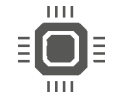


For UHP gas applications in semiconductor industry and fine chemistry

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 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 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.