

# EXPERTISE PRODUCTS AND SERVICES



# “PROCESS RELIABILITY

is our motivation – for processes in the semiconductor, pharmaceutical and biotechnology industries. “



## We connect processes with the highest purity

Dockweiler is a leading international manufacturer of stainless steel tube systems. The core business is the development of installation solutions for handling fluid and gaseous media in the semiconductor, pharmaceutical analytical and fine chemistry industries.

### Our manufacturing expertise is your advantage

Thanks to our manufacturing expertise, we find solutions which are economical and offer high process reliability. Consultancy and services are key components for us because our customers see us as an engineering partner.

Our specialists have extensive knowledge about all specifications and consult competently on choosing the right products. Our engineers plan and develop tailor-made components with you and see it through to implementation.

### Cutting-edge products for processes with the highest purity

Dockweiler supplies standard products such as tubes and fittings for highly technical sectors. We also offer tailor-made installation solutions, which fulfill the highest requirements for purity and precision. With inventory holdings of more than 1,500 Kilometers in tubes and approximately 1 million fittings, we guarantee speedy availability.



### Customer service from the very start

The demands on industrial processes have increased steadily in recent years. The most important indicator of our performance is successful collaboration with our customers. Our service begins right at the planning stage: In addition to our product range, Dockweiler has continually developed its service features.

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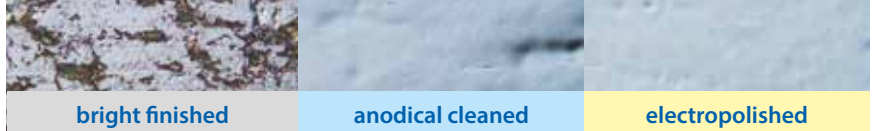




## Surface Treatment

## Treatment of inner surfaces for high purity

We have decades of experience in mechanical and electrochemical **surface treatments and finishes** and we offer **optimal quality for high purity industrial applications**. In addition to standard fittings and tubes, we also finish complex special components such as manifolds, CIP lances and bubblers. The spectrum of treatments ranges from **staining to mechanical processes** to ultra pure **electrochemical polish**. This 380 x magnification illustrates the differences between the surface treatments:













In anodic processes, the material is cleaned with a stripping force of 3 to 5  $\mu\text{m}$ . **The material stripping is significantly higher for the electropolishing process: which is up to 20  $\mu\text{m}$ .**

**ELECTROPOLISHED INNER SURFACE –**  
Extremely smooth and pure with a surface quality  
of up to  $Ra \leq 0,13 \mu m$






## Qualities for Liquids

bright finished (SF1)	bright finished (H3o)	bright finished (H4o)
–	anodical cleaned (H3o)	–
electropolished (SF4)	electropolished (HE3o)	electropolished (HE5o)

## Qualities for Gases

		
<p>TCC *</p>	<p>finetron</p>	<p>ultron</p>
<p>* Inner and outer surface is not defined / Ra value <math>\leq 0,80 \mu\text{m}</math> (32 <math>\mu\text{in}</math>) on request</p>	<p>finetron</p>	<p>ultron</p>

bright finished	bright finished	–
anodical cleaned	–	–
–	–	electropolished





Collaring

We know how

The collaring of T pieces, CIP lances or manifolds is well-developed Dockweiler know-how. **Closely-spaced branches** often pose a technical challenge. This is routine for our specialists. In combination with our welding expertise, products are created which are characterised by a **particularly compact and flow-optimized construction**. Included in this are excentric branches and branches with various angles (for example, T-pieces with 45 degree branches).

Benefits of Collaring Technology

- homogeneous transition contour from the main tube to the branch tube
- streamlined flow behavior
- effective welding preparation
- complete reduction in space for example in the production of manifolds
- compact component geometry

IO WELDING TECHNOLOGY FOR COMPLEX GEOMETRIES

Find out how that works here ▶



Welding Technology

Decades of experience in cutting-edge technology

Dockweiler is a pioneer in the area of orbital welding. **With the 3D inside out welding technology (IO welding) we have developed new and exciting opportunities for innovative production capabilities.** In this way, closely-spaced branches and those with lower dead space are produced in a highly-efficient manner. This 3D internal orbital welding technology is **ideal for complex geometries** and innovative components.



Benefits of Welding Technology

- 3D internal orbital welding technology for complex geometries such as 45° or 60° branches and saddle welds
- precisely reproducible welding processes due to a parameter database and automatization
- consistent quality thanks to Dockweiler orbital welding with pressure and residual oxygen monitoring
- minimization of  $\delta$  ferrite content
- low dead space and closely-spaced branches
- machine-controlled TIG processes
- 100% weld seam testing
- straightforward documentation with computerized processes



Cleanroom Production

High purity environment for high purity products

For products which are used in the semiconductor industry, production must take place in a high purity environment. There must be no contamination from foreign particles or residues. These conditions are only possible in the cleanroom. High purity products such as manifolds or Bubblers are welded, assembled, tested and packaged in the cleanroom.

For the most exacting requirements in cleanrooms, we rely on highly trained and experienced specialists. A high level of discipline and forward-thinking are among the demands we make of our employees. Regular training and further development in the area of cleanroom production ensures a high standard of product quality and thus your process reliability now and in the future.

Benefits of Cleanroom Manufacturing

- orbital welding of manifolds, UHP systems or complex vacuum systems
- assembly of components such as valves and bubblers
- quality checks and leak detection using Helium leak testing
- residue-free cleaning
- particle-free packaging
- from production to packaging: everything takes place in a self-contained work process



THE BEST WELD SEAM IS NO WELD SEAM

Find out how that works here ▶



3D Bending

Fewer weld seams for more reliability and purity

With our 3D bending technology, we are in the position to reduce the number of welding seams to a requisite minimum. This is particularly advantageous in complex tube systems.

Along with our collaring expertise and our welding know-how, we produce space-saving and dead-space-optimized solutions for custom applications.

Benefits of 3D Bending Technology

- minimization of weld seams for aspects of hygiene and safety
- CAD-construction and automatic production
- 3D measuring technology and documentation
- mid-process inspection for quality assurance



# “PRODUCTS FOR HIGH PURITY PROCESSES.”

Whether it's a standard product or a custom solution – everything is made to Dockweiler's high quality standard. ”



## Tubes and Fittings

### Standard Dockweiler products

Our standard products satisfy the highest surface quality and purity standards. They are used to transport fluids and gases in the semiconductor, pharmaceutical and chemical analysis industries, and further high tech industries. Our standard products include tubes, elbows, T-pieces, reducers and caps.



#### Technical Data

##### Dimensions

Imperial:	1/8" - 6"
ISO:	DN 8 - DN 200
Metric:	DN 4 - DN 150
Pipe:	DN/NPS 6 - DN/NPS 20

##### Materials

1.4404, 1.4435, UNS S31603 (316L), 1.4539, UNS N08367 (AL-6XN), UNS N08904 (904L), UNS N06022 (C22)

##### Surface

- $R_a \leq 0,80 \mu m$  -  $\leq 0,13 \mu m$
- bright finished, anodical cleaned, electropolished

##### Standards

ASME-BPE, DIN 11865, DIN 11866, ASTM A269/A632/A312 (pipe)

## COAX Tubes and Fittings

### The double-wall tube for critical media

With the COAX double-wall tube system we offer a safe solution for the safe transport of explosive, toxic, corrosive or highly viscous media. COAX consists of an internal process tube and an external safety tube. This allows for a control alert in a monitoring system for gas leakage. Another example could be steam monitoring for viscous media.

FOR CRITICAL MEDIA: ►  
The COAX double-wall tube system



#### Technical Data

##### Dimensions

Imperial:	1/4" - 1"
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##### Materials

1.4404, 1.4435, UNS S31603 (316L)

##### Surface

- $R_a \leq 0,80 \mu m$  -  $\leq 0,13 \mu m$
- bright finished, anodical cleaned, electropolished

## Presslok

### The alternative to welding

The Presslok system complements our product line. It allows for very quick, reliable and reproducible tube connections for process cooling water, inert gases or low-pressure systems, without any welding.



#### Technical Data

##### Dimensions

Imperial:	1/2" - 4"
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##### Materials

UNS S31603 (316L), UNS S30403 (304L)

##### Pressure Resistance

1/2" - 1 1/2": 20 bar and 2" - 4": 13 bar



Customized Fittings

When standard does not meet the requirements

Customized fittings manufactured to your specifications are the tailor-made solution when standard fittings do not meet customer requirements. Our service starts with drafting and extends to 3.1 documentation. Customized components include:

- **T-pieces with excentric branch** for residue-free drainage
- **branches with various angles**, e.g. 45° or 60°
- **flow-optimized Y-pieces**
- **180°-elbows with branch**, called “Point-of-Use” elbows



Technical Data

Dimensions

Imperial, Pipe, ISO, Metric

Materials

1.4404, 1.4435, UNS S31603 (316L), 1.4539, UNS N08367 (AL-6XN), UNS N08904 (904L), UNS N06022 (C22)

Surface

- $Ra \leq 0,80 \mu m - \leq 0,13 \mu m$
- bright finished, anodical cleaned, electropolished

Standards

ASME-BPE, DIN 11865, DIN 11866, ASTM A269/A632/A312 (pipe)

All custom fittings are prepared with weld-optimized ends. Finally they are appropriately cleaned and packaged. They are available in all current materials and in all Dockweiler surface qualities.

Connections

For a wide range of applications

We offer an equally diverse range of stainless steel tube systems with corresponding connections and gaskets in Dockweiler quality. For the safe connection of tubing components, our range includes aseptic screw connections, clamp or flange connections in accordance with demanding pharmaceutical standards, as well as standardized TriClamp connections.

For the highest purity and leak tightness, we offer our customers the patented ZeroCon connection and Dockweiler Cap.



Technical Data

Dimensions

Imperial: 1/4" - 1"

Materials

1.4404, 1.4435, UNS S31603 (316L), 1.4539, UNS N08367 (AL-6XN), UNS N08904 (904L), UNS N06022 (C22)

Surface

- $Ra \leq 0,80 \mu m - \leq 0,25 \mu m$
- bright finished, anodical cleaned, electropolished

Connection Components

To integrate instrumentation and control elements

Dockweiler connection components give you the option of integrating instrumentation and control elements to control temperature, flow rate and pressure in your system. These are manufactured for both gases and liquids, depending on the customer specification. Instrumentation T-pieces can be equipped with various sensors, which measure for example the flow rate while the system is in operation.

In addition to threaded, flanged or clamped connections, the Dockweiler connection components can also be equipped with the patented ZeroCon connection. With our many years of manufacturing expertise, we ensure low dead space design and a flow-optimized profile.

Technical Data

Dimensions

Imperial, Pipe, ISO, Metric

Materials

1.4404, 1.4435, UNS S31603 (316L), 1.4539, UNS N08367 (AL-6XN), UNS N08904 (904L), UNS N06022 (C22)

Surface

- $Ra \leq 0,80 \mu m - \leq 0,13 \mu m$
- bright finished, anodical cleaned, electropolished

PURGE TEE

For connecting measuring and control elements



Gaskets and O-Rings

Total traceability

Traceability from production to assembly is already an industry standard for quality stainless steel components. In contrast traceability for elastomers ends with installation. Without packaging a clear identification is no longer possible.

All Dockweiler gaskets are laser marked and satisfy USP Class VI and are made from FDA approved materials. This way, we are able to ensure total traceability, required in particular for pharmaceutical facilities.

Technical Data

Dimensions

Imperial: 1/4" to 6"  
ISO: 13.50 mm - 114.30 mm  
Metric: 6.00 mm - 154.00 mm

Materials

PTFE, FKM, PTFE/FKM, EPDM, VMQ, PTFE/316L, PTFE/EPDM



DOCKWEILER LASERMARKED GASKETS  
For total traceability



Flexible Hoses

PolyFlow – technical hoses

Dockweiler hoses made from high quality elastomer and thermoplastic produce flexible connections for system components. They have all necessary approvals (like FDA, USP, Class VI) and comply with the pharmaceutical requirements. For us, every hose is one of a kind: Lengths, connections and materials can be mixed and matched and are tailor made. TriClamp, aseptic connections, welding ends and ZeroCon are available as connectors. Dockweiler hoses are used in the chemical and pharmaceutical industries as well as the food sector and biotechnology sector. They are used wherever quick and flexible connections are required.

Technical Data

Measurements

Nominal Size: 1/4" - 2"  
Length: up to 40 m  
Temperature Range: from -60 °C to +180 °C

Material

Internal liner: EPDM, silicone, PTFE, PTFE electrically conductive (external)



◀ DIVERSE CONNECTION OPTIONS:  
Dockweiler hoses with TriClamp, aseptic connections, welding ends, ZeroCon and flared PTFE-liner

Flextron – the “flexible” stainless steel tube

The Dockweiler Flextron corrugated hose was developed for the semiconductor and fine chemical industries. The highest demands are placed on the purity of the process media in these industries. Flextron's electropolished inner surface allows for these requirements to be met in all aspects of the supply system - wherever a flexible connection is needed.

Flextron is manufactured from mechanically corrugated stainless steel (1.4404), as standard. An additional braid of stainless steel wire ensures a higher pressure resistance and protects the hose from damage. The unique combination of an electropolished surface and a flexible corrugated hose minimizes the risk of contamination and enables gas transport under full UHP conditions throughout the system. With Flextron, oscillations and vibrations can be decoupled and done to the highest purity standards.

Technical Data

Connection Sizes

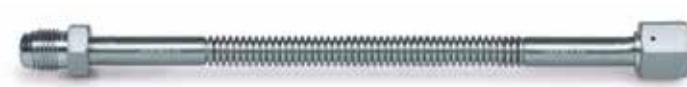
1/4" - 1"

Material

1.4404, UNS S31603 (316L)

Surface

- range from Ra ≤ 16 µin to ≤ 10 µin
- electropolished



Flextron with VCR connection



Flextron with ZeroCon connection



Flextron with optional wire braid and welding ends



With its components, Dockweiler ensures highly reliable, hygienic and efficient control in the production process. Depending on the application requirements ball valves or T-valves are used.

Ball Valves and Valves

T-valves

These components combine a premium diaphragm valve and high quality stainless steel tubing to reduce weld seams and dead space. We orbitally weld a valve body directly to a T-piece branch collar. This technique combines hygiene and cost savings in a pharmaceutical installation. The T-Valve is the ultimate alternative to Standard diaphragm valves with large dead space or very expensive block valves.



Ball valves

We categorize our ball valves into one-, two- and three-part versions. Ball valves are available with weld ends, VCR, compression fittings or flange connections, depending on the size and application. For valves with compression fittings, our VSR80 tube is the ideal combination.

Technical Data

Dimensions

Imperial, ISO, Metric

Materials

1.4435, 1.4404, UNS S31603 (316L), UNS N08367 (AL-6XN), UNS N08904 (904L), UNS N06022 (C22)

Surface

- Ra ≤ 0,80 µm - ≤ 0,25 µm
- bright finished, anodical cleaned, electropolished

Technical Data

Dimensions

Imperial, Metric

Materials

UNS 31603 (316L)/PTFE

Surface

- Ra ≤ 0,63 µm - ≤ 0,38 µm
- bright finished, electropolished



Customized solutions for the semiconductor and high-tech industry.

Dockweiler is one of the pioneers among the suppliers of UHP conduit systems. Since the introduction of PC's in the early 80's, the company has been developing and producing UHP tubing and fittings for the semiconductor industry. Today, Dockweiler offers components for all UHP media and processes: From thick-walled UHP tubes to prefabricated clean room manifolds. Options for flexible connection of ultra-pure gases, UHP process vessels as well as dead-space-free connection systems round off the product range.

Prefabricated manifolds

Prefabricated manifolds for UHP installations

Manifolds for utility lines are designed to simplify all UHP installations. Manifolds are necked out and then welded, tested and packaged in an ISO 14644-1 Class 4 cleanroom. The use of prefabricated manifolds reduces the overall installation and acceptance process of the system through faster purge time and reduced particle count.



Benefits:

- customized and efficient solutions for the semiconductor industry
- 100% helium leak tested:  $1 \times 10^{-9}$  mbar l/s
- Orbital welds for highest quality
- 3D data for design planning
- worldwide and fast delivery



Process Vessels

Double safety for the semiconductor industry and fine chemicals

Dockweiler process vessels for the semiconductor industry and fine chemicals ensure double safety when handling organometallic compounds: On the one hand, their design guarantees "process safety" when feeding ultra-pure media to critical manufacturing steps such as metal organic vapor phase epitaxy (MOVPE), a manufacturing process for sensitive opto-electronic components. On the other hand, the process vessels offer an additional plus in safety due to their absolute tightness (helium leakage rate  $\leq 4.0 \times 10^{-9}$  mbar l s<sup>-1</sup>) and robust design.

Dockweiler process vessels are manufactured to the highest manufacturing and quality standards: From melt specification to careful orbital welds and perfect electropolishing. Thus, the high-quality workmanship of the vessel ensures an optimal enrichment process, ideal utilization of the medium, best possible emptying, cleanability and reusability.

Dockweiler's process vessels are available for both solids and liquids.

Technical Data

Materials

1.4404, 1.4435, UNS S31603 (316L),  
UNS N08367 (AL-6XN),  
UNS N08904 (904L), UNS N06022 (C22)

Application Areas

for fluids (HPL and ECO series)  
and solids (HPS)

Volumes

from 200 ml to 56 l

Surface

- Ra  $\leq 0,80 \mu\text{m}$  -  $\leq 0,13 \mu\text{m}$
- bright finished, anodical cleaned, electropolished

MADE BY DOCKWEILER:  
Process vessels for organometallic compounds ►





Take advantage of the prefabricated components.  
For simple and smooth installations.

Experience in piping systems for transporting high-purity media is the Dockweiler „plus“: The safety and purity of production processes is the primary objective. In addition, improvements in design can increase productivity and simplify installation - synergies that our customers appreciate.



## CIP lances and CIP rings

CIP lances and CIP rings are precision-fit components for reliable, efficient and hygienic cleaning. The focus here is on low dead space and surface optimization.



### Benefits:

- customized and efficient solutions for the pharmaceutical and fine chemical industries
- extensive documentation
- manufactured with the latest welding technology
- 3D data for design planning
- worldwide and fast delivery



PREFABRICATED DOCKWEILER COMPONENTS:  
Efficient and precise fit ►



## Prefabricated components from Dockweiler

For small series and the development of individual components and prototypes, our team of specialists supports you with many years of application knowledge and translates your requirements into suitable special solutions. At Dockweiler, we do our very best to achieve this: the precise interaction of our manufacturing competencies results in prefabricated components for your specific application.

### Technical Data

#### Dimensions

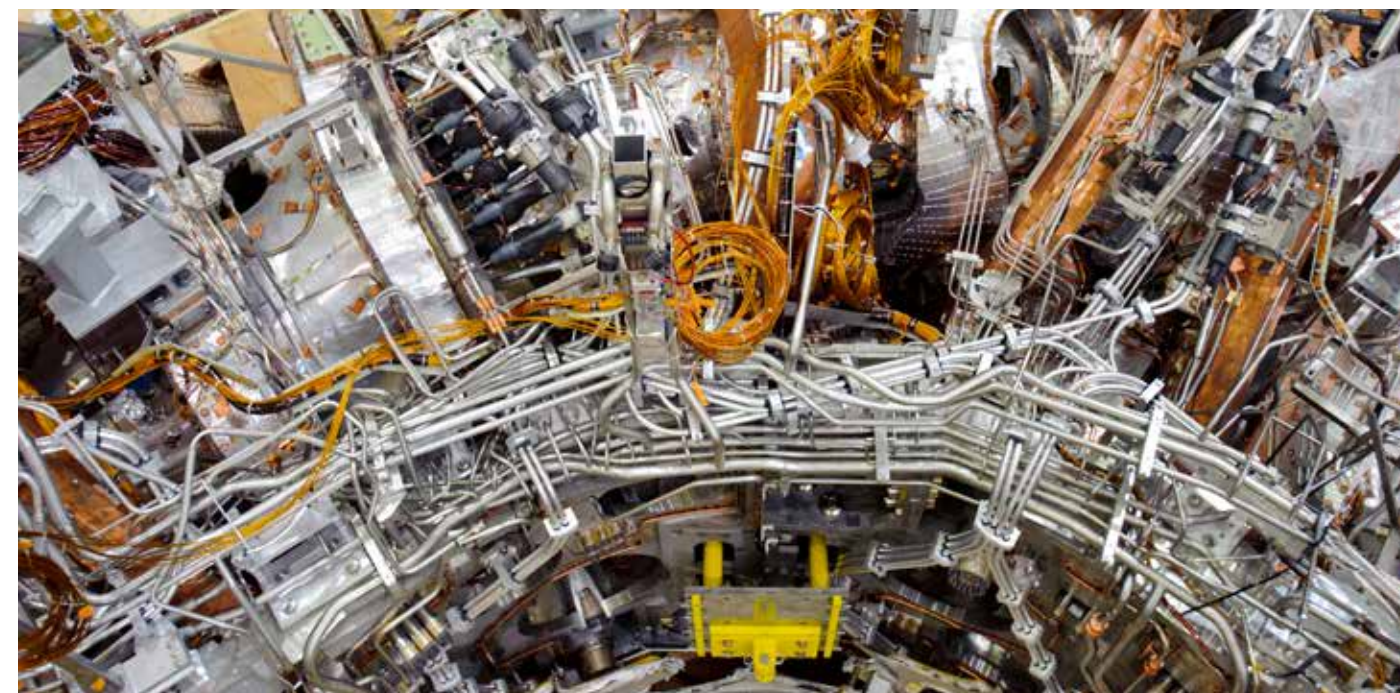
Imperial, ISO, Metric, Pipe

#### Materials

1.4404, 1.4435, 1.4539, 2.4602, UNS S31603 (316L), UNS N08367 (AL-6XN), UNS N08904 (904L), UNS N06022 (C22)

#### Surface

- $Ra \leq 0,80 \mu m - \leq 0,13 \mu m$
- bright finished, anodical cleaned, electropolished





# “DOCKWEILER-SERVICE FROM A TO Z

Our expert knowledge for your processes: analyses, assessments, consulting, training and much more for your success.”



## Laboratory Services

### Analyses, assessments and more

Quality is inextricably linked to our products and the manufacturing process. For example, a T-piece for the semiconductor industry is subjected to up to 50 different tests before it reaches the customer. Our Quality Department does not just put our own products through their paces. Dockweiler also offers a broad range of laboratory services for third parties.

Our services extend from Positive Material Identification (PMI), X-ray inspections, Cryo tests, surface analyses, corrosion tests to pure gas analyses and Helium leak testing. In our own laboratory, we will be pleased to carry out the tests required for your products.



## Material Consultancy and Metallurgy

### Which stainless steel material is the right one?

Are you not sure which stainless steel material is the right one for your application? Or would you like to know the difference between UNS S31603 and 1.4404? Our metallurgists will help you out and will be glad to advise you on the right choice of materials and on technical questions, such as weldability or corrosion resistance.

How does the sulfur content affect the welding seam or what properties does ferrite have? These are just a few of the common questions. Our experts offer consulting and technical support.

## Cleaning Processes

### For various industrial applications

Different industries and application areas have different requirements for the cleanliness of media contact surfaces. Thus Dockweiler offers a variety of different cleaning processes. From cleaning internal surfaces in accordance to ASTM A632, S3 or dry cleaning processes. Up to the most high-tech ultra pure and proprietary vacuum cleaning process with subsequent residual gas analysis. With our cleaning processes we ensure the cleaning of highly complex geometries and even capillary structures.

We supply the product purity you need for your process.



Engineering Services and Application Know-How

For technical customized solutions

We understand the specific challenges of diverse industries in the transport of high purity media. All our expertise flow together into our engineering know-how. In close contact with our customers we take ideas, rough sketches and develop them into tangible, technical, customized solutions. **“If you can draw it, we can make it”.**

Take advantage of our engineering services with optimized manufacturing processes, customer-specific solutions and new developments. With decades of know-how in the pharmaceutical and semiconductor industries we are engineering partner to industry and research.

Technical Documentation

Material and test reports also online

Dockweiler is taking documentation quality to the next level with the WebCert digital certificate portal. All our certificates and test reports are available via this optional service. It means that our customers can view documents online as soon as the goods leave our warehouse. This service is a big plus for plant operators in particular. Material test reports and production documentation are becoming increasingly important.



FIND OUT MORE:

You can find more information about WebCert here



Training

Know-how transfer from Dockweiler

We not only attach a great importance to the training of our employees, we also offer our customers the opportunity to undergo training at Dockweiler on “stainless steel tube systems”. In addition to regular webinars, we publish posts on YouTube for different topics.



We also provide interested installers, technicians and customers with the opportunity to study further directly in Neustadt-Glewe at one of our Dockweiler Academy events.



FIND OUT ONLINE:

Link to our YouTube channel



Logistics and Warehouse Service

All-round logistics service

In six international central warehouses, Dockweiler has around 1,000,000 meters of stainless steel tubes and a good 1 million fittings at its disposal. With the help of a well-balanced international supply chain, we secure our supply chains in the best possible way. In addition to classic consignment warehouses, Dockweiler also offers containers and swap trailers and containers as mobile storage on construction sites. The contain-

ers can be used to execute installation and production projects (SKID manufacturing or distribution system installations).

Since 2011 we have been an AEO(C) authorized economic operator by customs and since 2013 we have been certified as a known consignee. This guarantees faster customs clearance and thus shorter delivery times.







Highest Quality from Raw Material to Delivery

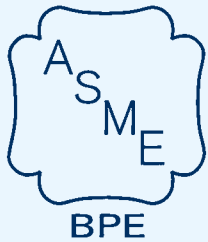
Complete documentation and traceability of the products

Quality is closely linked with our products and the manufacturing process. A T-piece for the semiconductor industry is, for instance, tested up to 50 times before it reaches the customer. All individual steps are continuously documented and archived. Our quality assurance guarantees the complete traceability of our products. Our customers have the option of accessing all relevant data online via the WebCert certified document management system.

Consulting and service are key components of Dockweiler quality. Expert and detailed knowledge of the relevant international specifications mean competent advice in the selection of the right products. Our engineers plan and develop customized components with you and support their implementation. This underscores that for us quality is much more than just making products.

We constantly look for ways to optimize and redesign products and processes with and for our customers. We support you with innovation in their applications, today and in the future.

Quality right from the start:  
With up to 50 tests per component ▶



All certificates are available on our website:  
[www.dockweiler.com](http://www.dockweiler.com)



DIN EN ISO 14001  
DIN EN ISO 9001



AD 2000 HPO  
DGRL 2014/68/EU and  
AD 2000 WO



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