Sci Max 10

UHP, Electropolished Tubing & Fittings Specifications

Material of Construction	• TP 316L, single melt, Stainless Steel; tubing to conform to ASTM A632 for OD sizes < 0.500" and ASTM A269 for OD sizes >/= 0.500". • Chemical composition of tubing will follow Table 1 of ASTM A269 • All tubing will be bright annealed in dry H2 atmosphere at the producing mill • All 316L material will maintain a sulfur range of 0.005 to 0.010 % for seamless material and 0.005% to 0.017% for welded material. • Bar stock (for specific Sci Max 10 fittings) to conform to ASTM A479 • Sci Max 10 tubing, </= 1" OD will be seamless. Welded tubing will be used for OD sizes > 1" OD through 6" OD, per ASTM A270
Dimensions	Tubing: ¼" x .035" to 6" x 0.109" | Fittings: ¼" x .035" to 6" x 0.109", per ASTM A269/A270/A632
Reference Documents	ASTM A269, A632, A276, A479, **CGA G 4.1 (cleaned for O_2 service), ANSI B31.3 (dimensional measurements)**
Tube lengths	Nominal lengths: 20 feet, 6 meters; tube ends will be square and smooth – suitable for orbital tube welding
Hardness	60 to 80 Rb max.
Tolerances	Tubing to be in accordance with ASTM A269 & A632
Interior Surface Electropolished	I.D. Surface Roughness: 10 Ra max for tubing and fittings; measured in accordance to ASME B46.1
O.D. Surface	Standard mill OD finish – 32 Ra
Traceability & OD marking	All raw material & finished products: will be mill and heat traceable, back to the original mill test report. Tubing to permanently marked with mechanical etch tool, or other approved method. Mill heat and job # to be etched within 16"(400mm) of one end.
Surface finishing, cleaning & packaging	• Tube & fitting ID to be electropolished, utilizing automated equipment – uniformly monitoring and controlling all variable of the EP process • Tube & fitting to be flushed with D.I. water immediately following electrolyte evacuation • Following initial rinse, tube & fitting to be flushed & passivated for 30 min at ambient temperature • From the passivation bath, tube & fitting to be rinsed with filtered D.I. water, then dried with polyester wipes – shot through tube with filtered UHP N2 gas. • Final rinse of tubing & fitting to take place in an ISO Class 4 cleanroom; *tube* rinsed with 0.1 micron filtered / 18 megohm-cm D.I. water, heated to 140 ° F (60 ° C). Rinsing to procced until effluent resistivity measure a min. of 17.5 megohm-cm for < 3" OD and min. of 17 megohm-cm for >/= 3" OD. • Post final DI water cleaning, tube& fitting to be dried with UHP N2, filtered to 0.005 micron. • Tube & fitting to be capped, while under N2 purge, with polyethylene caps, pressed over polyamide nylon film. • Tube & fitting to be individually double – bagged with 4-6 mil polyethylene and heat sealed.
Testing & Inspection	Visual inspection, Surface roughness measurement, He leak testing (welded fittings), Scanning Electron Microscopy (SEM), Auger Electron Microscopy (AES), Electron Spectroscopy for Chemical Analysis (ESCA or XPS), Particle Testing & Moisture Testing
Documentation	Original Mill Test Report(s) and COC for the following measurements: Surface Roughness, Dimensional Tolerance, He Leak Testing for welded fittings, Purity test for moisture & particulates, SEM test results (per request), ESCA test results (per request), Auger test results (per request)