UNITED INDUSTRIES

BPE SF4 Electropolished Tubing

100% Laser Welded Tubing

United Industries: The Experience to Exceed the Standards

United Industries has supplied stainless steel tubing to the pharmaceutical industry for over 35 years, providing ASTM A270-S2 tubing of exceptional quality that meets or exceeds the strict materials and production requirements of pharmaceutical and biotechnology environments. As the holder of the worlds first ASME BPE Certificate 101, United Industries is a world leader in the manufacture and supply of pharmaceutical and ultra-high purity tubing.

Proven Quality, Every Time: ASTM Testing and More

All of our pharmaceutical tubing is tested to meet or exceed ASTM 270/S2 ASME BPE requirements. We also perform flare, flatten, flange, and reverse bend tests in accordance with ASME SA249.

Surface Finish

SF4 Electropolish – 15 u-in (0.38 um) Ra ID, 32 u-in (0.8 um) Ra OD, max.

Surface roughness is measured per ASME/ANSI B46.1 requirements. These measurements are derived from four (4) readings taken at cross sections approximately 90 degrees apart.

All BPE tubes are 100% borescopes inspected.

Capabilities:

ASTM CHEMICAL COMPOSITION REQUIREMENTS (MAX.):

ELEMENTS	T316L
(C) Carbon, max.	0.030
(Mn) Manganese, max.	2.000
(P) Phosphorus, max.	0.045
(S) Sulphur, A270-S2	0.005-0.017
(Si) Silicon, max.	0.750
(Ni) Nickel	10.0-14.0
(Cr) Chromium	16.0-18.0
(Mo) Molybdenum	2.0-3.0

SIZES:

• Diameter: 1/2" (12.70 mm) - 6" (152.4 mm)

THICKNESS:

• 1/2" (12.70mm) - 3" (76.20 mm) = 16 gauge = 0.065" (1.65 mm)
• 4" (101.6 mm) = 14 gauge = 0.083 (2.11 mm)
• 6" (152.4 mm) = 12 gauge = 0.109 (2.77 mm)

PACKAGING:

• All SF4 tubing is end capped and poly sleeve per ASTM A270-S2.

Capabilities Cont.

DIMENSIONAL TOLERANCE

SIZE OD	NOMINAL WALL	OUTSIDE DIAMETER	LENGTH	WALL
1/2" (12.7)	0.065" (1.65)	+/- 0.005 (0.13)	+1/8" (3.18) - 0	+/-10.0%
3/4" (19.1)	0.065" (1.65)	+/- 0.005 (0.13)	+1/8" (3.18) - 0	+/-10.0%
1" (25.4)	0.065" (1.65)	+/- 0.005 (0.13)	+1/8" (3.18) - 0	+/-10.0%
1-1/2" (8.1)	0.065" (1.65)	+/- 0.008 (0.20)	+1/8" (3.18) - 0	+/-10.0%
2" (50.8)	0.065" (1.65)	+/- 0.008 (0.20)	+1/8" (3.18) - 0	+/-10.0%
2-1/2" (63.5)	0.065" (1.65)	+/- 0.010 (0.25)	+1/8" (3.18) - 0	+/-10.0%
3" (76.23)	0.065" (1.65)	+/- 0.010 (0.25)	+1/8" (3.18) - 0	+/-10.0%
4" (101.6)	0.083" (2.11)	+/- 0.015 (0.38)	+1/8" (3.18) - 0	+/-10.0%
6" (152.4)	0.109" (2.77)	+/- 0.030 (0.76)	+1" (25.4) - 0	+/-10.0%

ACCEPTANCE CRITERIA FOR BPE SF4 INTERNAL SURFACE FINISHES

ANOMALY DESCRIPTION	ACCEPT/REJECT CRITERIA
Pits/Porosity	If diameter <0.020 in. (0.51 mm) and bottom is shiny. Pits <0.003 in. (0.08 mm) diameter are irrelevant and acceptable.
Cluster of pits/Porosity	No more than 4 pits per 0.5 in. (13 mm) x 0.5 in. (13 mm) inspection window. The cumulative total diameter of all relevant pits shall not exceed 0.040 in. (1.02 mm).
Dents	None Accepted.
Finishing Marks	If Ra max is met.
Welds	Welds finished after welding shall be flush with the base metal, and concavity and convexity shall meet the requirements of MJ-8. Such finishing shall meet the Ra requirements of Table SF-2.4-1.
Nicks	None accepted.
Scratches	For tubing, if cumulative length is <12.0 in. (305 mm) per 20 ft. (6.1 m) tube length or prorated and if depth is <0.003 in. (0.08 mm)
Surface Cracks	None accepted.
Surface Inclusions	Accept if Ra max is met.
Surface Residuals	None accepted, visual inspection.
Surface Roughness (Ra)	15 µ-in Ra
Blistering	None accepted.

BPE

Certificate of Authorization
United Industries, Inc.
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Certificate Number
BPE-101

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