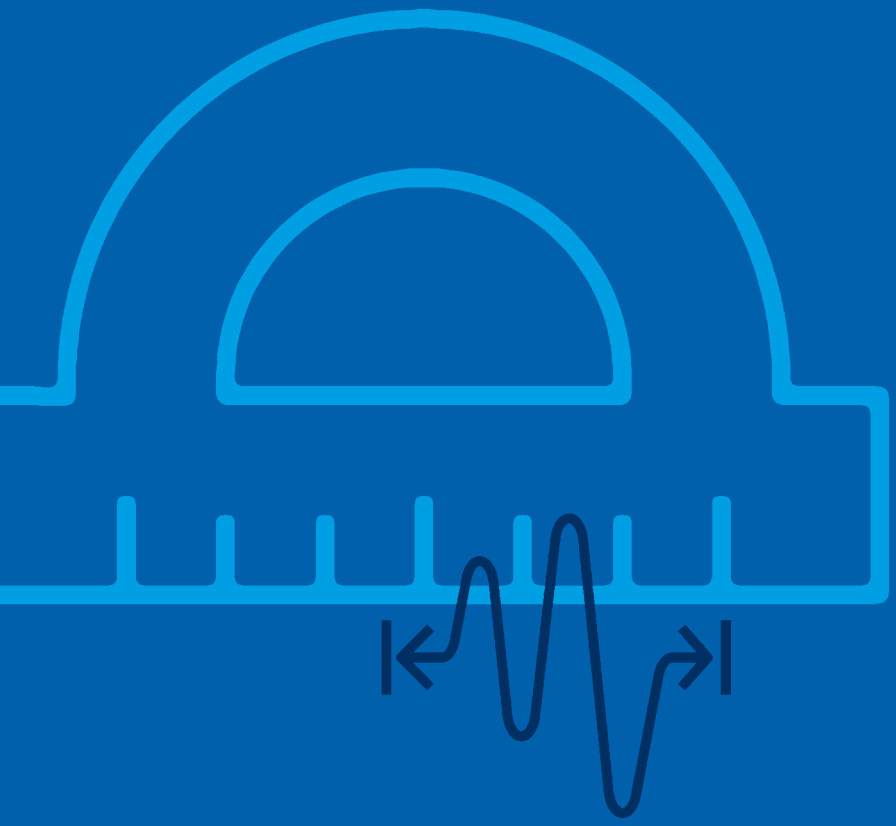
DOCKWEILER

connecting flow to purity

SPECIFICATIONS

FOR TUBES, PIPES, FITTINGS AND CONNECTIONS



FOR SEMICONDUCTOR AND HIGH-TECH INDUSTRIES

- ultron
- finetron
- TCC

FOR PHARMA, BIOTECH AND OTHER LIFE SCIENCE INDUSTRIES

- ASME BPE Certified

NORTH AMERICA

For UHP gas applications in semiconductor industry and fine chemistry

ultron

ep **electropolished**
cleanroom cleaning and packing

1. SURFACES QUALITIES

Tubes and fittings:	Inner surface (ep)	Outer surface
ultron	Ra $_{avg.}$ ≤ 10 µin (0.25 µm)	Ra $_{avg.}$ ≤ 40 µin (1.0 µm)
ultron VIM-VAR	Ra $_{avg.}$ ≤ 7 µin (0.18 µm)	Ra $_{avg.}$ ≤ 40 µin (1.0 µm)
On request:	Ra $_{avg.}$ ≤ 5 µin (0.13 µm) Ra $_{avg.}$ ≤ 7 µin (0.18 µm) Ra $_{avg.}$ ≤ 15 µin (0.38 µm)	

Pipes:	Inner surface (ep)	Outer surface
ultron	Ra $_{avg.}$ ≤ 20 µin (0.51 µm)	Mill finish, RA not defined

Additional notes:
- Pipes and fitting will be supplied with a square cut. Different end preparations may be agreed on.
  Other specified surfaces or ends are available upon request.
- The Ra value in the cold worked area of fittings (inner and outer surface) and on the surface of circumferential welds is not defined. For dimensions OD < 1/4" (6.35 mm) roughness is not defined.
- Free of oil and grease acc. to CGA G-4.1-2018 and ASTM G93 – level A.
- Electropolishing procedure acc. to Dockweiler guideline Doc. 8.4-40/3.1/3.3.1
- Cleanroom cleaning and packing (Federal Class 10 / ISO Class 4)

2. MATERIALS

ultron	1.4404 / UNS S31603 (316L) 1.4435 / UNS S31603 (316L) UNS S31603 (316L)
ultron VIM-VAR	UNS S31603 (316L) VIMVAR double melted stainless steel acc. to ASTM A 269/A 632 for OD tubing (Imperial)

Hardness equivalent to:
- max. 180 HV* according to DIN EN ISO 6507-1
- max. 90 HRB* according to DIN EN ISO 6508-1

* comparable to ASTM E-384 (HV) and ASTM E 18-22 (HRB)

3. DIMENSIONS

Tubes and fittings:	**Imperial** according to ASTM A269 / A270 / A632	
OD x WT:	1/8" x 0.022" to 6" x 0.109"	3.18 x 0.56 mm to152.4 x 2.77 mm
Length:	OD > 1/4": min. 19.36 ft to max. 19.98 ft (6000 mm -100/+90) OD < 1/4": min. 9.51 ft to max. 9.84 ft (2950 mm ± 50)	

Pipe:	**Pipe** according to ASTM A312	
Dimensions:	NPS 8, 10, 12 Schedule 10S	Length: min. 19.36 ft to max. 19.98 ft
Manufacturing process:	Seamless Tubes ≤ 1" OD (25.40 mm)	Welded tubes ≥ 1 1/2" OD (38.10 mm)

4. QUALITY AND TEST PROCEDURES

- Verification of basic test certificate
- Visual inspection
- Endoscopic inspection of bright finished tubes
- Verification of dimensions
- Roughness measurements
- Conductivity test (DI water)
- TOC-measurement of DI water
- Particle measurements
- Scanning electron microscope (SEM)
- XPS / ESCA
- Auger analysis (AES)

5. TECHNICAL TERMS OF DELIVERY

Tubes and fittings are prepared for orbital welding according to the following standards:

Tubes

acc. to ASTM A 269/A 632 / A 312 (Pipe), DIN EN 10217-7/ 10216-5 with a length of 19.35 ft - 19.98 ft (5900 - 6090 mm), max. 10% short lengths of min. 9.84 ft (3000 mm)

Tube fitting components

Prematerial acc. to ASTM A 269 / A 632 / A 312 / A 403 (Pipe), DIN EN 10217-7 / 10216-5

Machined components

Prematerial acc. to ASTM A 479, DIN EN 10088-3, DIN 17440, ASTM A 182 (Pipe)

Marking always with

DOCKWEILER / DW-Number / Dimension / Material / Heat number

Tube, pipe and fittings shall be permanently marked as per Dockweiler guideline AA 7.5.3–80. The marking must provide all necessary information to trace back the heat number and the material grade.

6. DOCUMENTATION, PACKAGING AND SHIPPING

The documentation result by the Dockweiler Inspection Certificate 3.1 according to DIN EN 10204.

Tubes and fittings filled with N2 (99.9998% incl. inert gas), closed with PA/PE squares and yellow PE caps, double-bagged and sealed in PE-sleeves.

Delivery in tubular container or wooden crate, fittings in strong cardboard box with shock absorbing filler.

The batch label on the foil contains the information ultron.

DOCKWEILER
connecting flow to purity

For gas applications in semiconductor industry
as well as in photovoltaics

finetron

bf **bright finished**

1. SURFACES QUALITIES

Tubes and fittings:	Inner surface (bf)	Outer surface
finetron	OD ≤ 2 1/2": Ra $_{avg.}$ ≤ 16 µin (0,40 µm)	Ra $_{avg.}$ ≤ 40 µin (1.0 µm)
	OD > 2 1/2": Ra $_{avg.}$ ≤ 32 µin (0,80 µm)	Ra $_{avg.}$ ≤ 40 µin (1.0 µm)

Additional notes:	- Pipes and fitting will be supplied with a square cut. Different end preparations may be agreed on. Other specified surfaces or ends are available upon request. - The Ra value in the cold worked area of fittings (inner and outer surface) and on the surface of circumferential welds is not defined. For dimensions OD < 1/4" (6.35 mm) roughness is not defined. - Bright finished Surface treatment: Cleaning and test procedure ASTM A 632, S3. - Free of oil and grease acc. to CGA G-4.1-2018 and ASTM G93 – level C.

2. MATERIALS

finetron	1.4404 / UNS S31603 (316L) 1.4435 / UNS S31603 (316L) UNS S31603 (316L)

Hardness equivalent to:	- max. 180 HV* according to DIN EN ISO 6507-1 - max. 90 HRB* according to DIN EN ISO 6508-1 * comparable to ASTM E-384 (HV) and ASTM E 18-22 (HRB)

3. DIMENSIONS

Imperial	according to ASTM A269 / A270 / A632	
OD x WT:	1/4" x 0.035" to 6" x 0.109"	6.35 x 0.89 mm to152.4 x 2.77 mm
Length:	min. 19.36 ft to max. 19.98 ft	6000 mm -100/+90

Manufacturing process:	Seamless Tubes ≤ 1" OD (25.40 mm)	Welded tubes ≥ 1 1/2" OD (38.10 mm)

4. QUALITY AND TEST PROCEDURES

- Verification of basic test certificate
- Visual inspection
- Endoscopic inspection of bright finished tubes
- Verification of dimensions
- Roughness measurements

5. TECHNICAL TERMS OF DELIVERY

Tubes and fittings are prepared for orbital welding according to the following standards:

Tubes

acc. to ASTM A 269/A 632/A 312 (Pipe), DIN EN 10217-7 / 10216-5 with a length of 19.35 ft - 19.98 ft (5900 - 6090 mm), max. 10% short lengths of min. 9.84 ft (3000 mm)

Tube fitting components

Prematerial acc. to ASTM A 269 / A 632 / A 312 / A 403 (Pipe), DIN EN 10217-7 / 10216-5

Machined components

Prematerial acc. to ASTM A 479, DIN EN 10088-3, DIN 17440, ASTM A 182 (Pipe)

Marking always with

DOCKWEILER / DW-Number / Dimension / Material / Heat number

Tubes are ink marked over the full length.
Fittings are needle or laser marked.

6. DOCUMENTATION, PACKAGING AND SHIPPING

The documentation result by the Dockweiler Inspection Certificate 3.1 according to DIN EN 10204.

Bright finished tubes and fittings are closed with transparent PE caps and are individually sealed in PE foil.

Delivery in tubular container or wooden crate, fittings in strong cardboard box with shock absorbing filler.

The batch label on the foil contains the information finetron.

Widely used in production, process measurement and photovoltaic

TCC

bf **bright finished**

1. SURFACES QUALITIES

Tubes and fittings:	Inner surface	Outer surface
■ **TCC** (bf)	Ra $_{avg.}$ ≤ 30 µin (0,80 µm)	Ra $_{avg.}$ ≤ 40 µin (1.0 µm)

Pipe and pipe fittings:	Inner surface	Outer surface
■ **TCC** (bf)	Ra $_{avg.}$ ≤ 30 µin (0,80 µm)	Ra $_{avg.}$ ≤ 40 µin (1.0 µm)

Additional notes:
- Tubes and fittings are prepared for orbital welding.
- Other specified surfaces or ends are available upon request.
- Pipes and fitting will be supplied with a square cut. Different end preparations may be agreed on.
- The Ra value in the cold worked area of fittings (inner and outer surface) and on the surface of circumferential welds is not defined. For dimensions OD ≤ 3/8" (5.00 mm) roughness is not measured.
- TCC (bf): Cleaning and test procedure ASTM A 632, S3 and ASTM G93 – level D.

2. MATERIALS

	Austenitic stainless steel tubes and fittings (seamless or welded / depending on diameter) in:
■ **TCC / TCC.1**	1.4435 / UNS S31603 (316L) 1.4404 / UNS S31603 (316L) UNS S31603 (316L) UNS S30403 (304L)

Hardness equivalent to:	- max. 180 HV* according to DIN EN ISO 6507-1 - max. 90 HRB* according to DIN EN ISO 6508-1 * comparable to ASTM E-384 (HV) and ASTM E 18-22 (HRB)

3. DIMENSIONS

Imperial:	according to ASTM A269 / A270 / A632	
OD x WT	1/8" x 0.022" to 6" x 0.109"	3.18 x 0.56 mm to152.4 x 2.77 mm
Length	min. 19.36 ft to max. 19.98 ft (6000 mm -100/+90)	

Pipe:	according to ASTM A312	
Dimensions	NPS 8, 10, 12, 16, 20 Schedule 10S	219,08 x 3,76 mm to 508,00 x 5,54 mm
Length	min. 19.36 ft to max. 19.98 ft (6000 mm -100/+90)	

Manufacturing process:	Seamless tubes (≤ 1/2")	Welded or seamless tubes (> 1/2")

4. QUALITY AND TEST PROCEDURES

- Verification of basic test certificate
- Visual inspection
- Endoscopic inspection of bright finished tubes
- Verification of dimensions
- Roughness measurements

5. TECHNICAL TERMS OF DELIVERY

Tubes and fittings are prepared for orbital welding:

Tubes

Acc. to ASTM A 632 A 269/A 270, DIN EN 10217-7/ 10216-5 with a length of 5900 - 6090 mm (max. 10% short lengths of min. 3000 mm possible).

Fittings

According to DIN 11865, ASTM A 403 (Pipe), ASTM A 182 (Pipe)

Marking always with

DOCKWEILER / DW-Number / Dimension / Material / Heat number

Tube and fittings shall be permanently marked as per Dockweiler guideline AA 8.5.2-80. The marking must provide all necessary information to trace back the heat number and the material grade.

6. DOCUMENTATION, PACKAGING AND SHIPPING

Documentation

The documentation result by the Dockweiler Inspection Certificate 3.1 according to DIN EN 10204.
Optional online documentation WebCert.

Packaging

Bright finished tubes and fittings are sealed with white/ transparent PE caps and packaged in PE foil.
The batch label contains the information TCC.

Anodically cleaned tubes and fittings are sealed with PE/ PA squares and white/transparent PE caps and packed in PE foil. The batch label contains the information TCC.1.

Shipping

Delivery in tubular container or wooden crate, fittings in strong cardboard box with shock absorbing filler.

DOCKWEILER
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For Pharma, Biotech and other Life Science Industries

ASME BPE

ASME BPE SF1 / Mechanically polished

ASME BPE SF4 / Electropolished

1. SURFACES QUALITIES

Tubes and fittings:	Inner surface (mp)*
ASME BPE SF0 - on request	No finish requirements
ASME BPE SF1	**Ra max. ≤ 20 µin (0.51 µm)** Dockweiler Standard
ASME BPE SF2 - on request	Ra max. ≤ 25 µin (0.64 µm)
ASME BPE SF3 - on request	Ra max. ≤ 30 µin (0.76 µm)

Tubes and fittings:	Inner surface (ep)
ASME BPE SF4	**Ra max. ≤ 15 µin (0.38 µm)** Dockweiler Standard
ASME BPE SF5 - on request	Ra max. ≤ 20 µin (0.51 µm)
ASME BPE SF6 - on request	Ra max. ≤ 25 µin (0.64 µm)

Surface treatment:	- Mechanically polished (or any other finishing method that meets the Ra max.)*: Cleaning and test procedure ASTM A 632, S3 - Electropolished: Procedure acc. to Spec. Doc. 8.4-40/3.2/3.3.2 Free of oil and grease acc. to CGA G-4.1-2018 and ASTM G93

2. MATERIALS

ASME BPE	UNS S31603 (316L)* UNS S31603 (316L) / 1.4404* UNS S31603 (316L) / 1.4435*	UNS N08904 (904L) / 1.4539 UNS N06022 (C22) / 2.4602 UNS N08367 (AL-6XN)

* defined sulphur of 0.005 - 0.017%

Hardness equivalent to:	- max. 180 HV* according to DIN EN ISO 6507-1 - max. 90 HRB* according to DIN EN ISO 6508-1 * comparable to ASTM E-384 (HV) and ASTM E 18-22 (HRB)

3. DIMENSIONS

Imperial	acc. to ASME BPE, Part DT	
OD x WT:	1/4" to 6" (0.250 x 0.035 inch to 6.000 x 0.109 inch)	6.35 x 0.89 mm to 152.40 x 2.77 mm
Length of tubes:	min. 19.36 ft to max. 19.98 ft (6000 mm -100/+90)	

Manufacturing process:	Seamless tubes ≤ 1" OD (25.40 mm)	Welded tubes ≥ 1 1/2" OD (38.10 mm)

4. QUALITY AND TEST PROCEDURES

- Verification of basic test certificate
- Visual inspection
- Endoscopic inspection of bright finished tubes
- Verification of dimensions
- Roughness measurements

5. TECHNICAL TERMS OF DELIVERY

Tubes and fittings are prepared for orbital welding according to the following standards:

Tubes

acc. to ASTM A 269 / A 632 / A 312 (Pipe), DIN EN 10217-7 / 10216-5 with a length of 19.35 ft - 19.98 ft (5900 - 6090 mm), max. 10% short lengths of min. 9.84 ft (3000 mm)

Tube fitting components

Prematerial acc. to ASTM A 269 / A 632 / A 312 / A 403 (Pipe), DIN EN 10217-7 / 10216-5

Machined components

Prematerial acc. to ASTM A 479, DIN EN 10088-3, DIN 17440, ASTM A 182 (Pipe)

Marking always with

DOCKWEILER / DW-Number / Dimension / Material / Heat number

Tube, pipe and fittings shall be permanently marked as per Dockweiler guideline AA 7.5.3–80. The marking must provide all necessary information to trace back the heat number and the material grade.

6. DOCUMENTATION, PACKAGING AND SHIPPING

The documentation result by the Dockweiler Inspection Certificate 3.1 according to DIN EN 10204.

Mechanically polished tubes and fittings are capped with transparent PE caps and are individually sealed in PE foil.

Electropolished tubes and fittings are capped with yellow PE caps and are individually sealed in PE foil.

Delivery in tubular container or wooden crate, fittings in strong cardboard box with shock absorbing filler.

The batch label on the foil contains the information ASME BPE SF1 or ASME BPE SF4.

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DW Specifications US / 12-2024