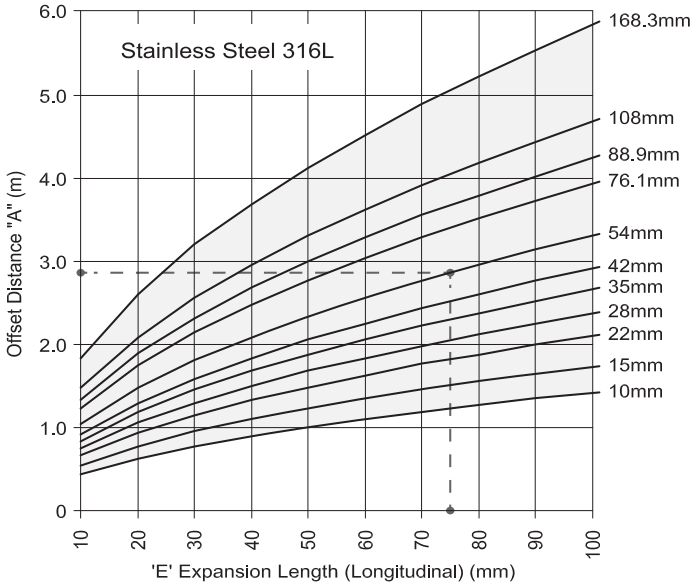
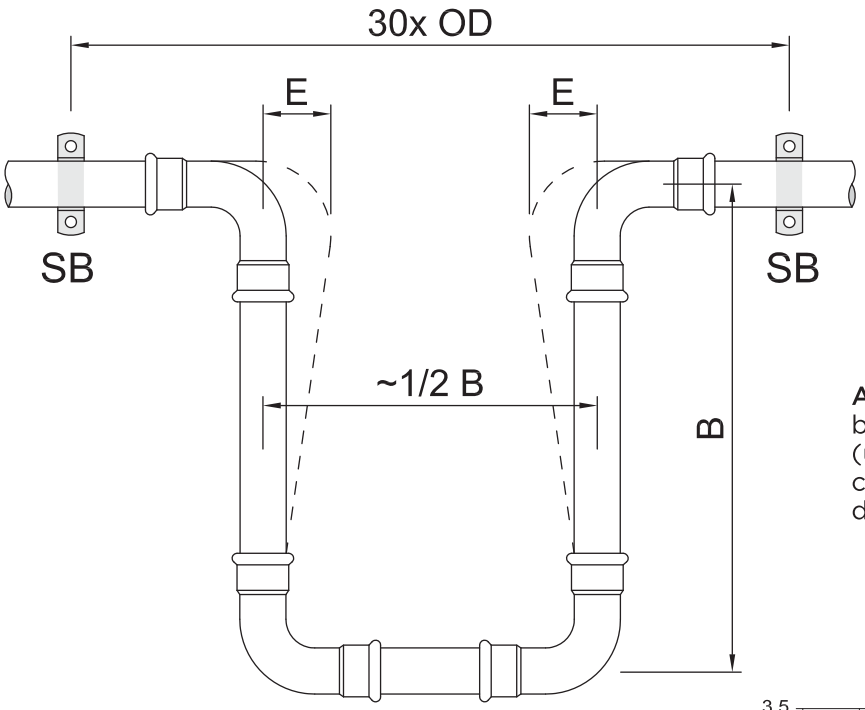


Table 11: Minimum distance "X" to sliding supports (m) to allow for thermal expansion (see Illustration 5)

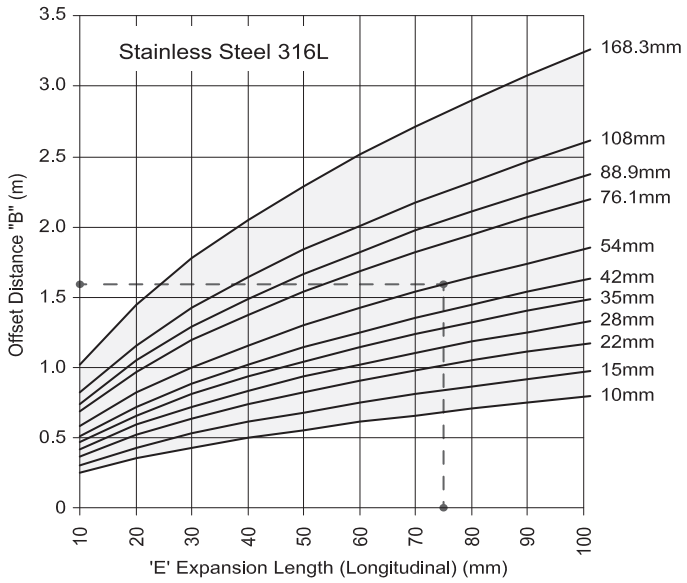
Tube Diameter d (mm)	Temperature Differential ΔL						
	10mm	20mm	30mm	40mm	50mm	60mm	70mm
15	0.57	0.80	0.98	1.13	1.27	1.39	1.50
22	0.69	0.97	1.19	1.37	1.54	1.68	1.82
28	0.77	1.10	1.34	1.55	1.73	1.90	2.05
35	0.87	1.22	1.50	1.73	1.94	2.12	2.29
42	0.95	1.35	1.64	1.90	2.12	2.32	2.51
54	1.08	1.52	1.86	2.15	2.41	2.63	2.85
76.1	1.28	1.81	2.21	2.55	2.86	3.13	3.38
108	1.52	2.15	2.63	3.04	3.40	3.73	4.02



The formula for calculating expansion bend length independently is as follows.

$$A=0.025 x\sqrt{(\text{Tube OD} \times E)}$$

Above: 'U' shape arrangements, Can also be achieved with cold bending the tube (up to 35mm). Use the chart below to calculate measurement 'B' based on the diameter.



Allow for movement
The expansion distance 'E' must be allowed for, particularly in long pipe runs, where expansion compensator arrangements can be used.

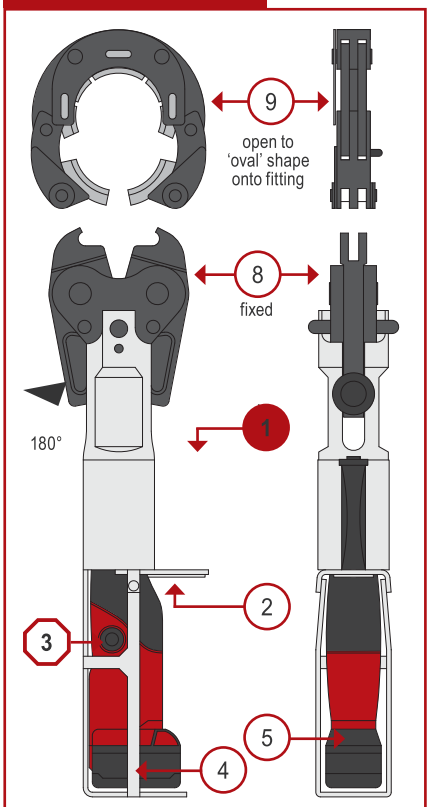
FB= Fixed Bracket
(No pipe movement)
SB= Sliding Bracket
(Support pipe movement)

Table 12: Minimum side length "L" of a U-bend expansion element for thermal expansion absorption (m) (see Illustration 6)

Tube Diameter d (mm)	Temperature Differential ΔL						
	10mm	20mm	30mm	40mm	50mm	60mm	70mm
15	0.33	0.46	0.57	0.65	0.73	0.80	0.87
22	0.40	0.56	0.69	0.79	0.89	0.97	1.05
28	0.45	0.63	0.77	0.89	1.00	1.10	1.18
35	0.50	0.71	0.87	1.00	1.12	1.22	1.32
42	0.55	0.77	0.95	1.10	1.22	1.34	1.45
54	0.62	0.88	1.08	1.24	1.39	1.52	1.64
76.1	0.74	1.04	1.28	1.47	1.65	1.81	1.95
108	0.88	1.24	1.52	1.76	1.96	2.15	2.32

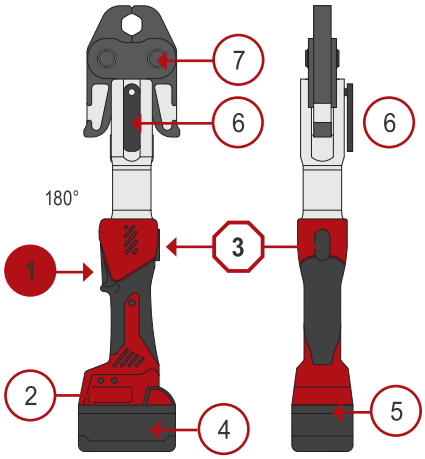
Using the Press Fitting Tools

Battery Operated 1



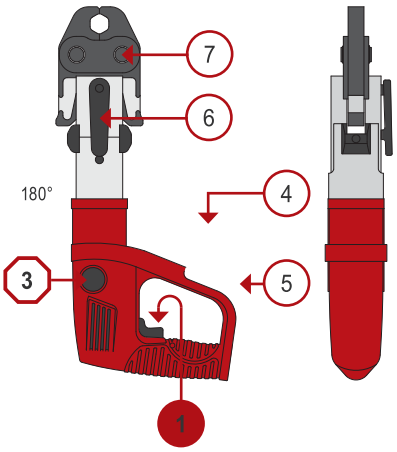
Serial number located under the removable battery.

Battery Operated 2



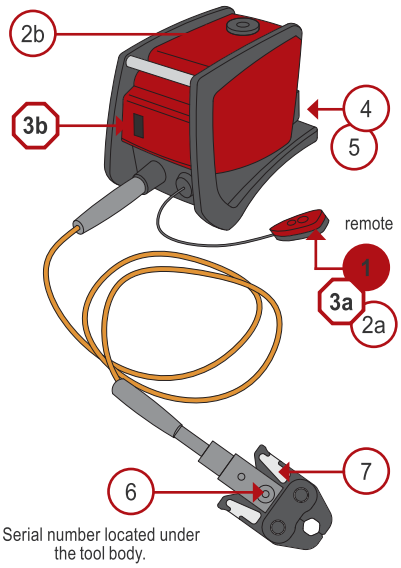
Serial number located on side above battery.

Electric Operated 1



Serial number located under the removable battery.

Electric Operated 2



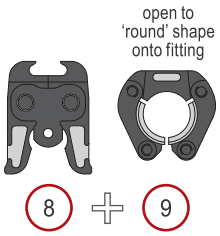
Serial number located under
the tool body.

Diameters

10 - 35mm

Diameters

42 - 108 mm



Understanding the Press Tools...

1. Start Button
2. LED Status Indicators
3. STOP & Reset Button
4. Rechargeable Battery
5. Battery Charge Indicator
6. Retaining Pin
7. Press Jaw
8. Adaptor Jaw
9. Press Collar
10. Sliding Finger Guard
11. Pump Lever
12. Valve Handle
13. Stroke Limit

Before using a Press Tool, you must of completed the relevant Rhinox Tool Training.

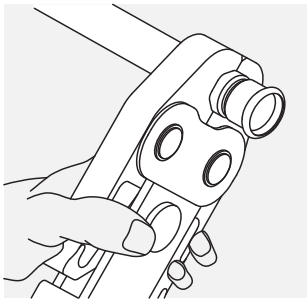
Rhinox Press Tools are calibrated to only fully press Rhinox fittings.

Start here

You should know...

10 - 35mm	Size OD	Size OD	42 - 108mm

1. Retract Retaining Pin (6).
2. Insert the Press Jaw (7) to match the diameter, close the Retaining Pin (6).
3. Open Press Jaw (7) and align the fitting socket lip with the jaw inner groove.



4. Press the Start Button (1) to commence the press.

   MFP2 Only: Turn the Valve Handle (12) anti-clockwise full & push into the tool. Turn (12) clockwise full to seal valve. Operate the Pump Lever (11) repeatedly until a 'click' or the pressure is released. Rotate the Valve Handle anti-clockwise full & pull to release the Press Jaws.
5. When complete, release the Press Jaw (7) and inspect pressed join.

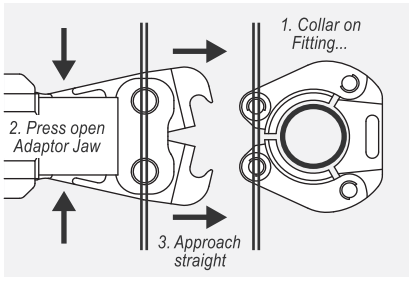
Half or Cancelled Press?

If the press tool operation is stopped or cancelled before completing a full press cycle, the press tool must be released by pressing the Reset Button (3) before proceeding.

1. Open Press Collar (9), align with the fitting socket lip and inner groove of collar.

   Note: Some Press Collars have 'pipe side' written on them for fitting correctly.

   ACO401 Only: For 76.1, 88.9 & 108mm Press Collars, open the collar to an oval 'egg' shape to fit onto the fitting.
2. Retract the Retaining Pin (6). *(not required for ACO401).*
3. Insert the Press Adaptor (8) & close the pin. *(not required for ACO401).*
4. Align the Adaptor Jaw (8) with, the already fitted to the fitting, Press Collar (9).



5. Press the Start Button (1).

   MFP2 Only: Refer to step 4 of the 15 - 35mm Press Tool instructions.
6. When complete, release the tool, remove Press Collar (9) and inspect the join.

   ACO202-XL Only: For 108mm size, repeat steps 3 to 6 for the 'Secondary Press' using the second Adaptor Jaw (8) and leaving the same Press Collar on the fitting.

Use the Right Tool.

The Press Tool used determines the maximum working pressure of the installation .

Use the 'Select a Press Tool' chart to check suitability.

Safety & Tool Training

We offer onsite tool training and maintain records of attendees for OH&S and Quality Assurance.

Tool Servicing

Rhinox Australia is the licenced press tool repair & service centre for tools used with Rhinox Press-Fit Systems.

Tool Maintenance

Every 10 Presses:
Light lubricate inside groove of Jaw/Collar.

Weekly:
Lubricate and inspect Press, Adaptor Jaws, and Press Collars.

40,000 Presses or 2 Years:
Service tool & all parts by authorised repairer.

Tool Not Working?

ƒ Press the Reset Button?
ƒ LED status?
ƒ Contact Us...

Green LED
ƒ Off = Tool is on standby or press is in progress.
ƒ Steady = Tool is ready.
ƒ)ODVK &KHFN5HWDLQLQJ Pin (6) or Battery Charge.

Red LED
ƒ Steady = Fault / Service.
ƒ)ODVK[([WUHPH temperatures or tool fault.

Red & Green LEDS
ƒ)ODVK 6HUYLFH

Generators

Please contact us before using generators with the 240V Press Tools.

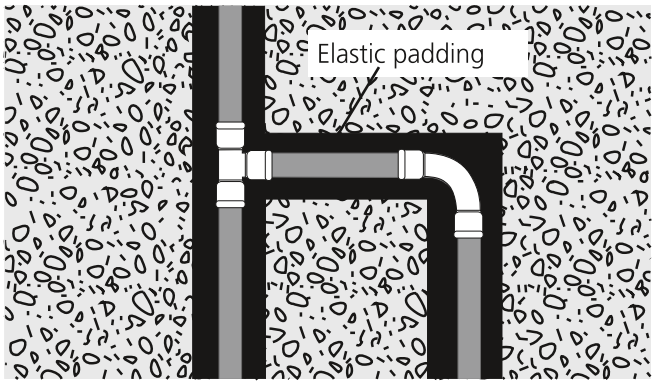
Batteries

Li-Ion batteries should be fully discharged & fully recharged 10x before partial charging to prolong their lifespan.

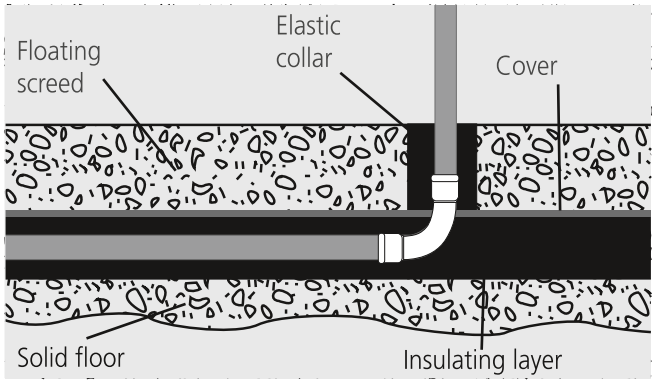
Pipe attachment and installation

Length variations during operation must be considered when the piping is installed. This means the establishment of expansion chambers and possibly expansion compensators. Fixed and floating points must be set precisely. It is possible to balance out small length variations through the existing expansion chamber and elasticity of the pipework. If this is not possible in larger pipework systems or for any other reasons, then expansion compensators must be used. Examples here are pipe arm or U-bend expansion compensators.

If the piping is installed in front of a wall or installation shaft, the expansion is usually large enough for the implementation of compensatory measures. If the piping is concealed, then it is essential to place it inside elastic padding, such as mineral wool or in a closed-cell insulation tube. Concerning piping installed in the impact sound insulation beneath screed, it is important to pay attention to outlets/wall breakthroughs and the screed itself. This must be padded as appropriate with insulating material. This generally applies to other wall or floor breakthroughs, too. One anomaly is the enclosure of piping beneath mastic asphalt screed, where the exposure to heat may damage the seal ring. For this reason, the piping has to be cooled down with cold running water. Besides, the entire piping must be protected with suitable insulation.

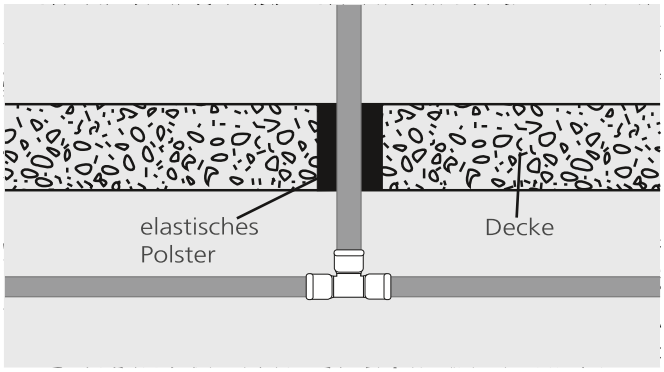


Concealed piping

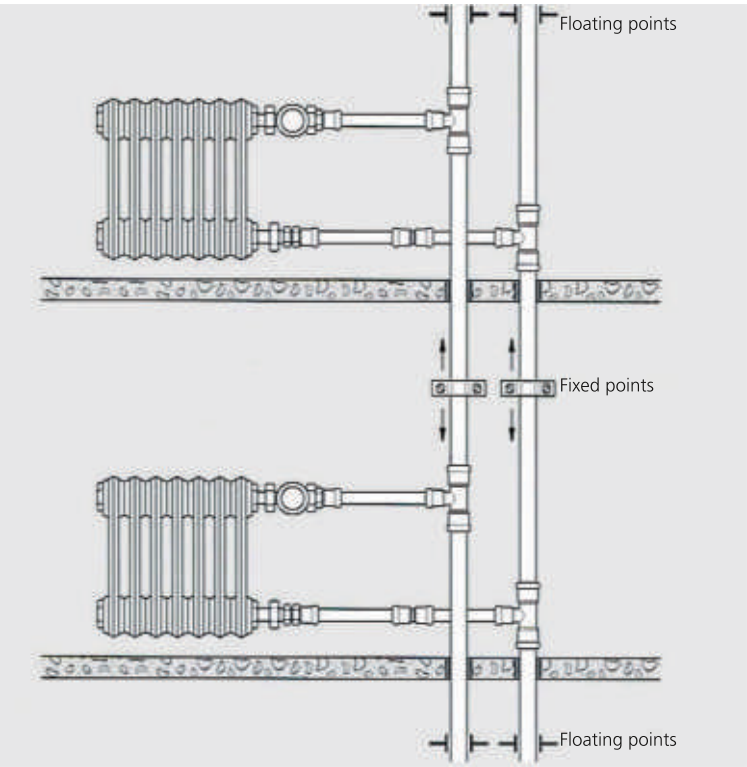


Piping beneath floating screed

Pipe attachments that support pipework and for the focused deflection of temperature-induced length variations are implemented as fixed points (pipe and fitting is permanently connected) and floating points (pipe and fitting are both able to move axially). It is essential to ensure that the pipe attachments are suitable for use with stainless steel. No mounting hardware may be attached to the press fittings.

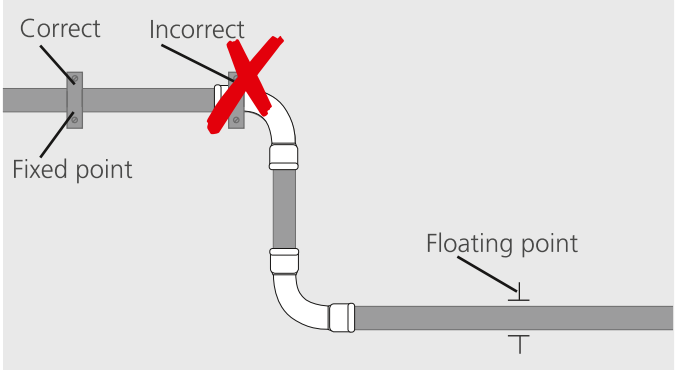


Piping in floor breakthroughs

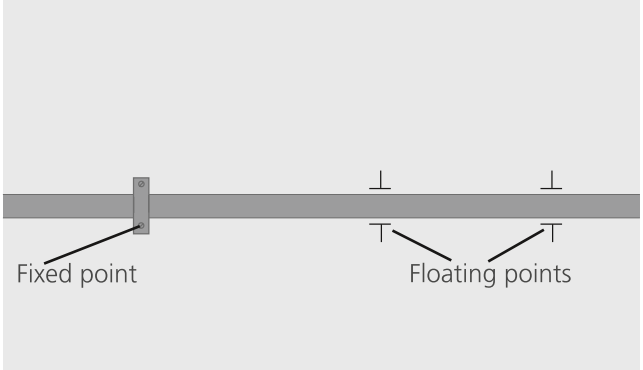


For long pipe sections, we recommend the placement of only one fixed point in the middle of the section for linear expansion in both the directions. This only subjects the branches to about half the load as opposed to a fixed point at the end of the piping. This use case is typical when riser pipes cover several floors. Connecting pipes (e.g.heating elements) must be long enough to absorb any possible linear expansion in the piping system.

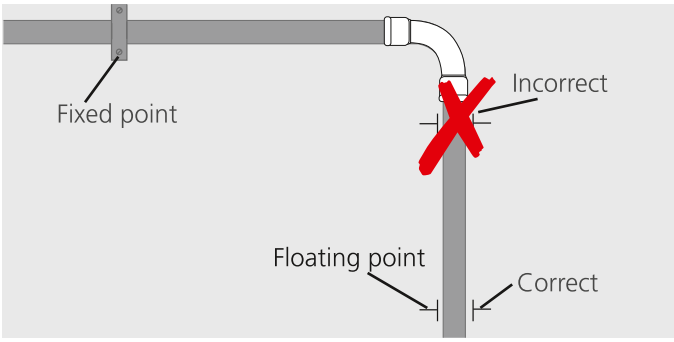
The below drawings illustrate how to set the fixed and floating points correctly:



Fixed points are always placed on the piping never on the fitting.



Incorrectly placed sliding guide horizontal piping is unable to expand.



Fixing continuous piping with only one fixed point (no interruptions due to changes in direction or expansion compensators).

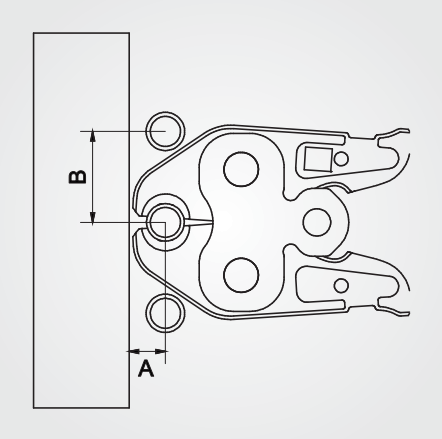
The support spacing for piping according to DIN 1988-2 and our recommendation are shown in the following table.

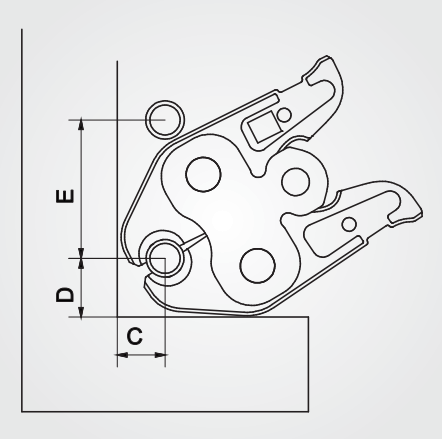
Pipe diameter	15	18	22	28	35	42	54	76.1	88.9	108
Support spacing (DIN)	1.25	1.50	2.00	2.25	2.75	3.00	3.50	4.25	4.75	5.00
Support spacing	1.50	1.50	2.50	2.50	3.50	3.50	3.50	5.00	5.00	5.00

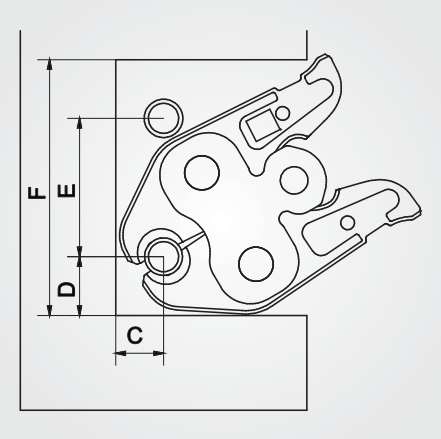
Press Tool Space Requirements

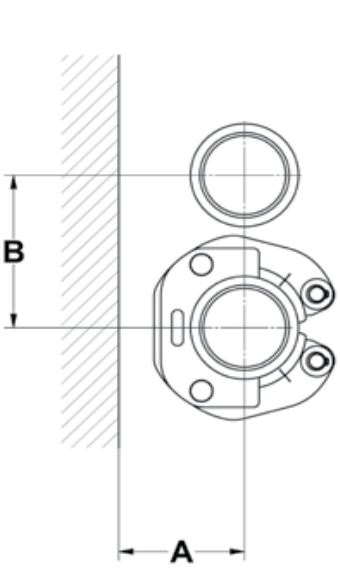
Table 17 and Illustration 11 below provide information regarding the required space to safely and effectively complete press cycles with Rhinox tools using either jaws and slings.

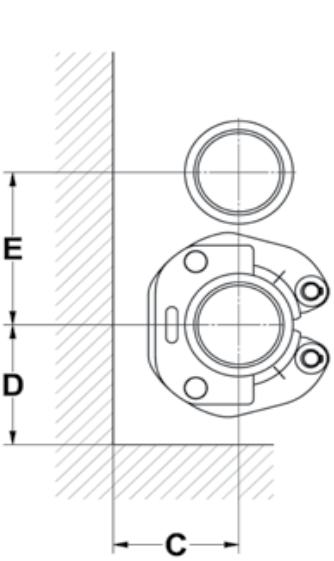
Tool Space requirements relative to walls and other tubes.						
Tube Size OD mm	**A mm**	**B mm**	**C mm**	**D mm**	**E mm**	**F mm**
15 Jaw	20	56	32	40	80	155
22 Jaw	25	65	32	50	82	175
28 Jaw & HP Sling	25	75	32	54	82	182
35 Jaw	30	83	32	65	85	205
35 HP Sling	75	95	75	75	95	205
42 Sling & HP Sling	75	140	85	110	155	375
54 Sling & HP Sling	85	150	90	110	155	375
76.1 Sling & HP Sling	115	220	120	200	220	650
108 Sling & HP Sling	150	255	150	200	255	650

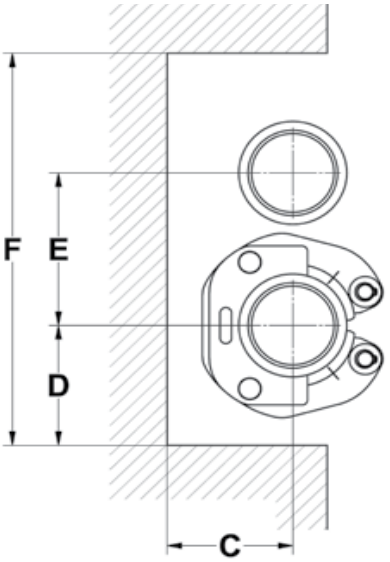










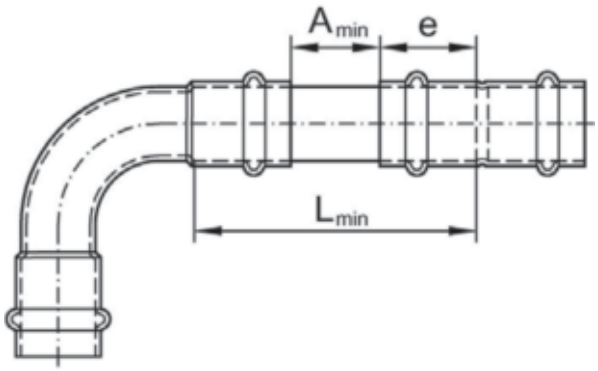


Insertion Depths And Distances of Fittings

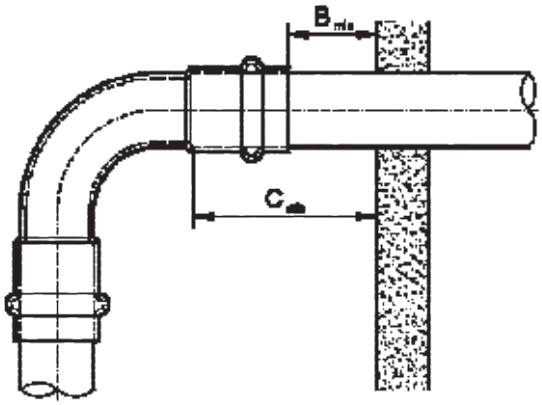
There are minimum tube insertion depths and minimum spacing requirements between two press fittings and from wall/floor penetrations to press fittings. These minimum distances are required to ensure proper use of the pressing tools and to facilitate the correct formation of the joints. Please refer to the following drawings and tables.

Minimum spacing between fittings and fom fittings to wall					
Tube OD mm	Insertion Depth mm (e)	Minimum Spacing in mm			
		A min	L min	B min	C min
15	24	10	58	60	84
22	28	10	66	60	88
28	28	10	66	60	88
35	30	10	70	60	90
42	38	20	96	60	98
54	43	20	106	60	103
76.1	50	30	130	60	110
108	69	30	168	60	129

For Tube Sizes d ≤54 mm



Minimum spacing between two press fittings (A), minimum distance from wall/floor to the front of the press



Insertion depth (e) and minimum tube length (L) for sizes d fitting (B) and socket end from the wall (C) for sizes

Threaded Fittings

Chloride-free sealant must be used to seal stainless steel threaded components. Do not use PTFE sealing tapes that contain chloride ions as these can lead to corrosion in stainless steel tubes and fittings. It is recommended to use a permanent elastic thread sealing compound, suitable for the end-use application, which is free from chloride ions.

Storage & Handling

Take care when storing Mayer stainless steel pipes and fittings. The products must be stored in a clean & dry environment free of corrosive gas or other materials, where they cannot be struck by sharp objects, collide with other materials, or be dropped or thrown. Avoid cluttering and mixing with other materials.

Should pipes become coated or stained by oil, clean immediately with attention to pipe ends and the rubber O-rings of the press-fitting. When transporting pipes, stack neatly in the box and cover to protect against rain and pollution.

Earthing

Stainless steel pipes and fittings create continuous electrical connections and equipotential bonding. This must be addressed following relevant codes and standards.

Soundproofing

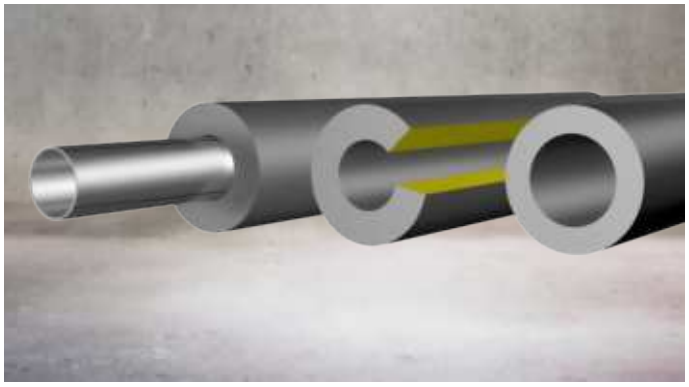
Building installation pipes do not represent an additional source of noise. When installed as per the norm, the sound pressure level in standard sound insulation must not exceed 30 dB (A). The increased sound insulation in residential construction requires 27 dB (A) and the comforting sound.

Insulation 24 dB(A). Compliance with these requirements in all parts of installation can only be guaranteed with extensive knowledge. It is advisable to consult an acoustical engineer during the planning phase.

Fire Protection

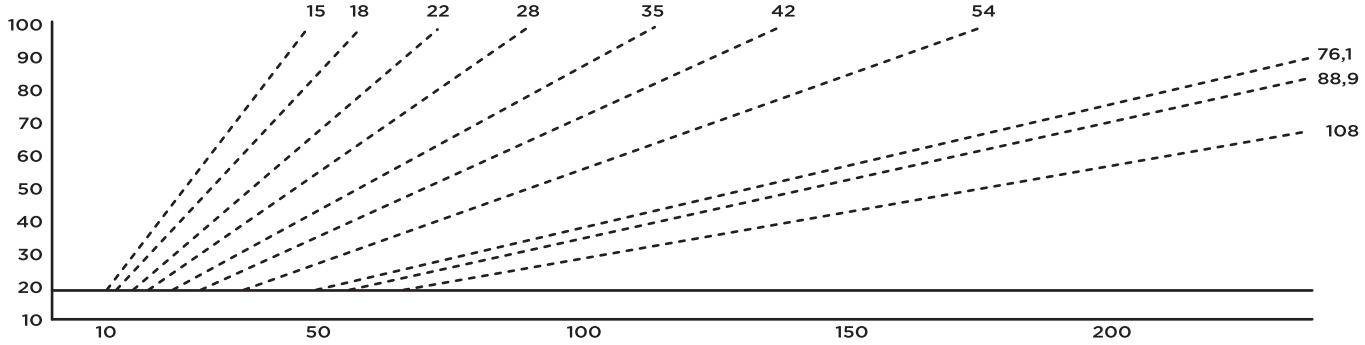
The pipes and fittings in the Rhinox stainless steel piping system are non-flammable. However, the relevant provisions must be observed for installation in the various building types. The requirement for pipe systems in buildings are laid down in Germany's prototype building regulation, federal-state building regulations, and special building regulations. Depending on the federal state, the design details are laid down in implementing regulations, administrative provisions or technical building regulations. Wall and ceiling ducts single non-flammable piping without insulation inside its own breakthrough/hole: the piping may be concealed in mortar. The spacing to the next piping must correspond to the diameter of the largest pipe. An annular space of up to 15mm may be closed with foaming material. An annular space of up to 50 mm may be closed using mineral wool with a melting point and density of at least 1000°C and 150 kg/m3, respectively. Single non-flammable piping without insulation in shared breakthroughs:

The pipes are installed side by side at a distance of at least the diameter of the largest pipe and concealed in mortar. Single piping with insulation in shared breakthroughs or its own hole: Mineral wool (see above) may be used for insulating the duct. The spacing between piping is at least 50 mm if non-flammable type A1 or A2 insulation follows. The spacing is the diameter of the largest pipe if no insulation follows.



Heat Emission and Insulation

In addition to conveying fluids, piping also emits heat when the ambient temperature is different from that of the fluid. It practically acts as a heating device. The same applies vice versa. When the ambient temperature is higher, the piping absorbs heat and cools the surrounding environment. This can be used for underfloor heating, electric blankets, heating panels, and concrete core cooling. Unintended heat transfer has to be minimized by suitable insulation, however. Low-temperature piping also needs to be insulated to prevent condensation and is being heated by high-temperature piping. Please note that the concentration of chloride ions in any material used for thermal insulation should be as low as possible. The use of felt is not allowed, as this insulant absorbs moisture quickly. We recommend the use of closed-cell insulation tubes that do not absorb moister The diagram below shows the linear heat emission of the Rhinox stainless steel piping system for uninsulated piping without cladding at the corresponding temperature differences in watts per meter



Notes on corrosion resistance

Internal corrosion

The steel used for the Rhinox stainless steel piping system is fully corrosion resistant with any of the media or applications listed under 'Installation' and 'Commissioning'. There must be no formation of increased halogen concentrations, e.g. due to seals that release chloride into water or lead to a local concentration of chlorides. Chloride-free hemp or plastic sealing tape that does not release halogens should be used for sealing threaded transitions. EPDM tape (Teflon tape) must not be used. There must be no external or internal heat transfers for the same reason. Deposits could form on the inside, causing a localized increase in chloride concentration and pitting corrosion. The use of trace heating is limited to 60°C maximum. The piping must be kept full at all times to prevent the three-phase boundary of water/material/air. In particular, this must be considered after pressure testing or if the piping has to be fully or partly emptied. We recommend a pressure test with compressed air or inert gases if the installation is emptied again after pressure testing or there is a possibility that water will evaporate from openings in the installation.

External corrosion

External corrosion may occur if stainless steel piping is exposed to building materials or insulant that are moist and contain halogens or if moisture forms on the piping permanently and evaporates there. A concentration of halogens could form there, causing pitting. The piping must not be exposed to chlorine gases, saltwater or other waters containing high levels of chloride. The pipes should be given a coating resistant to heat, non-aging and permanently waterproof if stresses of this nature are unavoidable. The insulant itself must not release any chloride ions. If moisture & inclusion of halogens cannot be ruled out from the building materials in which the pipes & components are installed, in such conditions surface-mounted installation should be considered.

Additional notes on corrosion resistance

It is safe to connect the stainless steel pipes and press fittings to other fittings and devices made of red brass. The one-to-one direct transition to carbon steel or copper is also safe in closed water circulation systems because there is no risk of contact/bimetallic corrosion. The stability of the Rhinox 1.4404 stainless steel piping system is not affected by mixed installations, regardless of the direction of flow. Hot bending techniques may not be used on stainless steel pipes, as heat tinting forms and the structure sensitizes critically after prolonged heat exposure, each of which reduces corrosion resistance and may cause leakage. The pipes must not be cut with a grinder, burning or plasma torch (see 'Cutting and deburring'). The pipes and fittings must be stored and machined such that no foreign materials, e.g. normal steel particles, sparks from grinders or building materials containing chloride (setting accelerator), can settle on or inside them. Stainless steel pipes may not be soldered or brazed, as they may be prone to knife-line attack when the corresponding temperatures are too high. A knife-line attack has also been observed even in the case of soldering or brazing techniques regarded as suitable. Stainless steel pipes may not be welded on-site because all the necessary conditions for reliable welded joints, such as making the weld site and heat-affected zone inert, are generally not given. It is safe to connect the stainless steel pipes and press fittings to other fittings and devices made out of red brass. The one-to-one direct transition to carbon steel or copper is also safe in closed water circulation systems because there is no risk of contact/bimetallic corrosion. The stability of the Rhinox 1.4404 stainless steel piping system is not affected by mixed installations, regardless of the direction of flow. Hot bending techniques may not be used on stainless steel pipes, as heat tinting forms and the structure sensitizes critically after prolonged heat exposure, each of which reduces corrosion resistance and may result in leakage. We must not cut the pipes with a grinder, burning or plasma torch (see 'Cutting and deburring'). The pipes and fittings must be stored and machined such that no foreign materials, e.g. normal steel particles, sparks from grinders or building materials containing chloride (setting accelerator), can settle on or inside them. Stainless steel pipes may not be soldered or brazed, as they may be prone to knife-line attack when the corresponding temperatures are too high. A knife-line attack has also been observed even in the case of soldering or brazing techniques regarded as suitable. Stainless steel pipes may not be welded on-site because all the necessary conditions for reliable welded joints, such as making the weld site and heat-affected zone completely inert, are generally not provided.

Pressure Testing (General)

The pressure test of water supply and heating systems can be carried out with water, (oil-free) air or non-corrosive gases. The pressure test of gas systems must be carried out with (oil-free) air or non-corrosive gases. Subject finished systems to leak tests before covering, insulating or painting.

Note: If the system is to be emptied again after a water pressure test, or not remain full, it is advisable to conduct the pressure test with air to avoid an increased risk of pitting and corrosion.

Pressure Testing (Using Water)

Water Supply Systems:

Conduct the pressure test of the laid system under AS/NZ 3500. Fill the system with filtered water so that it is free from air. Carry out a preliminary and main pressure test. The preliminary test of smaller components, such as connecting and distribution of pipes within bathrooms, may be regarded as sufficient in itself.

Heating Systems:

The pressure test of the laid system is generally conducted with water.

"Test hot water heating systems at pressure to 1.5 times the total pressure at any point in the system, and at least 1 bar. As soon as possible after the cold water pressure tests, heat the system to the design hot water temperature to check whether it also remains watertight at the maximum temperature."

Preliminary Test:

For this test, apply pressure equal to the permissible working pressure plus 5 bar, which must be restored twice at 10-minute intervals within 30 minutes. After a test period of a further 30 minutes, the test pressure must not have dropped by more than 0.6 bar (0.1 bar per 5 minutes).

Main Test:

Conduct the main test immediately after the preliminary test. The duration of this test is 2 hours. The test pressure read o after the preliminary test must not have fallen by more than 0.2 bar after these 2 hours. There must not be any leaks visible from any point of the tested system.

Pressure Testing (Using Air)

A pressure test with air or non-corrosive gases may be carried out under the AS/NZ 5601.

Gas Systems:

Conduct the pressure test of the laid system under AS/NZ 5601. Subject the system with working pressures of up to 100 mbar for preliminary and main tests.

Preliminary Test:

"Conduct the preliminary test with air or a non-corrosive gas (e.g. nitrogen or carbon dioxide), but not with oxygen, at a test pressure of 1 bar. The test pressure must not drop during the 10-minute test period."

Main Test:

Conduct the main test with air or a non-corrosive gas (e.g. nitrogen or carbon dioxide), but not with oxygen, at a test pressure of 110 mbar. After temperature equalization, the test pressure must not drop during the subsequent test period of at least 10 minutes. "Subject the system with working pressures between 100 mbar and 1 bar to a combined load and leak test. Conduct the test with air or a non-corrosive gas (e.g.nitrogen or carbon dioxide), but not with oxygen, at a test pressure of 3 bar. The test period must be at least 2 hours, taking account of any possible changes in the temperature of the test fluid, and after a temperature equalization period of about 3 hours. Use a class 1 pressure recorder and a class 0.6 pressure gauge as measuring instruments."

Liquefied gases:

Conduct the pressure test of the laid system following AS/NZ 5601. The pressure test requirements apply to low and medium pressure systems. Conduct the pressure test of liquefied gas systems with air or nitrogen at 1.1 times the permissible working pressure, but at least 1 bar, and include the fittings. The test may be carried out as a pressure test, with water as the test fluid, at 1.3 times the permissible working pressure. If a pressure test with water is planned for the first or regular tests, it must be planned for beforehand when the system is installed, by arranging the lowest points as drain connections so it can be drained thoroughly and completely.

Flushing the system and starting up

According to DIN prevent corrosion in potable water pipes, rinsing with a water-air mixture is required. Normally the potable water system is flushed through with a water-air mixture to avoid corrosion. From a corrosion point of view, Inoxpres potable water installations, however, only require simple flushing with filtered potable water, since thanks to the special connection technique no additional substances such as cutting oil and fluids are required. For hygienic reasons a high standard system flushing procedure may be required (for example, hospital, care center). In this situation, the ZVSHK / BHKS data sheets should be applied. Stagnant water from the house supply piping must not access the potable water installation. The pressure testing, flushing, and start-up of the system have to be documented. The system operator has to be instructed concerning correct working practices.

Protection of pipelines and connections from external corrosion - general

All pipes with hot or cold liquids must be protected externally by appropriate coatings to avoid any unwanted incidents, such as:

- Condensation;
- Condensation With External Corrosion;
- Corrosion By External Influences;
- Thermal Dispersion.

Pipes and connections must be protected with varnish, plastic coatings, press-on tires with adhesive tapes and thermal insulation. Varnish of the connections and pipes with primer. The matching pressing jaw is mounted in the pressing machine, or the appropriate collar/chain mounted on the fitting, depending on the dimensions of the press-fitting. The slot of the pressing jaw/collar must be positioned exactly over the press-fitting formed end. Following pressing, the complete connection should then be checked to ensure that the work has been carried out correctly and that the insertion depth is correct. The fitter should also ensure that all connections have been pressed. Following completed pressing, the pressing points may not be subjected to further mechanical loading. The positioning and straightening of the pipes and the sealing of threaded connections must, therefore, take place before the pressing is carried out. Slight movement and lifting of pipes, for example for painting work, are permitted. Technical Handbook 27 To prevent external corrosion of Steel press

systems - especially where condensation water could increasingly occur (e.g. air conditioning and cooling units) - the following is recommended:

- Use tubes with a PE coating if tubes of non-alloy steel are used;
- Proper protection of tubes/connections with the help of a coating with primer/epoxy
- Proper protection of tubes/connections with the help of viscoelastic tape, consisting of butanol-mastic, supported by a film made of high-density polyethylene (entire thickness approx. 0.8 mm).

The butanol-adhesive tape has high tensile and high adhesive strength and is self-fluxing. It requires no adherent primer, lets surfaces perfectly repel water and insulates against atmospheric influences and free chemicals. The high tensibility provides the tapes with comprehensive applicability for all types of surfaces, even for irregular surfaces such as bends, T-piece, sleeves, etc. For the application, it is sufficient that the surface is clean but not wet. The tape must be under pressure and cleaned depending on the situation. It extends over 70% compared to its original length, while the width at the end depends on the extension. It is recommended to overlap the tape with at least 10% of the tape width. Coating protection with the help of tapes and/or varnish must always occur after a trial run of the system. Important: the choice and the implementation of the type of protection against external corrosion is the responsibility of the planner and installer

Disinfection

The disinfection of potable water systems may be required in case:

- Germs Are Detected.
- Of Increased Hygienic Requirements.

The Inox press fitting system must be disinfected using hydrogen peroxide (H2O2) following DVGW worksheet W 291 - disinfection of water supply systems. If disinfection is carried out using chlorine, then the prescribed concentrations and disinfection periods are shown in the overview below must be strictly adhered to.

Chlorine content (free chlorine)	50 mg/l	100 mg/l
Disinfection period	max. 24 h	max. 16 h

Following disinfection with chlorine, the system must be flushed thoroughly with potable water until a residue-free chlorine value of < 1 mg/l in the potable water system is reached. Due to the dangers of corrosion through incorrect disinfection, we recommend disinfection either using hydrogen peroxide or thermal disinfection. Disinfection measures should always be carried out by trained professionals only.

Hygiene

The implementation of the new potable water regulations places great emphasis on the hygiene conscious planning, realization and operation of potable water systems. It is necessary to give attention to the applicable regulations in each country where the installation is done, with particular reference to aspects of plant level, sanitizing and maintenance.

The following measures are suitable both for the assurance of the required potable water quality and the minimizing of the danger of germs occurring:

- Material choice following DIN 50930-6;
- When calculating the pipe network, select the smallest possible widths;
- Hygiene-conscious system layout (looped systems); Are to avoid “dead branches” and branches that appear to be unidirectional critical from hygiene;
- No stagnation piping (drainage pipes, collective safety devices);
- Single safety devices are preferable;
- Separate extinguisher systems from potable water network;
- Ensure the target temperature is reached in the entire potable water heater;
- Install circulation piping with dimensions are following W 553;
- Verify the possibility of inserting traits bypass on the mainline in cases of complex lines, so that it is possible to make a thorough washing without stopping the system thus increasing the effectiveness of the disinfection treatment;
- Protect cold water piping against heating;
- Hygiene-conscious handling of materials;
- Document the piping system;
- Maintain the system regularly (maintenance contract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