

For UHP gas applications in semiconductor industry  
and fine chemistry



**ep** **electropolished**  
cleanroom cleaning and packing



1. SURFACES QUALITIES

Tubes and fittings:	Inner surface (ep)	Outer surface
<b>ultron</b>	Ra <sub>max.</sub> ≤ 10 µin (0.25 µm)	Ra <sub>max.</sub> ≤ 48 µin (1.2 µm)
<b>ultron VIM-VAR</b>	Ra <sub>max.</sub> ≤ 10 µin (0.25 µm)	Ra <sub>max.</sub> ≤ 48 µin (1.2 µm)
On request:	Ra <sub>max.</sub> ≤ 5 µin (0.13 µm) Ra <sub>max.</sub> ≤ 7 µin (0.18 µm) Ra <sub>max.</sub> ≤ 20 µin (0.51 µm)	

Pipes:	Inner surface (ep)	Outer surface
<b>ultron</b>	Ra <sub>max.</sub> ≤ 25 µin (0.64 µm)	Mill finish, RA not defined

Additional notes:	<ul style="list-style-type: none"><li>- Pipes and fittings will be supplied with a square cut. Different end preparations may be agreed on.</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 according to CGA G-4.1-2018 and ASTM G93 – level A.</li><li>- Electropolishing procedure according to Dockweiler guideline Doc. 8.4-40/3.1/3.3.1</li><li>- Passivation acc. ASTM A380 and ASTM A 967</li><li>- Cleanroom cleaning and packing (Federal Class 10 / ISO Class 4)</li></ul>
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2. MATERIALS

<b>ultron</b>	1.4404 / UNS S31603 (316L), 1.4435 / UNS S31603 (316L), UNS S31603 (316L)
<b>ultron VIM-VAR</b>	UNS S31603 (316L) VIM-VAR double melted stainless steel according to ASTM A 269/A 632 for OD tubing (Imperial)

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

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 to 152.4 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:

Tubes

According 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 according to ASTM A 269 / A 632 / A 312 / A 403 (Pipe), DIN EN 10217-7 / 10216-5

Machined components

Prematerial according 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 AND SHIPPING

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

Tubes and fittings filled with N2 (99.999% 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.