

**Specification**  
ultron

For UHP gas applications in semiconductor industry and fine chemistry



**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)	
	Ra <sub>avg</sub> ≤ 0,51 µm (20 µin)	

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

**3. DIMENSIONS**

Imperial:	according to ASTM A269 / A270 / A63	
OD x WT	1/8" x 0.022" to 6" x 0.109"	3,18 x 0,56 mm to 152,40 x 2,77 mm

Metrisch:	according to DIN 11866	
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")
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Pipe:	according to ASTM A312	
OD x WT	NPS 8, 10, 12, 16, 20 Schedule 10S	219,08 x 3,76 mm bis 508,00 x 5,54 mm

Manufacturing process:	Welded 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 Dimmensions	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 A632 / A269 / A270 / A312 (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). For electropolished tubes with an outer diameter ≤ 5.00 mm, the length is 2950 +/- 50 mm.

**Tube fitting components**  
Prematerial according to DIN11865, ASTM A 403 (Pipe) and ASME B16.9 (Pipe).

**Machined components**  
Prematerial acc. to ASTM A 479, DIN EN 10088-3, DIN EN 10272, DIN EN 10254, DIN EN 10222-5 and ASTM A 182

**Marking always with**  
DOCKWEILER / DW-Number / Dimension / Material / Heat number  
  
Tube, pipe and fittings are permanently marked. 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 (99.999% 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.