



PIPE SYSTEMS FOR WATER SUPPLY AND WASTE WATER MANAGEMENT



BUTTING

Progress by tradition

BUTTING was founded in 1777 as a copper-smith's, by the ancestors of the current owner, Hermann Butting. In 1945, the family company moved its headquarters to Knesebeck and started producing soldered, and later welded, copper pipes. In the late 1950s, stainless steel gradually replaced copper as the main raw material

for BUTTING products. The company has been in private ownership for seven generations, and its staff of over 1,000 now handle approx. 40,000 tonnes of stainless steel of various grades every year.

Diverse range of products

The production of high-quality longitudinally welded pipes made from stainless steel – in both standard and special sizes –

has long been the focal point of our business since the development of stainless steels. Few companies in Europe can point to such longstanding experience and diversity as BUTTING in the production of stainless steel pipes in sizes ranging from NB 15 to NB 1 800. Alongside the production of longitudinally welded pipes, BUTTING manufactures and supplies a wide range of pipework components. Our customers can cover all their pipework and

Longitudinally welded pipes



Assembly



Clad pipes



component needs with us – from a single source. The combination of pipes and fittings of proven BUTTING quality into special ready-to-install piping components within our extensive prefabrication capacity also guarantees you optimum cost-effectiveness and reliability. Since BUTTING was founded, the construction and assembly of vessels has been an established part of its wide range of services.

Pipe systems for water and sewage technology

The use of corrosion resisting steel pipes in the water and sewage industry has been the norm for years. For over 25 years, BUTTING has been prefabricating, supplying and installing high-quality stainless steel pipes for these sensitive industrial facilities.

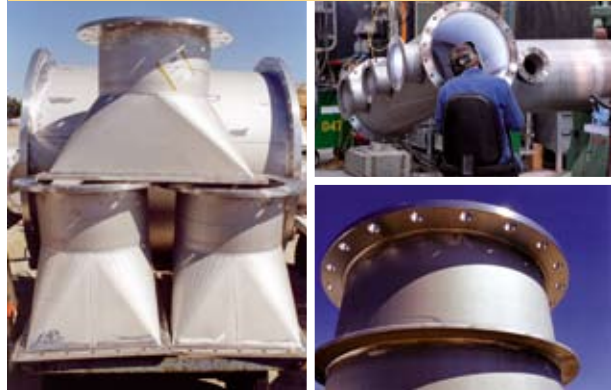
In more than 100 projects to date, companies in the water and sewage industry throughout the world have relied on the longevity and reliability of BUTTING's pipe systems.



Vessel construction



Prefabrication



Pipe fittings



Surface engineering



Close to customers worldwide

The history of BUTTING is one of continuous healthy growth with its roots in a far-sighted entrepreneurial spirit. It was this thinking that prompted Dr. Hannshermann Butting to establish an affiliated company in Schwedt on the Oder following German reunification in 1991. Today, BUTTING in Schwedt is our expert unit for vessel and pipework construction and for international installations.

BUTTING has been present in China since 2004, where we have a production facility in Malu on the outskirts of Shanghai, producing pipes and customised pieces for the Chinese market. Our pipe store for urgent needs from our Chinese customers is also set up there. Our aim is to inspire our customers, and for some services and/or products this requires geographical proximity to them. For the same reason, we decided in 2005 to establish a branch in Canada, and BUTTING Canada in Calgary will provide our Canadian customers with our many years of experience in processing stainless steels more quickly and directly.



Progress by tradition – we are proud of our 230-year history



A team with a vision: (L to R) Markus Bartsch, Hermann Butting, Dr. Iris Rommerskirchen, Thomas Schüller, Dr. Jens-Peter Lux

Our core competences

Over the last few years, BUTTING has invested in the latest manufacturing techniques, environmental protection and quality assurance systems, to expand its core competences in the fields of materials, forming and welding technology. We consider all the material properties of stainless steels throughout the value creation process. Our know-how and capabilities in surface engineering guarantee you BUTTING products with maximum corrosion resistance.

At BUTTING, the use of compatible weld procedures for the materials in question guarantees you problem-free product deployment, based on over 50 years of experience in the welding of stainless steels. The daily work of our welding engineers is to use and optimise familiar weld procedures and tackle new challenges.

Worldwide yardstick for quality

Since BUTTING was founded, reliable quality management has been a prominent pillar of our corporate philosophy. All over the world, the name BUTTING stands for high-quality stainless steel pipes, fittings and components. The high quality and reliability of our products are shown by the variety of applications in which they are used in all branches of industry, such as chemical plants, the aerospace industry, energy and environmental engineering and shipbuilding.

The constant development of new products and processes and the continuous improvement of the status quo have a long tradition at BUTTING. Combining craftsmanship and engineering knowledge, we have been facing the challenges of tomorrow together with our customers for over 230 years, according to the motto "Nothing is impossible".

Your partner for longitudinally welded pipes and pipelines



Our plant in Knesebeck

Longitudinally welded pipes

BUTTING produces high-quality longitudinally welded pipes for use all over the world. Since stainless steels were first developed, we have been working a wide variety of material grades into pipes and components. Our experience and diversity in the production of stainless steel pipes is unique across Europe. Our know-how in forming, welding and materials technology and our quality assurance are in evidence every day as we satisfy requirements from all kinds of industry.

BUTTING basically has two different production processes available for manufacturing pipes:

- Continuous production from coil
- Pipe production from plates

The continuous production of longitudinally welded pipes is very cost-effective



Extensive production facilities

The continuous, fully-automated production process is the most technically sophisticated and economical process for manufacturing longitudinally welded pipes. On several production lines, BUTTING produces pipes in diameters ranging from 20 to 762 mm, with wall thicknesses up to 16 mm. Pipes with wall thicknesses up to 70 mm and a maximum outside diameter of 3,000 mm can be produced from individual plates on our state of the art production facilities using the discontinuous process, with no outsourcing of individual production steps, in standard lengths up to 24 m.



Numerous welding techniques are available to our customers



Urgent needs for pipes are covered from our extensive stock

Wide selection in store

In an outdoor area covering over 20,000 m², BUTTING keeps permanent stocks of over 2,500 tonnes of stainless steel pipes in over 140 sizes, from NB 15 to NB 800, such as:

- Pipes in 1.4541 / 1.4571 according to DIN EN 10217-7
- Pipes in 1.4462 according to ASTM A928 / DIN EN 10217-7
- Pipes in 1.4539 according to ASTM A312 / DIN EN 10217-7
- Pipes in TP 304L / TP 316L according to ASTM A312 or ASTM A358
- Food pipes according to DIN 11850
- Piggable stainless steel pipes in 1.4307 / 1.4404 according to DIN 2430-1



Several variants of thick-walled pipes are produced from individual plates

Welding technologies for all requirements

BUTTING has both the processing facilities and qualified and certified staff to carry out all the usual welding processes.

For welding thick-walled plates, we are one of the few manufacturers in Europe to use not only the submerged arc welding method but also the efficient electron beam (EB) welding process, with its excellent performance and reproducibility.



18 m pipes for a water treatment plant are produced to order

Elbows and fittings

Along with longitudinally welded pipes, BUTTING also produces and supplies pipe fittings made to project requirements from all the stainless steel materials that we handle. For this, the company maintains diverse stocks of selected fittings. On an order-by-order basis, these fittings are also produced to particular dimensions and from special materials for a variety of different applications.

Elbows

Depending on the outside diameter, we produce pipe elbows without folds from longitudinally welded BUTTING pipes to customers' requirements by means of a bending process using rollers, cylinders or mandrels or from two halves made of plate.

The various production methods enable pipe elbows to be manufactured according to DIN 2605, type 3 or 5, or with even bigger radii – or on request with a tangent without a circumferential weld.



Elbow with flange and beading and welded sleeve for a water treatment plant

Three-dimensional multiple bends with graded radii can be made in accordance with customers' isometric drawings.

Tees and branches

Tees and branches are manufactured from high-quality BUTTING piping. The tolerances, construction types and testing of butt-welded or saddle-shaped tees can be chosen according to DIN 2615/2609 or ASTM standards, or on the basis of the customer's specifications.

The branches are produced as saddles, as extruded or butt-welded branches.

Collars

BUTTING manufactures slip-on collars and welding neck collars without bevels, similar to DIN 2642, using semi-automatic presses. Large quantities of these fittings up to NB 400 in size are produced continuously from coils, or in individual production, from plates. Cold formed angles from plate are used to make larger welded collars up to NB 1000.

To match our stock of standard pipes, we can provide you with a wide range of welded and slip-on collars from stock.

Reducers

Depending on the size, BUTTING produces reducers both from longitudinally welded pipe and plate. The customer can specify an eccentric or concentric (conical) shape – also with cylindrical ends. Depending on requirements, the tolerances and testing for these fittings are defined according to DIN 2609, ASTM A403 or the customer's specifications.



Y-pipe ready for dispatch to a water treatment plant in Vienna/A

Flanges

Flanges are wrought or produced from plate and machined all round. Flanges are constructed according to DIN or ASTM B16.5 with the corresponding pressure ratings.



Special components prefabricated to isometric drawings

Production for the Greek sewage industry: tees NB 1200/1219x7 mm



Special components

Combining craftsmanship and state-of-the-art production facilities, BUTTING produces ready-to-install special components such as non-standard fittings or other special constructions to customer specifications.

As part of our extensive value creation process, the use of excellent raw materials and high-quality semi-finished products such as our own pipes, elbows and reducers, a high level of automation and technically qualified specialists guarantee our first-class quality – even with complex designs.

Partner to the water and sewage industry

BUTTING opted for the maximum use of prefabricated pipes for this industry at an early stage. In addition to the selection of materials, expert and efficient processing of corrosion resisting steels is crucial for the safe operation of a pipe system and for the minimisation of investment and whole life costs. Also, the maintenance costs in the 'maintenance and repairs' and 'dismantling and recycling' phases of the equipment lifecycle are reduced. Due to extensive factory prefabrication, BUTTING guarantees high processing quality and at the same time reduces the costs of assembly. In the last few years, for example, we have produced pipes and equipment for over 100 projects in the water and sewage industry in Germany, the Netherlands, the Czech Republic, Greece and Switzerland, to name just a few.



Prefabrication at the factory improves the quality of the pipe



The use of the latest workshop equipment reduces the amount of testing



Symbiosis of craftsmanship and technology to the benefit of our customers

Factory prefabrication

The prefabrication of pipes and vessels involves installation work carried out under workshop conditions. The fewer welds have to be made and pickled on site, the higher the quality of the joints and surfaces.

The following clear arguments favour prefabrication:

- Minimisation of joint welds on the construction site, for example due to bending rather than welding elbows or using pipe sockets instead of welding tees
- Improved production quality and less extensive testing due to the use of a wide range of modern workshop facilities
- Less space required on construction site
- Shorter installation times on site
- Full body pickling of all ready-to-install pipe components – the most reliable and environmentally-friendly method for sustainable corrosion resistance

- Increase in planning security for the assembly schedule through high-quality factory prefabrication that is completed on time

Preliminary service – CAD

To pre-plan factory prefabrication on paper, we use the latest 3D CAD systems. Our CAD service department supports responsiveness on site by drawing up assembly documents. A well-versed team at the factory and on site ensures that projects are handled smoothly.

To summarise: apart from a significantly higher product quality, you will be won over by the major savings that can be made on the installation, maintenance and repair of pipe systems thanks to our factory prefabrication.

Bending instead of welding elbows minimises the number of welds on the construction site



Prefabricated pipes with flanges for a water treatment plant



Assembly is a matter of trust

BUTTING is aware that the assembly of high-quality goods is a major responsibility, especially if stainless steel is used. The processing of piping components as well as their fabrication and installation is crucial to guarantee the quality of technical plants.

BUTTING mainly assembles prefabricated piping components manufactured in our plant. We have already touched on the advantages of prefabrication (see page 7). When segmenting the piping sections to be prefabricated, it should be ensured that flange connections can be used in the subsequent assembly. This is especially important with aggressive media, because in these situations, even with automated welding processes, only circumferential welds with minor tinting can be achieved if it is not possible or desirable to fill the pipe with inert gas during assembly.



True to our motto "All from a single source" – vessels, pipes and assembly

Many years of experience

BUTTING has been handling pipework and vessel assembly ever since the establishment of the company in 1777 – when it worked with copper. The first stainless steel pipes and vessels were assembled in 1950 for the German paper mill in Oberau. Over the years, our first-class assembly team of highly-qualified, experienced and responsible employees have become our trademark. Along with our product quality, we have our assembly engineers to thank for our good reputation in the stainless steel industry.

Diverse applications

In the last few years, we have taken the responsibility for the overall installation of piping for many major projects in Germany and abroad in various branches of industry, including water treatment plants (e.g. in Munich), drinking water facilities, gas tanker projects for the German shipbuilding industry and piggable piping systems for chemical plants.

Prefabrication shortens assembly times

The advantage of extensive prefabrication of pipework components from isometric drawings in helping to reduce assembly time was clearly shown in the construction of a water treatment plant in Munich.



Assembly time can be drastically reduced with a high degree of prefabrication

The decision by the planning office to commission both phases - prefabrication and assembly – from the same supplier produced the desired synergy effects and costs-savings for the project.

BUTTING offers its customers "vessels, pipes and assembly – all from a single source": you can take advantage of our efficient package of advice on materials and pipework planning, the combination of pipework and vessel construction, CAD planning and economical prefabrication, our optimised shipment management and site organisation, and the high quality of the assembly work itself, in bringing your investments to fruition. We will be happy to bring our specialised knowledge and experience to bear on your project.

Assembly of pipes for a water treatment plant in Amsterdam



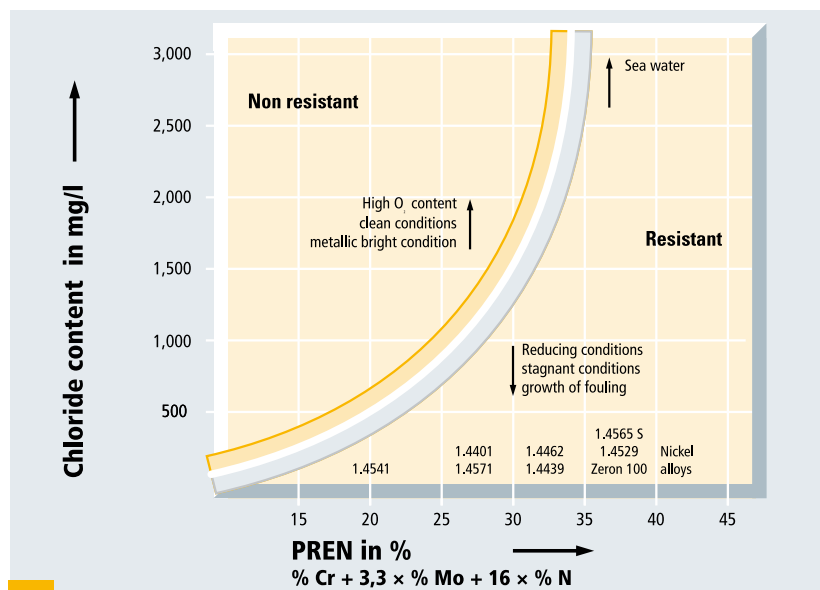
Years of experience with materials

BUTTING has been processing stainless steels ever since they were developed and has concentrated on special alloys right from the start. By 1979, we were already producing longitudinally welded duplex pipes for an on-shore project. For over 30 years, we have been supplying pipes in nickel alloys (e.g. Alloy C4) for shipbuilding, national chemical plant construction and off-shore installations. The BUTTING production programme offers a diverse spectrum of high-performance materials for specific corrosive applications such as sea water desalination plants.

Choice of materials

The choice of the right material depends on its later use and the requirements associated with this. For the wide variety of industrial applications in the water and sewage industry, there is a large selection of stainless steels available, with predominantly austenitic but also ferritic-austenitic microstructure.

The selection of materials for water treatment plants requires particular care, as the composition of sewage (hydrocarbons, acids and alkalines) changes continuously from one application to another and is often difficult to define.



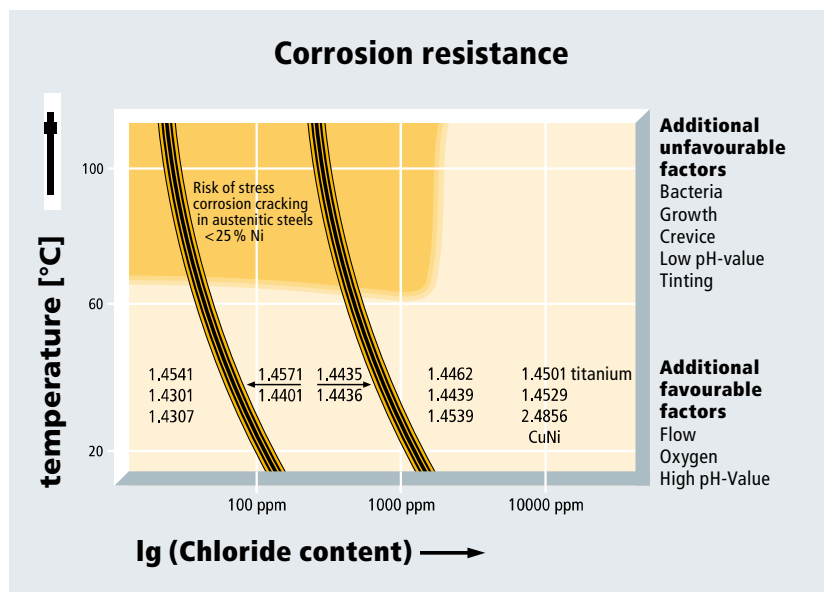
Resistance to pitting and stress corrosion of stainless steels in water" – based on the PRE formula

Along with the stresses on the components, other decisive criteria for the choice of materials are processibility and availability. BUTTING meets these demanding requirements by way of intensive advice to its customers on materials in the preliminary stages of a project, and can look back on extensive cross-industry experience in materials technology.



Pipe component with reinforced branch in Superduplex material for well construction

Resistance to pitting and stress corrosion of stainless steels in water" – depending on the temperature



The choice of materials for drinking water extraction plants, water treatment plants and seawater desalination is made according to project-specific criteria.



Pipes in 18 m lengths with welded flange in material 1.4571/TP 316L for a water treatment plant in Amsterdam/NL

Wide range of materials

In the water and sewage industry, stainless steel materials have become almost universal. The choice of material grades is governed by the purpose for which they are used:

- For industrial and drinking water with a moderate chlorine content, 1.4301, 1.4306 and 1.4541 are suitable
- For industrial and drinking water with increased chlorine content, 1.4401, 1.4404 and 1.4571 are suitable
- For process and cooling water with a relatively high chlorine content, 1.4429, 1.4435 and 1.4436 are suitable
- For springs and brackish water and sea water with a high chlorine content, 1.4439, 1.4462, 1.4539, 1.4529 and 1.4501 are suitable

- For the feed side of sea water desalination plants, depending on the salt content of the water used, TP 316L, 1.4435, Duplex or TP 904L may be suitable

Under particularly crucial operating conditions, nickel-based alloys or titanium should be considered.

Optimised material properties

Where there are special requirements, e.g. corrosion resistance, formability, strength or micro-structure, BUTTING optimises the properties of the parent metal and the longitudinal weld by heat treatment, to adapt them to the requirements.

There are various online and offline processes available for this: solution annealing, stabilising annealing, stress relieve annealing, recrystallisation annealing and soft annealing; followed by surface treatments such as blasting, grinding and full-body pickling.

Material processing

Apart from the appropriate choice of material and material-specific construction, the use of corrosion resisting steels requires the correct processing and adequate operating conditions. The groups of stainless steels can only reveal their good properties regarding corrosion resistance if the surface is free of tinting and ferrite during fabrication.

Stainless steels of the groups V2A and V4A

Material grade no.	Short name	AISI/UNS	Chemical composition (%)							Mechanical and physical properties			
			C ≤	Si ≤	Mn ≤	Cr	Mo	Ni	Other elements	0.2 % Yield strength (MPa)	1 % Yield strength (MPa)	Tensile strength (MPa)	Density (g/cm ³)
V2A stainless steels													
1.4301	X5CrNi18-10	304 / S30400	0.07	1.00	2.00	17.00 up to 19.50	—	8.00 up to 10.50	N ≤ 0.11	≥ 195	≥ 235	520–750	7.9
1.4306	X2CrNi19-11	304L / S30403	0.030	1.00	2.00	18.00 up to 20.00	—	10.00 up to 12.00	N ≤ 0.11	≥ 185	≥ 225	500–670	7.9
1.4307	X2CrNi18-9	304L / S30403	0.030	1.00	2.00	17.50 up to 19.50	—	8.00 up to 10.00	N ≤ 0.11	≥ 185	≥ 225	500–670	7.9
1.4541	X6CrNiTi18-10	321 / S32100	0.08	1.00	2.00	17.00 up to 19.00	—	9.00 up to 12.00	Ti = 5 × C up to 0.70	≥ 185	≥ 225	500–720	7.9
1.4550	X6CrNiNb18-10	347 / S34700	0.08	1.00	2.00	17.00 up to 19.00	—	9.00 up to 12.00	Nb = 10 × C up to 1.00	≥ 185	≥ 225	500–720	7.9
V4A stainless steels													
1.4401	X5CrNiMo17-12-2	316 / S31600	0.07	1.00	2.00	16.50 up to 18.50	2.00 up to 2.50	10.00 up to 13.00	N ≤ 0.11	≥ 205	≥ 245	520–680	8.0
1.4404	X2CrNiMo17-12-2 / X2CrNiMo17-13-2	316L / S31603	0.030	1.00	2.00	16.50 up to 18.50	2.00 up to 2.50	10.00 up to 13.00	N ≤ 0.11	≥ 205	≥ 245	520–680	8.0
1.4571	X6CrNiMoTi17-12-2	316Ti / S31635	0.08	1.00	2.00	16.50 up to 18.50	2.00 up to 2.50	10.50 up to 13.50	Ti = 5 × C up to 0,70	≥ 205	≥ 245	520–690	8.0
1.4580	X6CrNiMoNb17-12-2	316Cb / S31640	0.08	1.00	2.00	16.50 up to 18.50	2.00 up to 2.50	10.50 up to 13.50	Nb = 10 × C up to 1.00	≥ 220	≥ 260	520–720	8.0



To optimise the surface properties, products are blasted

Care right down the line

After their fabrication, stainless steels must have the same corrosion resistance – especially when used as welded joints – as the parent metal. It is therefore very important to provide a bright metallic surface, i.e. it must be completely free from tinting, scale and ferrite contamination. This is why BUTTING recommends the prefabrication of pipework components at the factory, as the whole component can then be treated to full body pickling. This production step also minimises the time-consuming and cost-intensive process of environmentally unfriendly pickling on the construction site.

Optimum pickling conditions

BUTTING has a number of ways of producing a corrosion resisting surface of the components. Chemical full-body pickling remains the most reliable method of eliminating ferrite contamination and tinting, as well as grease left over from production. BUTTING subjects all stainless steel pipes, fittings and components to this kind of full-body pickling. This ensures that the part is clean and that the necessary corrosion resisting passive layer is formed even in otherwise inaccessible places. We have a number of 20.0 × 4.0 × 2.0 m pickling baths, plus 16 pipe pickling baths up to 27 m long.

This means that BUTTING has many different options for surface treatment of the prefabricated components and vessels. In our factories, very large components and vessels can also be treated by spray pickling, if required.

Alternative surface treatments

In water treatment and sewage plant construction, planners and operators make high visual demands on the quality of the external surface of pipes and piping components. BUTTING has the skill and capacity for various forms of surface finishing. In addition to chemical surface treatment, customer-specific requirements are met by



Our products can be blasted with glass beads to meet visual requirements

Caption: Full-body pickling of prefabricated castings assures the quality of the pipework system



means of mechanical processes, in particular grinding inside and outside surfaces. Grinding – inside and outside – can prevent incrustation and ensure that water drainpipes are cleaned in the best possible way. For external grinding, BUTTING uses radial grinding machines. Both radial and axial grinding machines are available for grinding the inside surfaces.

Shot-blasted products

Our products can also be treated by shot-blasting with different types of grit. Our centrifugal machine is designed for components from 4 m to 12 m in length and 114 mm to 762 mm in diameter. We can also offer glass bead blasting as a further service.



The selection of materials for pipes helps to reduce costs in the construction of sewage plants

Cost-containing selection criteria

With the increasing pressure of competition in many markets, the need for projects to be economical is increasing all the time. In the field of sewage and water plants, too, there is a constant search for ways of increasing efficiency. Particularly in the preparation of technical specifications, potential savings can often be tapped and exploited.

The following decision factors should thus be closely analysed and taken into consideration as early as the planning phase to make optimum use of resources while maintaining quality.

- Choice of materials appropriate to the field and media
- Appropriate sizing and choice of semi-finished products
- Selection of the best possible manufacturing processes

Choice of materials appropriate to the field and media

The construction materials for sewage and water plants have to cater for a number of factors and environmental effects. Corrosion resistance when exposed to aggressive media and atmospheres and variations in temperature must be maintained at all times. There are general recommendations for the use of pipes made from stainless steels (see pages 9 and 10), which need to be adapted to project-specific operating conditions. Apart from corrosion resistance, the availability of the materials also needs to be taken into account when making a selection. For example, this would avoid inviting tenders for bolts and fixings in grades 1.4541 or 1.4571, as these grades are not generally used for bolts. Instead, bolt manufacturers meet the market demand from stocks of the molybdenum-free materials of type 304L or the molybdenum alloy grades of type 316L, which are now the standard internationally also. If a project absolutely demands material 1.4541 or 1.4571 for all components including bolts, they must be produced by a cost-intensive individual production process. From an application standpoint, i.e. both in corrosion and strength behaviour, there is no relevant difference between the variants for this type of use. The bolt material can be selected from the standard grade available without any discernible loss of quality.

Because of the higher strength values, semi-finished products in stainless steel can be designed with thinner walls



The optimum choice of materials then allows potential savings of several percentage points to be realised right away.

Appropriate sizing of semi-finished products

In the past, the sizing of semi-finished products for projects was often based on steel pipes, or precisely calculated from the expected operating pressure. In contrast to this widespread practice, pipes in stainless steel, with their higher strength values, may be designed with thinner walls. For products made of stainless steel, according to AD data sheets B1 and B0, the extra wall thickness to compensate for the strength tolerance and corrosion/wear is no longer required. A corresponding reduction in the wall thicknesses of pipes and fittings means – particularly with rising global raw material prices – an increase in economic efficiency of several percentage points over the whole project. When sizing semi-finished products however, thinning of the wall caused during manufacture must also be taken into account.

Optimum manufacturing processes

Alongside the possible savings mentioned above, the choice of the best possible manufacturing process constitutes a further potential. Here is a selection of conceivable alternatives:



BUTTING makes extensive use of prefabrication to reduce costs

- **Integrated bends**

By default, elbows are produced in the desired radii and joined together with circumferential welds according to the isometric drawings provided – sometimes on site. Apart from the risk to quality, a large number of circumferential welds also entails higher costs, caused by the necessary welding work and additional testing. These circumferential welds can often be avoided in production and the welded elbow according to DIN 2605 type 2 or 3 replaced with an integrated bend according to DIN 2605 norm 5.

What is more, this quality-improving work is carried out under workshop conditions, not on site, whereby the advantages of prefabrication in terms of environmentally harmful factors come into their own.

- **Beading on the pipe**

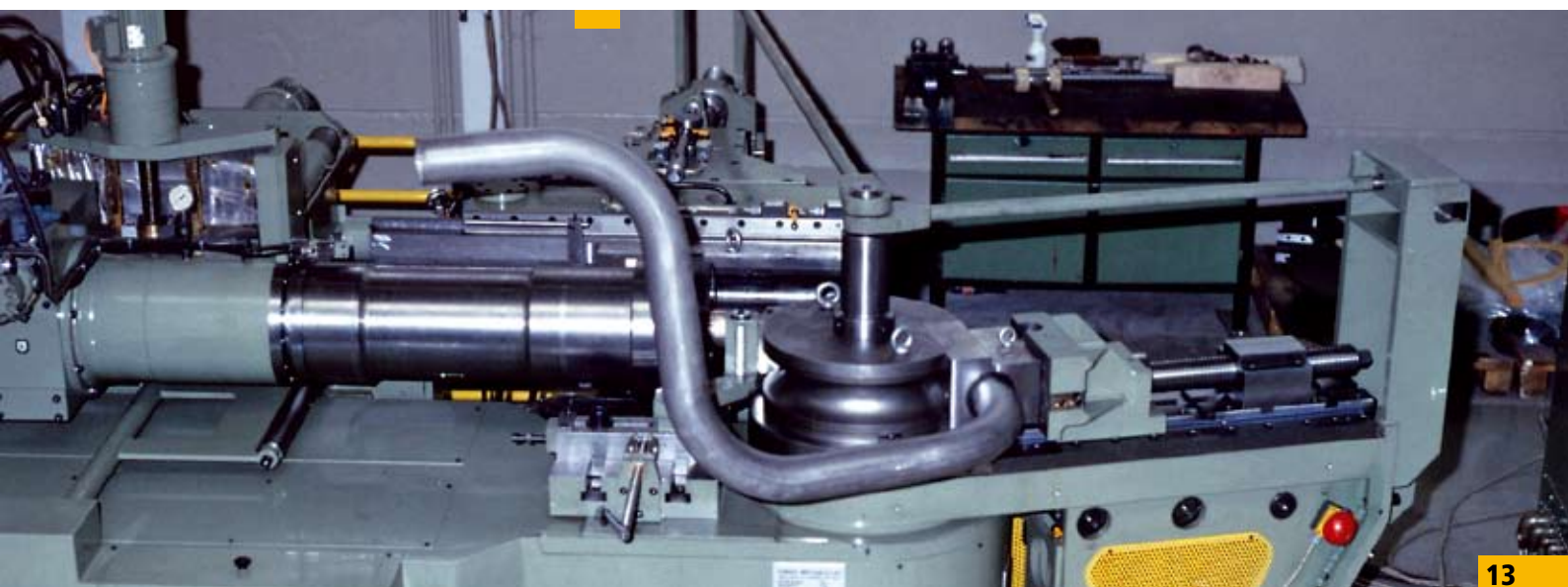
Depending on the operating pressure of the specific plant, the use of welded on flanges may also be avoidable. Instead, the option of “pipe beading with loose flanges” should be taken. Here, the bead is created by forming the pipe ends into a collar. The avoidance of circumferential welds guarantees a high-quality finish, while also realising financial savings from reduced testing, savings on fittings and on welded joints.

- **Branches**

It is also important to check whether the flow conditions necessitate the use of saddles. At low flow speeds, we recommend butt-welded branches instead. These are more cost-effective.

By considering the selection and construction criteria given as examples above in the various decision-making areas, potential cost reductions can be realised even at the technical specification stage. Apart from the options set out here, there are certainly many other ways of optimising the specification of materials and designs and the manufacturing processes. Get in touch with us, we will be happy to assist you.

The production of integrated bends guarantees improved quality



Water supply and waste water management

In more than 100 projects to date, companies in the water and sewage industry throughout the world have relied on the longevity and reliability of BUTTING's pipe systems. Water and sewage plants in Germany, Switzerland, the Netherlands and Greece, and all the way to Russia and China, are equipped with our pipes. Some reference projects are described here. We will be happy to send you a full list of references on request.

BUTTING prefabricated the pipes for the water treatment plant I in Munich so extensively that no more welding work was required on the construction site. For the NB 450 tank head pipeline for 10 tanks, a total of 2,300 m of piping components were glass bead blasted by BUTTING for optical reasons after their prefabrication and protected with chlorine-free foil for transport to the assembly site.

BUTTING used material 1.4462 to make the pipes for the waste water system of an ethylene and propylene producing plant operated by Linde/Ruhr Öl. This stainless steel was chosen by the customer for its excellent corrosion properties, and processed by us in the light of the specific material characteristics.



Prefabricated pipework components for a sewage plant in the Netherland

Isometric drawings produced by BUTTING

For the drinking water treatment plant at Halbergmoos near Munich, BUTTING supplied and assembled the stainless steel pipes in material 1.4571 in sizes from NB 50 to NB 600. We were also responsible for the production of all the isometric drawings in the planning phase, and when assembly was complete, for producing the drawings for the final bill.

The two water treatment plants at Gut Marienhof and Gut Grosslappen today share the work of cleaning the waste water in Munich. Around 140,000 domestic waste pipes and 70,000 street drains discharge about 180 million cubic metres of waste water into the two Munich treatment plants. BUTTING was charged with producing isometric drawings based on the pipework plans, along with drawing up isometrics for billing. For the pipework to the digestion tower, BUTTING supplied



BUTTING has been supplying the water and sewage industry for over 25 years

over 8,000 m of pipes in sizes from NB 25 to NB 500. As well as prefabricating the pipes in material 1.4571, we were also entrusted with assembly, for quality and cost reasons.



Director Dr. Iris Rommerskirchen inspects assembly on site in Halbergmoos in Germany together with site manager Peter Klages

The equipment for a sewage plant in Greece also included the provision of large longitudinally welded pipes



The largest water treatment plant in Europe was built on the coast at Piraeus for the 2004 Olympic Games. BUTTING was awarded the contract for producing the required pipes and piping components made of 1.4571 and TP 316L for this plant, with a total weight of around 400 tonnes. The 13,500 m of pipes in sizes from NB 50 to NB 1 400 were made in wall thicknesses from 2.0 to 8.0 mm.

100 % factory prefabrication

For the construction of the Amsterdam-West biological sewage plant, BUTTING was already involved from the planning and construction phase, and commissioned to supply the materials and to prefabricate the pipes.

Our production and delivery covered pipes from NB 50 to NB 1 000 with wall thicknesses from 2 to 10 mm in materials 1.4571 and TP 316L. The customer for this project, covering approx 200 tonnes of pipes, specified 100% factory prefabrication of the main air duct and the circular tanks. Altogether, we manufactured 161 aeration lattices in varying sizes. For these lattices, we produced 1,900 m of NB 150 air distributor pipes with welded on caps and 3,000 NB 80 pipe extrusions. 8,185 m of NB 80 aeration pipes were provided with 22,600 laser-cut holes (diameter 5.0 mm) and the associated weld studs to attach the aerator plates, and then joined to the air distributor pipes with circumferential welds.

Pipe systems from BUTTING after assembly in a sewage plant



Deliveries worldwide

BUTTING has been well known as a reliable partner in this sector for many years. For example, we supplied the water plant in Syndical in Italy with the semi-finished products such as pipes, elbows and components, and the prefabricated pipes in material 1.4571. The Jebel Ali sewage



Your contacts for the water and sewage industry (L to R) Corinna Forjahn, Walter Henke, Diana Langner, Alexander Schlundt

plant in Dubai was equipped with BUTTING pipes in sizes from OD 33.4 mm to 1,200 mm. Our delivery included over 500 tonnes of pipes in material TP 316L.

For a sewage plant in Moscow, BUTTING covered the entire need for stainless steel products, both the pipes and fittings and the prefabricated components in material 1.4571. The pipes with outside diameter NB 800 were assembled on site by a Russian plant construction company.

With its contribution to the construction of the sewage plant in Zhapu City in China, our family faced quite a new challenge. For this project, BUTTING assumed responsibility for the prefabrication of the pipes in Knesebeck. Following delivery in China, our subsidiary in Shanghai, BUTTING China, handled the assembly on site. This division of labour, and the high-quality work at both locations, brought significant synergy effects for our customer.

Production of special components

For decades, apart from supplying and assembling pipes, the range of services from BUTTING has also included producing ready-to-install special components according to customer specifications. For example, we were awarded the contract to produce a lobster back bend as an intake pipe for an overflow system in Glashütte. At 4,340 x 4,970 x 4,180 mm (W x L x H) and a diameter of 3,500 mm, the elbow was of imposing dimensions. The individual segments were prefabricated, welded together and 100% X-rayed in the factory, and provided with flanges on both ends for fixing purposes. Because of its excessive width and height, the 10-tonne elbow had to be sent as a special load. With factory prefabrication, BUTTING guaranteed high processing quality, reducing the costly assembly element to the benefit of our customer.

Our contribution to a sewage plant: 161 aeration lattices, 22,600 laser-cut holes, 3000 pipe extrusions

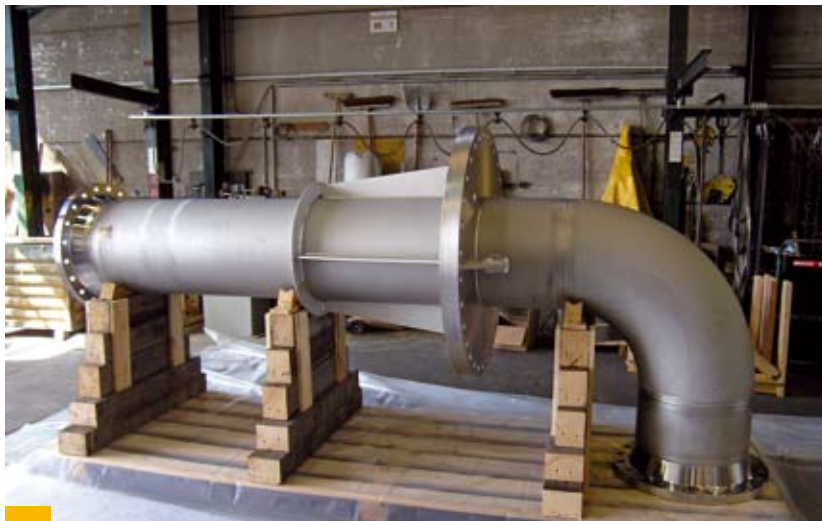


BUTTING supplies everything from one source – including vessel



Well equipment

For several years, BUTTING has supplied the drilling and well building industry with pipes and prefabricated components that offer a high degree of operational safety and corrosion resistance. Customised special production, extensive experience and skill make us an ideal supplier of riser pipes, filters, flanged and threaded pipes, as well as sealing systems (seal packers) and well heads. BUTTING produces these high-quality products – some from special alloys – for well-known customers in this sector all over the world, such as KSB in Frankenthal and Brazil, and Pleuger in Hamburg.



For corrosion protection reasons, Duplex material is used for prefabricated pipe systems for drilling and well equipment

Water for the desert

For the "Great Man Made River" project in Libya, the world's largest ever project to obtain drinking water in the desert, BUTTING supplied pipes and fittings with

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a total weight of 3,000 tonnes. Our experience went into producing 18 5/8 (473.1 × 11.05 mm) and 10 3/4" (273 × 8.9 mm) casings including API threads and double sockets. To connect the screen filter to the pipe/thread, we developed a combined weld procedure in-house, using laser and electron beam welding.

Well heads in special materials

For many years now, BUTTING has been receiving more and more interesting orders from longstanding customers in this

industry. For example, we were commissioned to produce a number of riser pipes and well heads of particularly impressive dimensions. The production of these components, each weighing 1 tonne, with an outside diameter of 508 × 9.53 mm for the pipe and an overall dimension of 3,155 × 1,000 mm posed a particular challenge because of the tight tolerances of form and position. The well heads are used on drilling platforms to transport sea water which is used as process water. In order to assure corrosion resistance in the aggressive saline sea water, Duplex and Superduplex materials were used.

Symbiosis between traditions craftsmanship and modern engineering knowledge: cooler-riser for well construction



Sea water desalination

In order to provide people all over the world with sufficient drinking water, diverse technical processes to obtain drinking water from brackish water or sea water have been developed under varying local water management conditions. BUTTING supports economical new methods with its know-how and high-quality products.

We have been supplying pipes, fittings and components in highly corrosion resisting materials for such plants for over 20 years. From Israel, Kuwait and Qatar to Saudi Arabia and the United Arab Emirates, our products are involved in obtaining drinking water.

Special alloys for special demands

In 1983, for example, we supplied pipes in 1.4529 (UNS S31254) for a plant in the United Arab Emirates, which was followed by a number of projects worldwide. In 2003, the newly developed material Superduplex (UNS S32750) was chosen for the first large-scale desalination plant in Israel, to meet its anti-corrosion requirements. BUTTING was awarded the contract to produce over 110 tonnes of pipes with outside diameters from 762.0 to 914.0 mm for the Ashkelon project from individual plates and deliver them in time.

Large wall thicknesses for high pressure levels

As part of a strategic programme for the widespread use of sea water desalination in the Israeli water industry, another plant



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of a comparable size was commissioned at Hadera on the Mediterranean coast. For this plant, designed for an annual throughput of 100 million cubic metres, BUTTING supplied more than 57 tonnes of pipes ranging from 4" to 14" in material 254 SMO. Of these, for example, we produced 1,000 m of 168.3 x 7.11 mm pipe in our discontinuous production process. We also worked more than 162 tonnes of Superduplex plates into pipes of various sizes with large wall thicknesses, e.g. 36" x 23.84 mm, to handle the increased operational pressure requirements.

Pressure exchangers with tight tolerances

Apart from producing and supplying pipes and prefabricated components, we also work with our partners in this field to create project-specific solutions. For use in reverse osmosis, one customer developed a system which substantially reduces energy costs through hydraulic force transfer. The core of this system is a pressure exchanger made from BUTTING pipes. The 273 x 12 x 8,900 mm pressure exchanger pipes that we produced for this were subject to very tight tolerances, in order to

assure smooth running of the internal pig and to prevent any mixing of saline and desalinated water. The maximum variation in inside diameter was just ± 1.0 mm. In the course of quality assurance, the welds were subjected to a 100% X-ray testing and a 10% dye penetrant test, and the pipes were exposed to a pressure test at 100 bar for 30 minutes.

In this pressure exchanger pipe, the tightest tolerances have to be maintained to assure smooth running of the internal pig



Distributor pipes for a sea water desalination plant



The squareness of the ends had to be within a tolerance of 0.3 mm, and the true running of the flanges and the parallelism of the flange ends were not allowed to be out by more than 0.2 mm.

Nations all over the world, especially in dry but energy-rich countries, will increasingly focus on the construction of sea water desalination plants. Activities in this market segment make us confident that we can also make our contribution to obtaining vital drinking water.

Approved world-wide

The Quality Management System of BUTTING is approved by Germanischer Lloyd according to DIN EN ISO 9001. BUTTING also holds approvals from classification companies and third party inspectorates, like Bureau Veritas and BDLI and renowned companies.

A great number of testing installations

As regards non-destructive testing, the following equipment is available at BUTTING:

- Radiography
- Eddy-current testing
- Radioscopy
- Ultrasonic testing
- Endoscope
- Surface roughness measurements
- spectroscopic examination

The following destructive tests are performed in the internal laboratory:

- Corrosion tests
- Hardness tests
- Ferrite determination
- Tensile tests
- Technological testing
- Metallographic examinations
- Spectroscopic analyses



Tensile Test



Loading a muddy water pipe onto a truck

Quality assurance during transport

The stainless steel pipes and components are packed in customized pallets/wooden cases/crates to avoid any direct contact with the transport and handling equipment. For special requirements on the inside surfaces, e. g. for piggable pipes, these will be protected by special caps. Logistic processes are rendered more efficient by the various packing methods we use. The loading and off-loading times are reduced, less safety measures are needed, easier trans-shipments in case of collect freight and storage of unit loads, without additional equipment.



508 x 9.53 mm riser pipes wrapped in foil ready for dispatch

Radioscopic examination (real time radiography) – Jörg Müller





Longitudinally welded pipes

Produced continuously from coil in sizes of 15 mm – 762 mm OD and wall thicknesses up to 16 mm

From plate: in sizes of 33.7 mm – 3,000 mm OD and wall thicknesses up to 60 mm

Pipes in special shapes

In random length up to 24 m with circumferential welds



Clad pipes

Mechanically bonded BuBi®-pipes in sizes of 114.3 mm – 660 mm OD

Metallurgically clad pipes

In random length up to 24 m with circumferential welds



Vessel construction

Up to 6,000 mm OD: complete prefabrication at the mill

Above 6,000 mm OD: prefabrication at the mill and assembly on site



Pre-fabrication

Piping components ready for assembly

Pipe bends acc. to drawings, piping segments, isometric drawings



Fittings

Tees, reducers, special fittings

Pipe bends acc. to DIN 2605

Collars acc. to DIN 2642

Elbows with long radii



Piping technology

Pipes with special tolerances, e.g. furnace rollers, jackets for pumps

Pipes with special surface requirements e.g., for the pharmaceutical industry, architecture

Further processing of pipes using forming, grinding, laser cutting, e.g. jackets for pumps, valves and lamps

Special products, e.g. BUTTING HeRo® (an uncooled furnace roller)



Assemblies

Vessels

Linepipes

Special constructions, equipment



Surface treatment

Pickling (also on subcontract basis)

Blasting, peening (also on subcontract basis)

Grinding (also on subcontract basis)



Services

Expert technical and metallurgical guidance

CAD-facilities, isometric drawings

Metallurgical testing and non-destructive testing

Material selection

- Steels containing 10.5 % Cr min, e.g.
 - Stainless steels
 - Heat resisting steels
 - Creep resisting steels
- Nickel alloys
- Titanium
- Aluminium and aluminium alloys
- Special alloys
- Clad materials

Approvals

- By TÜV acc. to AD-WO/HPO and TRD 100/201 and DIN EN 729-2
- DGRL (pressure equipment directive)
- Acc. to the water supply rules (WHG) § 19 I
- Quality Management System acc. to DIN EN ISO 9001:2000
- Accreditation of the laboratory acc. to DIN EN ISO/IEC 17025:2000
- Statement of Assessment ASD-EASE acc. to EN 9100 (without design)
- Environmental Management System acc. to DIN EN ISO 14001
- Work Safety Management acc. to OHSAS 18001

Photographs

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Aerial view BUTTING Knesebeck



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