

# TOP LINE

PROCESS EQUIPMENT COMPANY

Top Line Process Equipment Company continues to be a leading supplier of high purity stainless steel processing equipment for over 50 years. Top Line products consist of high purity stainless steel process flow equipment for the pharmaceutical, biotech, personal care, food, beverage and other sanitary industries. As a long-time contributing member of ASME BPE, we supply certified BPE fittings and tubing along with our complete line of high purity processing equipment designed for the pharmaceutical and biotechnology industries. Our industry leading technology and manufacturing techniques result in the highest quality equipment manufactured at the lowest production cost, thus providing competitive priced products. We market through a world-wide network of distributors with key organizations specializing in the pharmaceutical and biotechnology market. We provide full factory technical support to our customers with direct communication to engineering firms and project managers to provide exacting equipment with superior customer service.

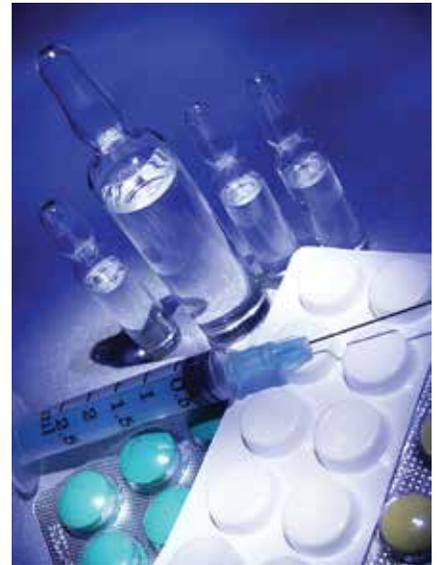
Our commitment to finely crafted, high quality certified BPE components, unequaled customer service and competitive pricing has led to our company's continued growth and highly respected reputation in the industries we serve.

## BPE Products

This publication is designed to provide the biopharm industry with the most current information on high purity equipment. Top Line Process Equipment Company and Allegheny Bradford Corporation have been contributing members to the BPE standards since its first publication in 1997 and have worked closely with end users and engineering firms long before this date in developing the most appropriate standards for bioprocessing.

## BPE Certified Fittings

Top Line provides certified BPE fittings in sizes ranging from 1/2" through 4" in both automatic weld and hygienic clamp ends. 6" fittings also available. These fittings are manufactured in exact compliance with BPE dimensions, tolerances, surface finish specifications, and metallurgy. All BPE fittings are protected with end caps, sealed in transparent bags or shrink wrapped and provided with material test reports.



## BPE Certified Tubing

Top Line provides BPE certified tubing in sizes ranging from 1/2" though 6". This domestic product is manufactured from 316L stainless steel in exact compliance with BPE dimensional and surface finish specifications. All BPE tubing is protected with end caps, sealed in 6 mil protective sleeves, and shipped in wood boxes or tri-wall corrugated cartons for maximum protection.

## BPE Surface Finish

Surface finish preparation is a mechanical process (polishing) that reduces or eliminates material surface finish imperfections and allows increased clean-ability and reduced coefficient of friction. Surface finish can be further enhanced by electropolishing, a controlled electrochemical process to further smooth the surface by removal of metal.  $R_a$  ( $\mu\text{in.}$ ) (microinches) or ( $\mu\text{m}$ ) (micrometers) is a numerical expression of measured surface roughness or texture of a polished metal surface. Measurements are taken with a profilometer across the lay where possible. Clearly defined surface designations have been developed to describe an acceptable surface finish for the bioprocessing industry.

Surface	$R_a$ Max.		Polishing
Designation	$\mu\text{in.}$	$\mu\text{m}$	Criteria
<b>SF0</b>	No Finish Requirement		
<b>SF1</b>	20	0.51	Mechanical
<b>SF2</b>	25	0.64	Mechanical
<b>SF3</b>	30	0.76	Mechanical
<b>SF4</b>	15	0.38	Electropolished
<b>SF5</b>	20	0.51	Electropolished
<b>SF6</b>	25	0.64	Electropolished



### BPE Dimensions and Tolerances

Top Line BPE Certified fittings are manufactured to exacting standards for stainless steel tube automatic weld fittings, hygienic clamp fittings and other process components. Fittings are made with nominal outside diameter (O.D.) tubing type 316L stainless steel. Tolerances stated are after heat and surface treatment. Automatic weld ends are supplied cut and squared.

Nominal Size	OD	OD	Wall	Wall	Wall
Inches	Inches	Tolerances	Inches	Polished Tolerance	Polished & EP Tolerance
<b>1/2</b>	0.500	±0.005	0.065	+0.005/-0.008	+0.005/-0.010
<b>3/4</b>	0.750	±0.005	0.065	+0.005/-0.008	+0.005/-0.010
<b>1</b>	1.000	±0.005	0.065	+0.005/-0.008	+0.005/-0.010
<b>1-1/2</b>	1.500	±0.008	0.065	+0.005/-0.008	+0.005/-0.010
<b>2</b>	2.000	±0.008	0.065	+0.005/-0.008	+0.005/-0.010
<b>2-1/2</b>	2.500	±0.010	0.065	+0.005/-0.008	+0.005/-0.010
<b>3</b>	3.000	±0.010	0.065	+0.005/-0.008	+0.005/-0.010
<b>4</b>	4.000	±0.015	0.083	+0.008/-0.010	+0.008/-0.012
<b>6</b>	6.000	±0.030	0.109	+0.015/-0.015	+0.015/-0.017

### Website URL Shortening

This catalog includes website URLs on every page to give you immediate access to the most up-to-date and detailed information available specific to the product you are reviewing. The website addresses (URLs) in this catalog have been shortened for your convenience and will direct you to information about the products you are viewing on the catalog page. For example, the C-Series pumps page includes [topln.co/curves](http://topln.co/curves), which you can type into your web browser to immediately view the pump curves for the C-Series pumps. Please call 1-800-458-6095 if you have any questions.

## Glossary of Terms

**Automatic weld** - Uses equipment which welds without the constant adjusting of controls by the welder or operator. Equipment controls joint alignment by using an automatic sensing device.

**Bioprocessing** - Specific process that uses complete living cells or their components (e.g., bacteria, enzymes, chloroplasts) to obtain desired products.

**Borescope** - An optical device consisting of a rigid or flexible tube with an eyepiece on one end, an objective lens on the other, linked together by a relay optical system in between. Used for the inspection of difficult access locations.

**Clean-in-place (CIP)** - A method of cleaning the interior surfaces of pipes, vessels, process equipment, typically with acid, caustic or a combination of both, without disassembly.

**Compendial water** - Water that complies with USP and/or other acknowledged body related to the quality, manufacture or distribution of high purity water.

**Dead leg** - An area of entrapment in a vessel or piping run that could lead to contamination of the product.

**Electropolishing** - An electrochemical process that removes material from a metallic workpiece. It is used to polish, passivate, and deburr metal parts.

**Fixture mark** - An area on an electropolished component where the electrical connection was made for processing the component.

**Full penetration weld** - A weld joint where the depth of the weld extends from its face into the weld joint so that the joint is fully fused.

**Gasket** - A static seal which fills the space between two or more mating surfaces, generally to prevent leakage from or into the joined objects while under compression.

**Heat number** - The identification number that is stamped on a material plate after it is removed from the ladle and rolled at a steel mill.

**Hydrotest** - A pressure test of vessels, piping or components performed by pressurizing the internal volume with water at a pressure defined by applicable code.

**Hygienic** - Term used to describe equipment and piping systems that, by their design, construction and operation provide for cleanliness so that the products produced will not adversely affect human or animal health.

**Lay** - One of the three components of surface finish. Lay is the direction of the predominant surface pattern ordinarily determined by the production method used.

**Manual welding** - Welding in which the entire welding operation is performed and controlled by hand.

**Maximum working temperature/pressure** - The temperature/pressure at which the system is capable of operating for a sustained period of time.

**Mechanical seal** - A device used for sealing fluids with rotating shafts.

**Orbital welding** - Automatic welding whereby the arc is rotated mechanically through 360° (180° in double up welding) around a static work piece, an object such as a pipe, in a continuous process, with or without filler material.

**O-ring** - A static seal of circular cross section.

**Passivation** - The removal of free iron from the surface of stainless steel by means of a chemical dissolution usually by acid which enhance the formation of the passive layer.

**Product contact surface** - Any surface that contacts raw materials, process materials and/or product.

**Profilometer** - A measuring instrument used to measure a surface's profile, in order to quantify its roughness.

**R<sub>a</sub>** - Log of the arithmetic mean of the surface profile.

**Steam-in-place (SIP)** - The use of steam to sterilize a piece of equipment without the use of an autoclave.

**Sterile** - Free from living organisms.

**Surface finish** - The description of the surface expressed in R<sub>a</sub>.

**Validation** - Documented evidence that the system does what it purports to do.

**WFI** - A classification of compendial water suitable for human injection.

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