

SciMax Tubes and Fittings

Specifications and Submittal Documentation



NEUMO | HPT | EGMO

NEUMO Ehrenberg Group



Tubes and Fittings Specifications and Submittal Documentation

Products: Tubing and fittings for use in the semiconductor industry

Material: Stainless steel 316L

Sizes: ¼" O.D. up to 6" O.D

Surface finish: Electropolished / Mechanical Polished / Bright Annealed

Reference Standards

ASTM Specifications

- ASTM A269, A270-S2: Standard specification for seamless or welded austenitic stainless-steel tubing for general uses
- ASTM A632, Standard specification for seamless or welded austenitic stainless-steel tubing (Small diameters) for general uses
- ASTM A262: E, recommended practices for detecting susceptibility to intergranular attack in austenitic stainless steel
- ASTM E112: Standard Test Methods for Determining Average Grain Size
- ASTM A967 Passivation process
- ASTM A912 EP Process (when applicable)
- ASME B46.1, ASTM A213, SA 213, ASTM 312

CGA G-4.1

- Cleaning Equipment

SEMI F17

- Specification for Ultra High Purity Electropolished and High Purity Mechanical Polished (MP) / Bright Annealed 316L Stainless steel tubing and tubular fittings
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Material characteristics

Manufacturing

- ¼" - 1" (include): Seamless
- 1" - 6": Welded

Sulfur content*

- ¼" - 1": 0.005 - 0.010%
- 1" - 6": 0.005 - 0.017%

Tube Annealing Process

- Bright Annealed in dry hydrogen atmosphere
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* Seamless material - 0.005 to 0.010 %

Welded and bar stock material - 0.005 to 0.017 %

Coax sleeves are fillet welded and the sulfur content may be up to 0.03%



Mechanical Properties

Yield strength offset (0.2%)	Tensile strength	Elongation (in 2" (50mm))	Reduction	Hardness
170 (N/mm ²) min	485 (N/mm ²) min	40%	N/A	Max. 95 HRB

Surface roughness - SEMI F17 & ASME B46.1

Tube and fitting Code	Description	Roughness - Ra measurements [μ-inch]	
		Inner Diameter	Outer Diameter
EP	Electropolished	Ra max ≤ 10*	Ra max ≤ 32
MP/BA	Mechanical Polished (MP) / Bright Annealed (BA)	Ra max ≤ 20	Ra max ≤ 32

* For products >1": Ra ave. 10 μInch

Tube and Fittings Tolerances

Tubing specifications, ASTM A269 / A270 / A632

Tubing Diameter	Wall Thickness	OD Dimensional Specifications	Length*	Wall Thickness Tolerance
		ASTM Spec.	ASTM Spec.	ASTM Spec.
¼"	.035"	+0.004"/-0.000"	-0+1/8"	+/-10%
⅜"	.035"	+0.004"/-0.000"	-0+1/8"	+/-10%
½"	.049"	+0.005"/-0.005"	-0+1/8"	+/-10%
¾"	.065"	+0.005"/-0.005"	-0+1/8"	+/-10%
1"	.065"	+0.005"/-0.005"	-0+1/8"	+/-10%
1½"	.065"	+0.010"/-0.010"	-0+1/8"	+/-10%
2"	.065"	+0.010"/-0.010"	-0+1/8"	+/-10%
2½"	.065"	+0.010"/-0.010"	-0+1/8"	+/-10%
3"	.065"	+0.010"/-0.010"	-0+1/8"	+/-10%
4"	.083"	+0.015"/-0.015"	-0+1/8"	+/-10%
6"	.109"	+0.030"/-0.030"	-0+1/8"	+/-10%

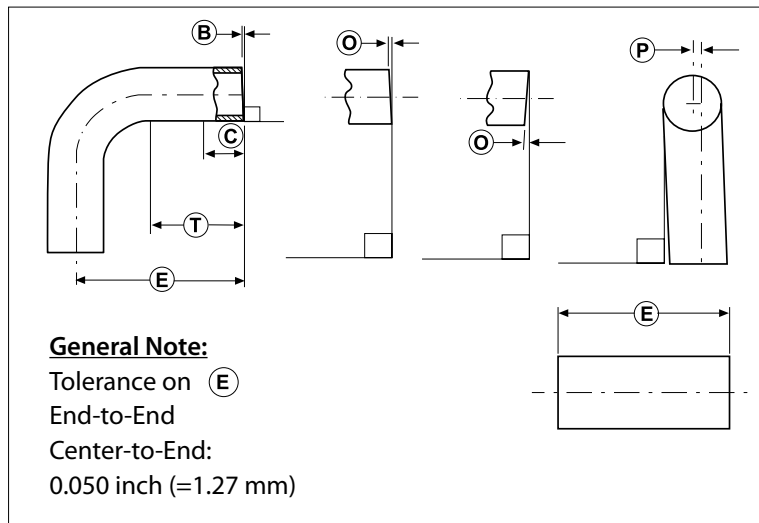
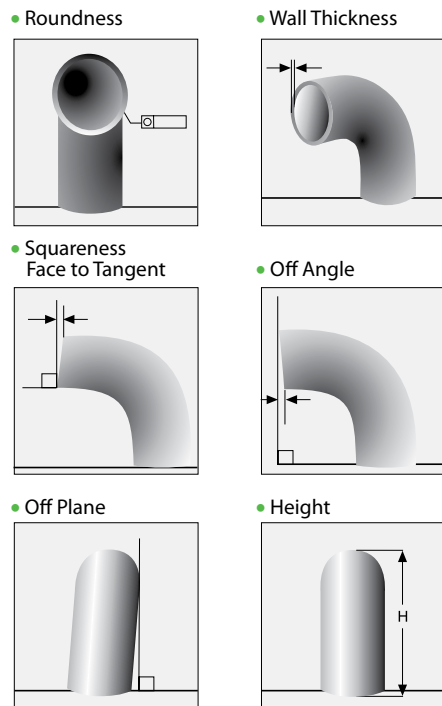
Tube Face End-Square Tolerance

OD Size [Inch]	¼" - ¾"	1" - 2"	2½"	3" - 4"	6"
	0.005	0.008	0.01	0.016	0.03

Fitting Tolerances

Nominal OD Size	¼"	⅜"	½"	¾"	1"	1½"	2"	2½"	3"	4"	6"
O.D. Tolerance	±.005	±.005	±.005	±.005	±.005	±.008	±.008	±.010	±.010	±.015	±.030
Nominal Wall Thickness	.035	.035	.049	.065	.065	.065	.065	.065	.065	.083	.109
Wall Thickness Tolerance before EP	+0.003/- .004	+0.003/- .004	+0.005/- .008	+0.005/- .008	+0.005/- .008	+0.005/- .008	+0.005/- .008	+0.005/- .008	+0.005/- .008	+0.008/- .010	+0.015/- .015
Wall Thickness Tolerance after EP	+0.005/- .010	+0.005/- .010	+0.005/- .010	+0.005/- .010	+0.005/- .010	+0.005/- .010	+0.005/- .010	+0.005/- .010	+0.005/- .010	+0.008/- .012	+0.015/- .017
Control Length	Ⓒ .750	.750	.750	.750	.750	.750	.750	.750	.750	.750	.750
Tangent Length	Ⓓ 1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.750	2.000	2.500
Squareness Face to Tangent	Ⓑ .005	.005	.005	.005	.008	.008	.008	.010	.016	.016	.030
Off Angle	Ⓔ .009	.012	.014	.018	.025	.034	.043	.054	.068	.086	.135
Off Plane	Ⓕ ±.030	±.030	±.030	±.030	±.030	±.050	±.050	±.050	±.050	±.060	±.060

* All dimensions are in Inches
 Tubing specifications, ASTM A269 / A270 / A632



- All other tolerances per ASTM A270 / A269.
- The measured wall Thickness of each tubing batch should be reported as part of the certificate of test results.
- Each separate package should contain tubing with the same wall thickness, produced from the same ingot (i.e., a "BATCH") and the same nominal size (i.e., same O.D.).

Marking

- Marking method - permanent**
- Tubes - Engraving / Pin marking / Laser Mark
 - Fittings - Laser Mark
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- Each product will be marked with the following details**
- Brand Name: SciMax
 - Job Number
 - Size x Wall Thickness (in inch units)
 - Material Grade
 - Heat Number
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Labeling

- Each product is identified with a SCiMax label with the following:**
- Brand Name: SciMax
 - Job Number
 - Size x Wall Thickness (in inch units)
 - Material Grade
 - Heat Number
 - QR Code - to scan and download the MTR (Material Test Reports) from the web
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Packing

- EP Products**
- EP products are cleaned with UPW 18M Ω , packed in a Class10 (ISO4) clean room and UHP N2 is used to purge.
 - EP products are capped with mylar and red PE caps.
 - EP products are packed with two layers nylon sleeves.
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- MP/BA Products**
- MP/BA products are cleaned with DI-WATER, packed in a Class1,000 (ISO6) clean room and HP N2 is used to purge.
 - MP/BA products are capped with mylar and yellow PE caps.
 - MP/BA products are packed with one layer nylon sleeve.
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- Tubes Length: 6.1 meters (20Ft) long
 - Conventional Cargo - wooden crates
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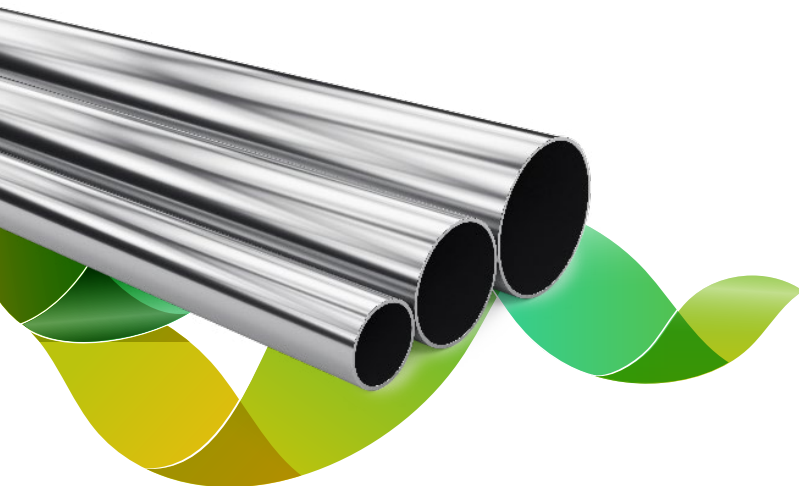
Documentation / Certification

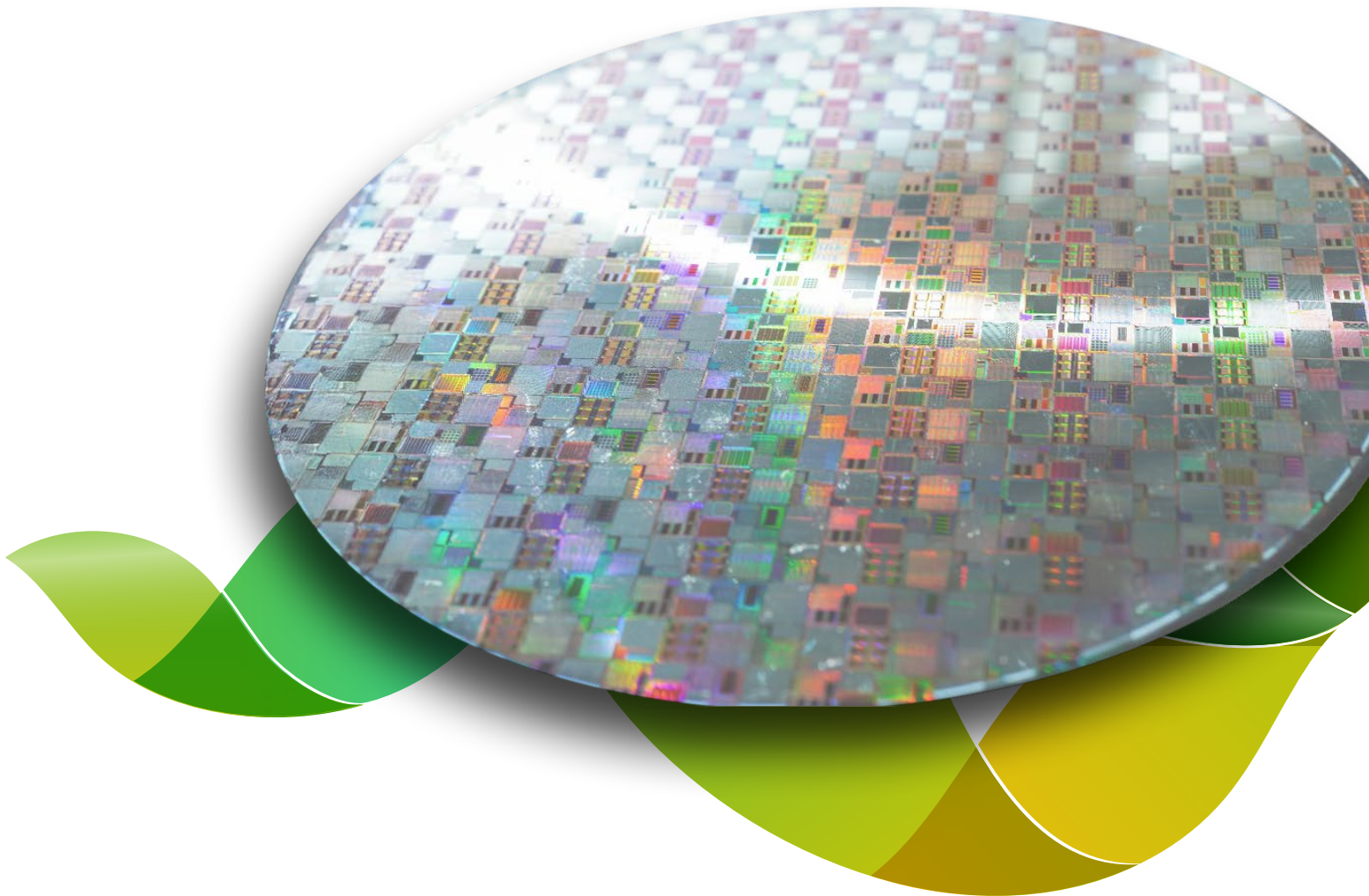
- The MTR (Material Test Reports) are supplied with the finished products.
 - Inspection documents certification to be according to standards in page 6.
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Inspection Tests and Documentation

Summary table of testing, inspection and certification that can be given per our process.

Description	Standard / Value		
		SCiMax10	SCiMax20
Material Composition	ASTM A269, A270, A632, A-213, SA-213	✓	✓
Mechanical Tests	ASTM A269, A632	✓	✓
Visual Inspection 100%	Internal procedure	✓	✓
Dimensional Measurements	ANSI B31.3	✓	✓
Hydrocarbon Cleaning Inspection	CGA G-4.1	✓	✓
Helium Leak Test for Welded Fittings	1*10 ⁻⁹ scc/sec	✓	✓
Inspection Certification	EN 10204 3.1	✓	✓
Ra Measurements	ASME B46.1	✓	✓
Particles Test	<10 particles (greater than 0.1µ ft ³)	✓	
Moisture Test for Tube: Additional Moisture on UHP N2 Purged Gas	Δ0.5 ppm	✓	
Ultra Pure Water Resistivity	18 MΩ	✓	
SEM TEST - Scanning Electron Microscopy for Defects	SEMATECH 90120401B 50 defects (magnification*3600)	✓	
XPS TEST - X Ray Photoelectron Spectroscopy for Analysis of Cr / Fe	SEMATECH 90120403B > 1.5/1	✓	
XPS TEST - X Ray Photoelectron Spectroscopy for Analysis of Cr ox / Fe ox	SEMATECH 90120403B > 2/1	✓	
AES TEST - Auger Electron Spectroscopy for Measuring of Oxide Thickness	SEMATECH 91060573B > 20A	✓	





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