





# SPECIFICATIONS

## FOR TUBES, PIPES, FITTINGS AND CONNECTIONS

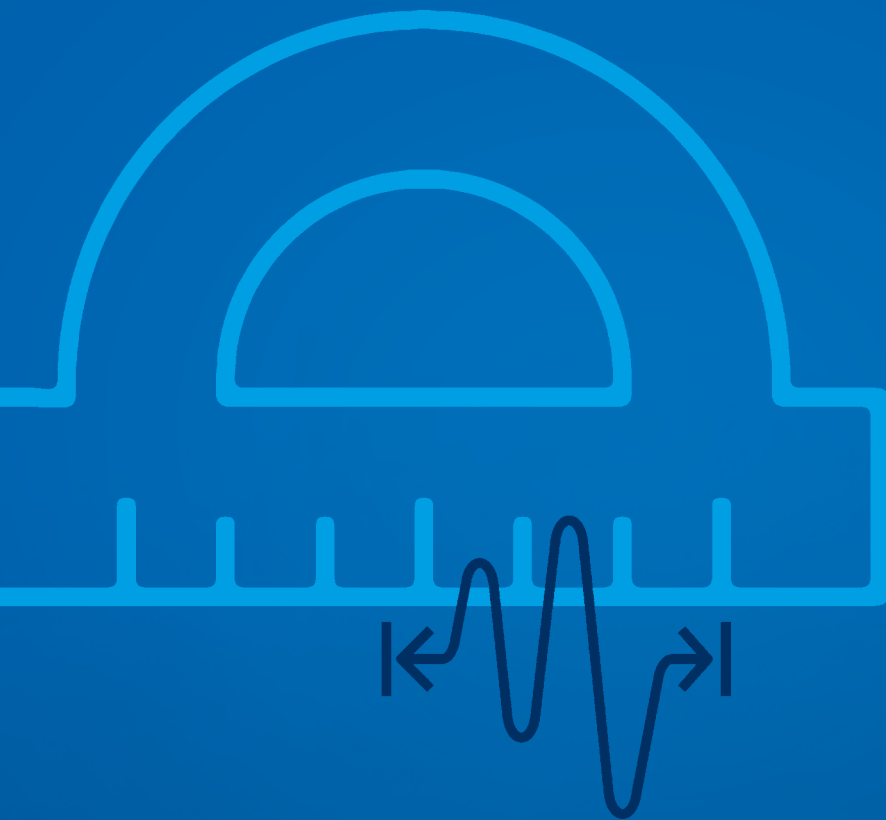
FOR SEMICONDUCTOR  
AND HIGH-TECH INDUSTRIES

-  ultron
-  finetron
-  TCC / TCC.1
-  VSR80

FOR PHARMA, BIOTECH AND  
OTHER LIFE SCIENCE INDUSTRIES

-  ASME BPE Certified
-  weldtron
-  safetron

EMEA



**Specification**  
ultron

For UHP gas applications in semiconductor industry and fine chemistry

**ultron**

**ep** Electropolished



**1. SURFACES QUALITIES**

Tubes and fittings:	Inner surface (ep)	Outer surface
<b>ultron</b>	<b>Ra<sub>avg</sub> ≤ 0,25 μm (10 μin)</b>	<b>Ra<sub>avg</sub> ≤ 1.0 μm (40 μin)</b>

On request:	Ra <sub>avg</sub> ≤ 0,13 μm (5 μin) Ra <sub>avg</sub> ≤ 0,18 μm (7 μin) Ra <sub>avg</sub> ≤ 0,38 μm (15 μin)	
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Pipe:	Inner surface (ep)	Outer surface
<b>ultron</b>	<b>Ra<sub>avg</sub> ≤ 0,51 μm (20 μin)</b>	Mill finish, RA not defined

Additional notes:	<ul style="list-style-type: none"> <li>- Tube and Fittings are prepared for orbital welding (acc. to Dockweiler guideline Doc. 8.3-9/7).</li> <li>- Ra values may differ for 1/8" tubes</li> <li>- Pipe will be supplied with a square cut (acc. to Dockweiler guideline Doc. 8.3-9/7).</li> <li>- Other specified surfaces or ends are available upon request.</li> <li>- 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 &lt; 1/4" (6,35 mm) roughness is not defined.</li> <li>- Free of oil and grease acc. to CGA G-4.1-2018 and ASTM G93 – level A.</li> <li>- Electropolishing procedure acc. to Dockweiler guideline Doc. 8.4-40/3.1/3.3.1</li> <li>- Cleanroom cleaning and packing (ISO Class 4 / Federal Class 10)</li> </ul>
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**2. MATERIALS**

<b>ultron</b>	1.4404 / UNS S31603 (316L) 1.4435 / UNS S31603 (316L) UNS S31603 (316L)
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Hardness equivalent to:	<ul style="list-style-type: none"> <li>- max. 180 HV* according to DIN EN ISO 6507-1</li> <li>- max. 90 HRB* according to DIN EN ISO 6508-1</li> </ul> <p>* comparable to ASTM E-384 (HV) and ASTM E 18-22 (HRB)</p>
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**3. DIMENSIONS**

Imperial:	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 to 152,4 x 2,77 mm

Pipe:	Pipe according to ASTM A312	
Dimensions	NPS 8, 10, 12 Schedule 10S	Length: min. 19.36 ft to max. 19.98 ft

Metric:		
OD x WT	6,00 x 1,00 mm to 35,00 x 1,50 mm	Length: 6000 mm -100/+90

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

**Tubes**

Acc. to ASTM A 632 / A 269 / 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). Tubes with an outside diameter of 5.00 mm or smaller are supplied with a length of 2950 mm (+/-50 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 A403 (Pipe)

**Marking always with**

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

Tube, pipe 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 & SHIPPING**

**Documentation**

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

**Packaging**

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

The batch label on the foil contains the information ultron.

**Shipping**

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

**Specification**  
finetron

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
<b>finetron</b>	<b>Ra<sub>avg.</sub> ≤ 0,40 µm (16 µin)</b>	<b>Ra<sub>avg.</sub> ≤ 1.0 µm (40 µin)</b>
Additional notes:	- Tubes and fittings are prepared for orbital welding. - 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 ≤ 3/8" (5.00 mm) roughness is not measured. - Cleaning and test procedure ASTM A 632, S3 – level C.	

**2. MATERIALS**

Austenitic stainless steel tubes and fittings (seamless or welded / depending on diameter):	
<b>finetron</b>	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 / A632	
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
Lenght	min. 19.36 ft to max. 19.98 ft	6000 mm -100/+90
Metric:		
OD x WT	6,00 x 1,00 mm to 35,00 x 1,50 mm	
Lenght	6000 mm -100/+90	
Manufacturing process:	Seamless tubes (≤ 1")	Welded or seamless tubes (> 1")

**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).

**Tube fitting components**

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

**Marking always with**

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

Tubes 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 & 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 capped with transparent PE caps and are individually sealed in PE foil.

The batch label on the foil contains the information finetron.

**Shipping**

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

**Specification**  
TCC/TCC.1

Widely used in production, process measurement and photovoltaic

**TCC / TCC.1**

**bf** bright finished

**ac** anodical cleaned



**1. SURFACES QUALITIES**

Tubes and fittings:	Inner surface	Outer surface
■ <b>TCC</b> (bf)	<b>not defined</b> ; on request Ra <sub>avg.</sub> ≤ 0,80 μm (32 μin)	<b>not defined</b>
■ <b>TCC.1</b> (ac)	<b>not defined</b> ; on request Ra <sub>avg.</sub> ≤ 0,80 μm (32 μin)	<b>not defined</b>

Pipe and pipe fittings:	Inner surface	Outer surface
■ <b>TCC</b> (bf)	<b>not defined</b> ; on request Ra <sub>avg.</sub> ≤ 0,80 μm (32 μin)	<b>not defined</b>
■ <b>TCC.1</b> (ac)	<b>not defined</b> ; on request Ra <sub>avg.</sub> ≤ 0,80 μm (32 μin)	<b>not defined</b>

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.
- TCC.1 (ac): Free of oil and grease acc. to CGA G-4.1-2018 and ASTM G93 – level B.

**2. MATERIALS**

	Austenitic stainless steel tubes and fittings (seamless or welded) in:
■ <b>TCC / TCC.1</b>	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 to 152.4 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)	

Metric:		
Dimensions	3,00 x 0,50 mm to 35,00 x 1,50 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). TCC.1 tubes with an outside diameter of 5.00 mm or smaller are supplied with a length of 2950 mm (+/-50 mm).

**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 & 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 capped with white/transparent PE caps and packaged in PE foil. The batch label contains the information TCC.

Anodically cleaned tubes and fittings are capped 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.

**Specification**  
VSR80

For leak-tight but detachable connections with controlled hardness for easy installation

**VSR80**

**bf** bright finished



**1. SURFACES QUALITIES**

Tubes:	Inner surface	Outer surface
<b>VSR80</b>	<b>Ra values are not defined</b>	<b>Ra<sub>avg.</sub> ≤ 1.0 μm (40 μin)</b> free of longitudinal and vertical scratches

**2. MATERIALS**

<b>VSR80</b>	1.4404 / UNS S31603 (316L) 1.4571 / S31635
Hardness equivalent to:	- max. 70-90 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 and DIN 11866 Series C	
OD x WT	1/16" (0,0625"x 0,010") to 1" (1,000" x 0,065 ") 1,59 mm x 0,25 mm to 25,40 mm x 1,65 mm	
Length	min. 19.36 ft to max. 19.98 ft (6000 mm -100/+90)	
Metric:	according to DIN 11866 Series A	
Dimensions	3,00 mm x 0,50 mm to 28,00 mm x 1,50 mm	Length: 6000 mm -100/+90
Manufacturing process:	Seamless austenitic stainless steel tubes	

**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 according to the following standards:

**Tubes**

Acc. to ASTM A 632 / A 269 / A 270, DIN EN 10217-7 / 10216-5 with a length of 19.35 ft - 19.98 ft (max. 10% short lengths of 9.8 ft min. possible)

**Marking always with**

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

Tubes are permanently marked in accordance with Dockweiler guideline AA 8.5.2-80.

**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**

The batch label on the foil contains the information VSR80.

**Shipping**

Delivery in tubular container or case for safe transport.

**Specification**  
**ASME BPE**

For pharma, biotech and other life science industries

**ASME BPE**

 **ASME BPE SF1 / mechanically polished**

 **ASME BPE SF4 / electropolished**



**1. SURFACE QUALITIES**

Tubes and fittings: Inner surface (mechanically polished)\*


ASME BPE SF0 - on request	No finish requirements
 <b>ASME BPE SF1</b>	<b>Ra<sub>max.</sub> ≤ 0,51 µm / 20 µin</b> (Dockweiler Standard)
ASME BPE SF2 - on request	Ra <sub>max.</sub> ≤ 0,64 µm / 25 µin
ASME BPE SF3 - on request	Ra <sub>max.</sub> ≤ 0,76 µm / 30 µin

Tubes and fittings: Inner surface (electropolished)

 <b>ASME BPE SF4</b>	<b>Ra<sub>max.</sub> ≤ 0,38 µm / 15 µin</b> (Dockweiler Standard)
ASME BPE SF5 - on request	Ra <sub>max.</sub> ≤ 0,51 µm / 20 µin
ASME BPE SF6 - on request	Ra <sub>max.</sub> ≤ 0,64 µm / 25 µin

Surface treatment:	<ul style="list-style-type: none"> <li>- Mechanically polished (or any other finishing method that meets the Ra max.): Cleaning and test procedure ASTM A 632, S3</li> <li>- Electropolished: Procedure acc. to Spec. Doc. 8.4-40/3.2/3.3.2</li> <li>- Free of oil and grease acc. to CGA G-4.1-2018 and ASTM G93 – level B (SF4) / level C (SF1)</li> </ul>
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**2. MATERIALS**

 <b>ASME BPE</b>	UNS S31603 (316L)*, UNS S31603 (316L), 1.4404, 1.4435*
	* defined sulphur of 0.005 - 0.017%

Hardness equivalent to:	<ul style="list-style-type: none"> <li>- max. 180 HV* according to DIN EN ISO 6507-1</li> <li>- max. 90 HRB* according to DIN EN ISO 6508-1</li> </ul>
	* 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

Manufacturing process:	Welded or seamless tubes
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**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**

Acc. to ASME BPE-2024, ASTM A 269/270, tubes with a length of 5900 - 6090 mm (19.35 ft - 19.98 ft), max. 10% short lengths of min. 3000 mm (9.84 ft)

**Marking always with**

DOCKWEILER / DW-Number / Dimension / Material / Heat Number / ASME Certification Mark, Surface Finish Designation

Tubes, pipes and fittings shall be permanently marked as per ASME BPE-2024, DT-11. 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**

Mechanically polished tubes and fittings are closed with transparent PE caps and are individually sealed in PE foil. The batch label on the foil contains the information ASME BPE SF1.

Electropolished tubes and fittings are closed with PA/PE squares and yellow PE caps, sleeved and sealed in PE. The batch label on the foil contains the information ASME BPE SF4.

**Shipping**

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



**Specification**  
safetron

For sensitive media in pharma and biotech:  
WFI, serums and parenterals

**safetron**

**bf** bright finished  
**ep** electropolished



**1. SURFACE QUALITIES**

Tubes and fittings: Inner surface (bf)

**safetron | H4o** **Ra<sub>avg.</sub> ≤ 0,40 μm / 16 μin**

Surface treatment:

- Bright finished (bf) / H4o Hygienic Class according to DIN 11866/11865/11864/DIN 32676
- Ra value for circumferential weld seam of fittings not defined
- T-pieces according to DIN 11865, option "u".
- Circular weld seams ground with specified Ra value on request
- Cleaning and testing methods ASTM A 632, S3
- Weld ends of tubes and fittings are prepared for orbital welding (square cut and faced).

Tubes and fittings: Inner surface (ep)

**safetron | HE5o** **Ra<sub>avg.</sub> ≤ 0,25 μm / 10μin**

Surface treatment:

- Electropolished (ep)/HE5o Hygienic Class according to DIN 11866/11865/11864/DIN 32676
- Ra value for circumferential weld seam of formed parts not defined
- T-pieces according to DIN 11865, option "u".
- Circular weld seams ground with specified Ra value on request.
- Cleaning and testing procedures according to Spec. doc. 8.4-40/3.2/3.3.2
- Oil and grease-free in accordance with CGA G-4.1-2018 and ASTM G93 – level B
- Weld ends of tubes and fittings are prepared for orbital welding (square cut and faced).

**2. MATERIALS**

Austenitic stainless steel tubes and fittings in:

**safetron** 1.4435 / UNS S31603 (316L) acc. to Basler Norm 2 (BN2)  
1.4404 / 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 acc. to ASTM A269 / A270 / A632, ASME BPE and DIN 11866 Serie C

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

ISO acc. to DIN EN ISO 1127 und DIN 11866 Serie B

OD x WT: 13,50 x 1,60 mm to 219,10 x 2,60 mm

Metric acc. to DIN 11866 Series A  
on request

Manufacturing process: Welded or seamless tubes

**4. QUALITY AND TEST PROCEDURES**



Verification of basic test certificate



Visual inspection



Endoscopic inspection of bright finished tubes



Verification of dimensions



Roughness measurements



Delta ferrite measurement 1.4435 BN2 / 316L

**5. TECHNICAL TERMS OF DELIVERY**

Tubes and fittings are prepared for orbital welding:

**Tubes**

According to 11866, ASTM 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).

For electropolished tubes with outer diameter ≤ 5.00 mm, the length is 2950 ± 50 mm.

**Fittings**

According to DIN 11865, DIN 32676, DIN 11864

**Marking always with**

DOCKWEILER / DW-Number / Dimension / Material / Heat number / Standards and Hygiene Class

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 transparent PE caps and individually packaged in PE foil. The batch label on the foil packaging contains the information safetron.

Electropolished tubes and fittings are sealed with PA/PE squares and yellow PE caps, sleeved and sealed in PE. The batch label on the foil packaging contains the information safetron ep.

**Shipping**

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

**Specification**  
weldtron

For biotech and the pharma industry  
and for sensitive sectors of cosmetics and food  
industries

**weldtron**

**bf** bright finished  
**ep** electropolished



**1. SURFACE QUALITIES**

Tubes and fittings: Inner surface (bright finished)

<b>weldtron   H3o</b>	<b>Ra<sub>avg.</sub> ≤ 0,80 µm / 32 µin</b>
Surface treatment:	<ul style="list-style-type: none"> <li>- Bright finished (bf) / H3o according to DIN 11866 / 11865 / 11864 / DIN 32676</li> <li>- Ra value for circumferential weld seam of fittings not defined</li> <li>- T-pieces according to DIN 11865, option "u".</li> <li>- Circular weld seams ground with specified Ra value on request</li> <li>- Cleaning and testing methods ASTM A 632, S3</li> </ul>

Tubes and fittings: Inner surface (electropolished)

<b>weldtron   HE3o</b>	<b>Ra<sub>avg.</sub> ≤ 0.60 µm / 24 µin</b>
Surface treatment:	<ul style="list-style-type: none"> <li>- Electropolished (ep) / HE3o according to DIN 11866 / 11865 / 11864 / DIN 32676</li> <li>- Ra value for circumferential weld seam of formed parts not defined</li> <li>- T-pieces according to DIN 11865, option "u".</li> <li>- Circular weld seams ground with specified Ra value on request.</li> <li>- Cleaning and testing procedures according to Spec. doc. 8.4-40/3.2/3.3.2</li> <li>- Oil and grease-free in accordance with CGA G-4.1-2018 and ASTM G93 – level B</li> </ul>

**2. MATERIALS**

Austenitic stainless steel tubes and fittings in:

<b>weldtron</b>	1.4435 / UNS S31603 (316L) acc. to Basler Norm 2 (BN2) 1.4404 / UNS S31603 (316L)
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Hardness equivalent to:	<ul style="list-style-type: none"> <li>- max. 180 HV* according to DIN EN ISO 6507-1</li> <li>- max. 90 HRB* according to DIN EN ISO 6508-1</li> </ul> <p>* comparable to ASTM E-384 (HV) and ASTM E 18-22 (HRB)</p>
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**3. DIMENSIONS**

Imperial:	acc. to ASTM A269 / A270 / A632, ASME BPE and DIN 11866 Serie C	
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
ISO:	acc. to DIN EN ISO 1127 and DIN 11866 Serie B	
OD x WT	13,50 x 1,60 mm to 219,10 x 2,60 mm	
Metric:	acc. to DIN 11866 Series A	
OD x WT	6,00 x 1,00 mm to 154,00 x 2,00 mm	

Manufacturing process: Welded or seamless tubes

**4. QUALITY AND TEST PROCEDURES**



Verification of basic test certificate



Visual inspection



Endoscopic inspection of bright finished tubes



Verification of dimensions



Roughness measurements



Delta ferrite measurement 1.4435 BN2 / 316L

**5. TECHNICAL TERMS OF DELIVERY**

Tubes and fittings are prepared for orbital welding:

**Tubes**

Acc. to 11866, ASTM 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).

For electropolished tubes with outer diameter ≤ 5.00 mm, the length is 2950 ± 50 mm.

**Fittings**

Acc. to DIN 11865, DIN 32676, DIN 11864

**Marking always with**

DOCKWEILER / DW-Number / Dimension / Material / Heat number / Standards and Hygiene Class

Tubes, pipes 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**

**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 transparent PE caps and individually packaged in PE foil. The batch label on the foil packaging contains the information weldtron.

Electropolished tubes and fittings are sealed with PA/PE squares and yellow PE caps, sleeved and sealed in PE. The batch label on the foil packaging contains the information weldtron ep.

**Shipping**

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



**Dockweiler AG**

An der Autobahn 30  
19306 Neustadt-Glewe  
Germany

☎ + 49 38757 58-0

✉ sales@dockweiler.com

[www.dockweiler.com](http://www.dockweiler.com)

