

# STAINLESS STEEL TUBES

SANITARY | HYGIENIC | ULTRA HIGH PURITY



# About Us

## We as a Group

Radiant Stainless Limited an ISO 9001:2015 Certified entity with over 25 years of industry experience. Our legacy is built on delivering stainless steel excellence across critical sectors. Backed by a manufacturing capacity of 5000 MT per annum, we've become a trusted name in producing top-grade stainless steel pipes and tubes that meet global standards.

We specialize in a wide range of grades including:

**304 / 304L / 316 / 316L**

## We as a Company

Driven by innovation and equipped with a state-of-the-art manufacturing setup, Radiant Tubes focuses on producing high-quality Stainless Steel Mechanical and Electropolished Pipes and Tubes.

We follow stringent internal quality protocols aligned with ASTM A249, A269 and A270, ensuring superior corrosion resistance, tight tolerances, and excellent surface finishes.

Our tubes are designed for applications where hygiene, durability and aesthetics are non-negotiable — including cleanrooms, sterile processing environments, and high-purity service lines.

Our products serve industries that demand absolute precision and purity, including **Pharmaceuticals, Bio-Pharma, Food & Beverages, Dairy, Healthcare and Cosmetics.**



## Vision

To become a globally respected brand known for redefining quality in stainless steel tubing through innovation, integrity and engineering excellence.

## Mission

To manufacture world-class tubing solutions that meet the highest purity, performance and safety standards, empowering critical industries through technology, precision and an unshakable focus on customer satisfaction.

## Our Core Values



Transparency



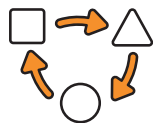
Accountability



Perfection



Performance



Adaptability

## Standard We Adhere To

3A

Stainless  
Steel Tubes

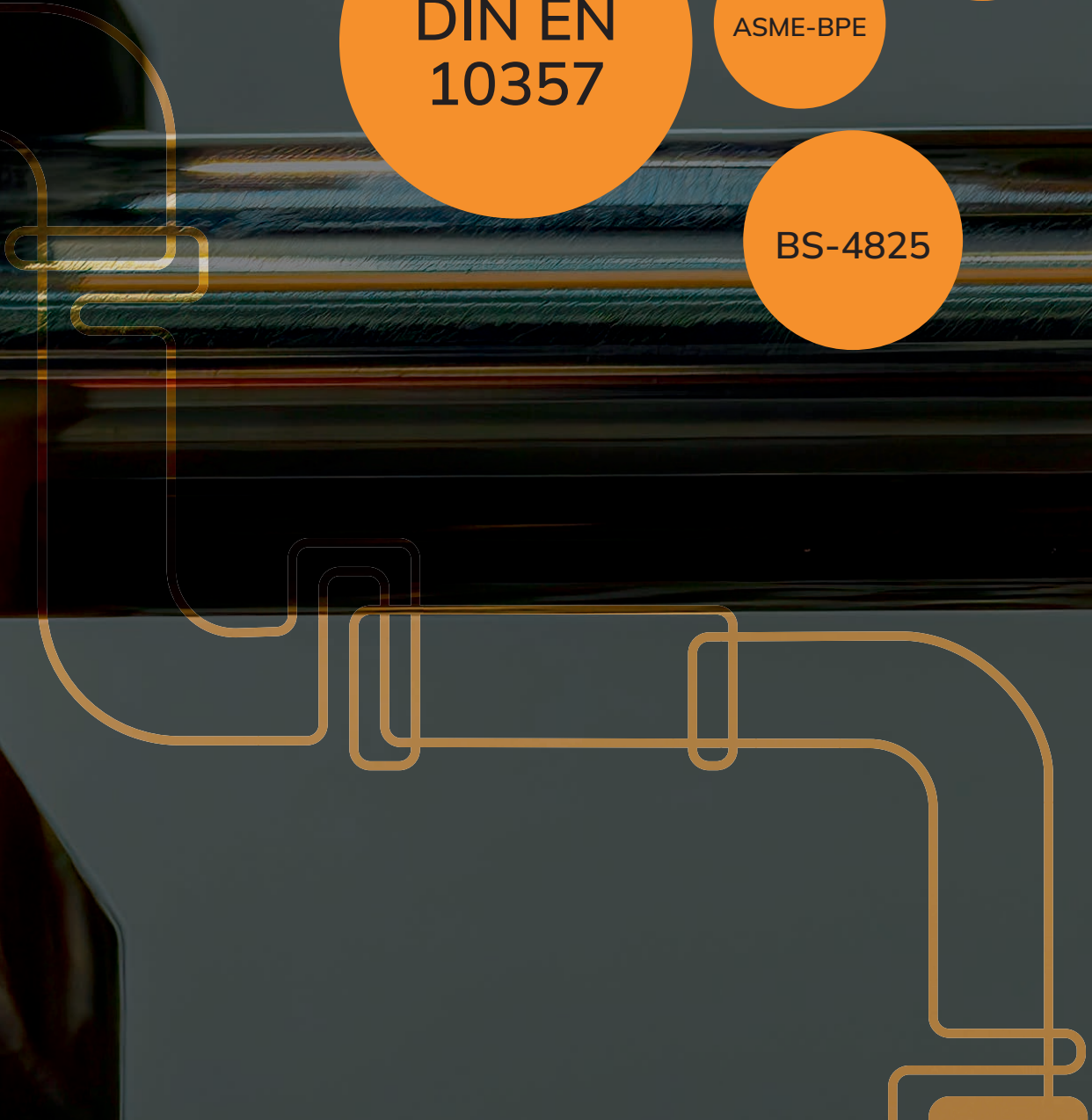
ASTM A270

ISO-SMS

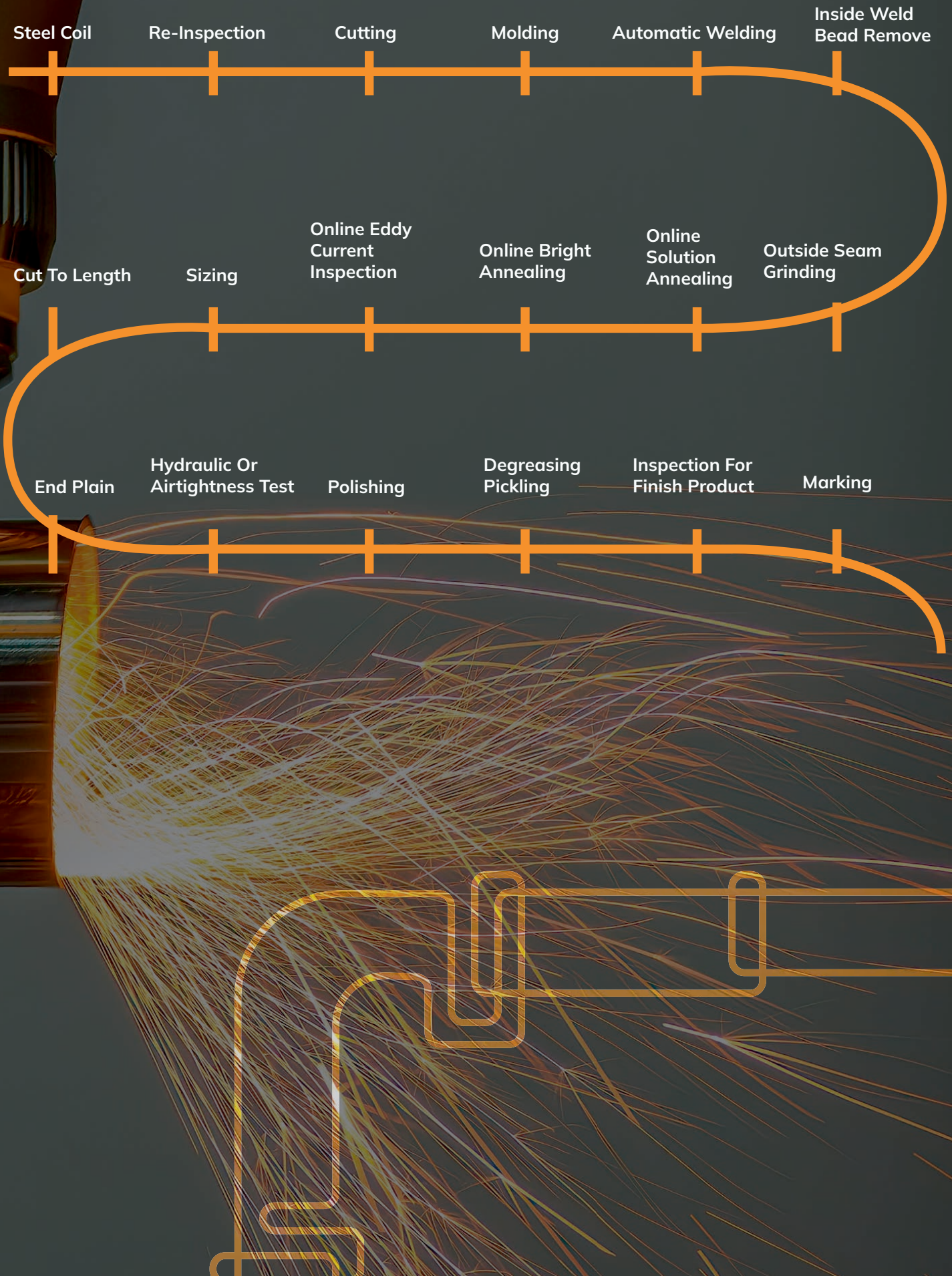
DIN EN  
10357

ASME-BPE

BS-4825



# Tube Manufacturing Process



# Our Product Overview

Our stainless steel tubing is manufactured to meet stringent global standards, ensuring high corrosion resistance, excellent surface finish and precision. The range includes widely used austenitic grades and specialized duplex materials, available in various diameters and surface finishes for high-purity and hygienic applications.

## Product Range

OD mm	WT mm/inch	Length mm/feet
Min. 12.7	0.5 / 0.02"	3000 mm / 10 feet
Max. 104	2.11 / 0.09"	6100 mm / 20 feet

## Grades

Grade	Standard
TP304 / 304L / 1.4307 / 316 / 316L / 316Lxs / 1.4404	ASTM A270 S2 / EN 10217-07 / BS 4825 / ISO / SMS
316Lxs / 1.4404 / 1.4435	ASTM A270 S2 / ASME-BPE / EN 10217-07
TP304 / 304L / 316L / 904L / 1.4539 and duplex material	ASTM A249 / ASTM A688 / ASTM 269 / ASTM 789 / A790
Grade 1 / Grade 2	ASTM B 338

## Product Finish Specification

Process Designation	Equivalent to	Outer Surface	Inner Surface	Surface Finish Value (Ra)	
				μ-In	μm
BA – BA	SF0	Bright Annealed	Bright Annealed	–	–
MP – BA	SF3	Mechanical Polished	Bright Annealed	30	0.76
MP – MP	SF2	Mechanical Polished	Mechanical Polished	20	0.50
MP – MP	SF1	Mechanical Polished	Mechanical Polished	20	0.50
MP – EP	SF4	Mechanical Polished	Electro Polished	15	0.38
MP – EP	SF5	Mechanical Polished	Electro Polished	20	0.50
MP – EP	SF6	Mechanical Polished	Electro Polished	25	0.64

# Radiant Advantage

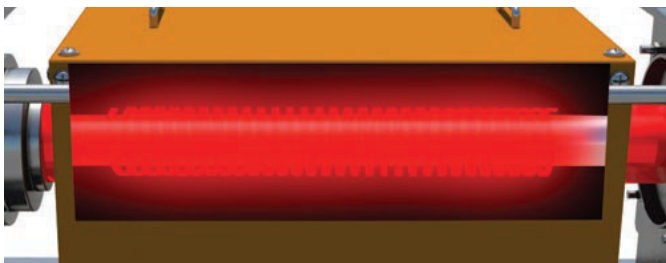
## Bright Annealing (BA)

**Precision Treated. Performance Ready.**

Our stainless steel tubes go through a series of advanced processes that enhance surface quality, durability, and corrosion resistance, ensuring unmatched performance in critical applications.

### Brilliance Forged Through Precision Heating

Bright Annealing is not just about heat, it's about engineering clarity, durability and purity into every tube. This high-precision process is performed in a hydrogen-controlled atmosphere, eliminating oxidation and delivering unmatched surface quality.



### Radiant Highlights

#### Hydrogen Furnace Technology

Tubes are annealed in a high-purity hydrogen environment to prevent oxidation, ensuring a scale-free, bright finish.

#### Surface That Shines

Achieves a smooth, reflective appearance without additional mechanical polishing, ideal for sanitary and aesthetic applications.

#### Built for Demanding Environments

Enhanced corrosion resistance makes these tubes perfectly suited for pharmaceuticals, biotech and food-grade installations.

#### No Acid, No Compromise

The clean process eliminates the need for pickling, making it eco-conscious and cost-efficient.

#### Perfect Metallurgical Balance

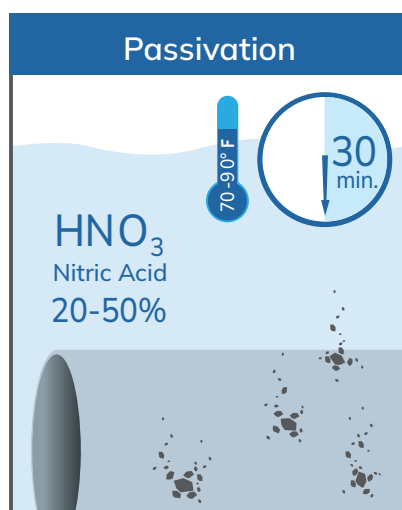
Guarantees uniform grain structure, ensuring stability during fabrication and welding.

## Passivation

### The Invisible Shield of Stainless Steel

Passivation is a chemical process that enhances the corrosion resistance of stainless steel by forming a protective, passive oxide layer — all without altering its appearance or dimensions.

Passivation an  
**Essential**  
**STEP** in the  
**Radiant**  
Tubes  
Production Process



### Radiant Highlights

#### Iron-Free, Corrosion-Resistant Surface

Removes surface contaminants like free iron, enabling the formation of a dense chromium oxide layer for superior protection.

#### Preserves Finish, Enhances Durability

Maintains the tube's original bright finish while extending its lifespan in harsh environments.

#### Meets Global Sanitary Standards

Ideal for applications in the pharmaceutical, food, beverage, and semiconductor industries where hygiene is non-negotiable.

#### Chemical Treatment, Long-Term Gains

Uses nitric or citric acid solutions as per ASTM A967/ A380 standards, ensuring compliance, consistency, and safety.

#### Perfect Metallurgical Balance

Guarantees uniform grain structure, ensuring stability during fabrication and welding.

# Mechanical Polish

## Mechanical Polish

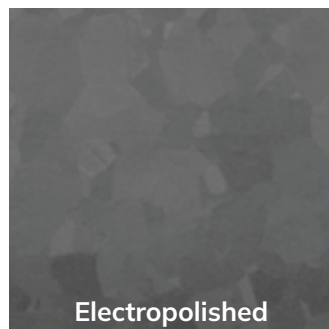
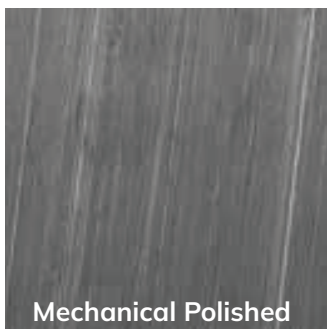
The mechanical polishing process begins with deburring both ends of the tube. An abrasive, rotating on a pneumatic head, polishes the tube's interior, producing fine metal powder as residue. This is removed by blowing a clean wipe through the tube

before visual inspection and surface measurement. The process typically achieves a surface finish of up to  $0.5 \mu\text{m Ra}$ . Our finishing shop has multiple lines, each capable of polishing several tubes at once. **TYPICAL SURFACE FINISH:  $<0.5 \mu\text{m Ra}$**

# Electropolishing

## Mirror Finish. Maximum Performance.

Electropolishing is an advanced electrochemical process that removes a thin layer from the stainless steel surface, delivering unmatched smoothness, cleanliness and corrosion resistance.



## Radiant Highlights

### Ultra-Smooth Surface Finish

Achieves a surface roughness (Ra) as low as  $\leq 0.25 \mu\text{m}$ , reducing product adhesion and bacterial retention.

### Enhanced Corrosion Resistance

Removes embedded contaminants and micro-crevices, allowing the passive chromium oxide layer to reform uniformly, resulting in greater resistance to oxidation and chemicals.

### Superior Aesthetic & Functional Appeal

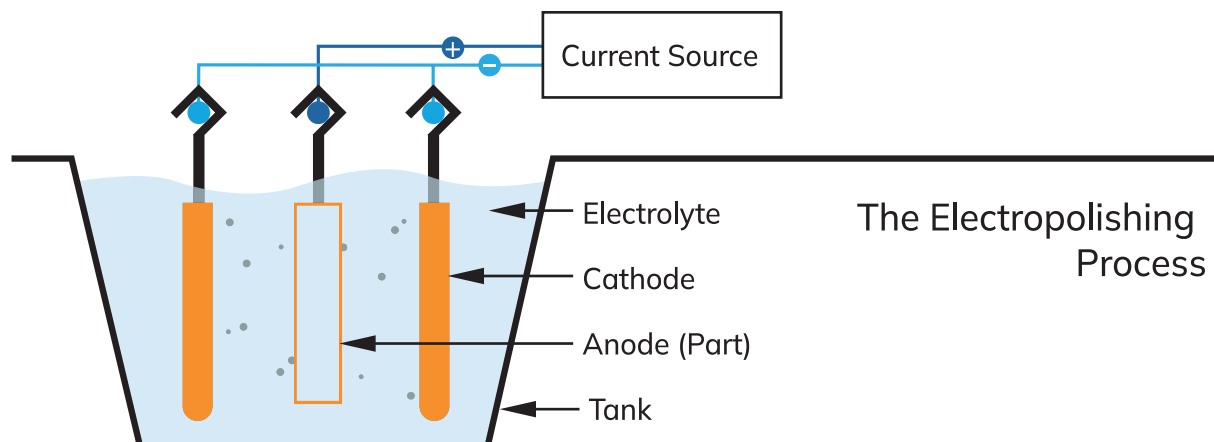
Creates a bright, lustrous finish that is both visually appealing and functionally superior for critical applications.

### Clean-in-Place (CIP) Friendly

The smoother surface ensures easier cleaning and sterilization, essential for pharma, biotech and food-grade environments.

### Conforms to Global Pharma Standards

Meets stringent requirements of ASME BPE, ASTM B912, and other hygienic design protocols.



# Quality & Testing

## Ensuring Consistency, Reliability & Trust

- Verification Of Material Grade (PMI)
- 100% Visual & Dimension Inspection
- Eddy Current Testing (ECT)
- Id Surface Roughness Measurements
- Corner Cut Measurements
- Chemical Analysis By Spectrometer
- Hydrostatic Test
- Intergranular Corrosion Test (On Request)
- Weld Decay Test (On Request)
- Micro & Macro (On Request)

## Mechanical Testing Facilities

- Tensile
- Hardness
- Flattening
- Reverse Bend
- Reverse Flattening
- Flare
- Flange



# Our Product Range

## Precision Tubes for Sanitary, Hygienic & High-Purity Applications

At Radiant, we manufacture a comprehensive range of **stainless steel sanitary tubes** that meet global standards for hygiene, quality and performance.

Our tubes are ideal for use in pharmaceutical, food & beverage, biotechnology and personal care applications where cleanliness and reliability are critical.

Designed as per the 3A sanitary standard, these tubes meet stringent criteria for food, dairy, and environmental sanitation. Suitable for systems requiring clean-in-place (CIP) compatibility and robust corrosion resistance.

### 3A Stainless Steel Sanitary Tubes

Specifications	
Standard	ASTM A 270 compliant & EN 10217-7
Material	304/304L/1.4301/1.4307 316 L / 1.4404
Length	6.1 mtrs (20 ft)
Surface Finish	Mill finish: - Bright Annealed (ID/OD) - Mechanical Polished (ID/OD) - Electropolished (ID)

OD Inch	OD mm	THK mm
1/2"	12.70	1.65
3/4"	19.05	1.65
1"	25.40	1.65
1 1/2"	38.10	1.65
2"	50.80	1.65
2 1/2"	63.50	1.65
3"	76.20	1.65
4"	101.60	2.11

### ASME BPE Stainless Steel Sanitary Tubes

Compliant with ASME BPE, these tubes are manufactured for bioprocessing, pharmaceutical, and personal care industries. They ensure ultra-high purity, dimensional accuracy, and repeatable cleaning cycles.

Specifications	
Standard	ASTM A 270 compliant & EN 10217-7
Material	304/304L/1.4301/1.4307 316 L / 1.4404
Length	6.1 mtrs (20 ft)
Surface Finish	Mill finish: - Bright Annealed (ID/OD) - Mechanical Polished (ID/OD) - Electropolished (ID)

OD Inch	OD mm	THK mm
1/2"	12.70	1.65
3/4"	19.05	1.65
1"	25.40	1.65
1 1/2"	38.10	1.65
2"	50.80	1.65
2 1/2"	63.50	1.65
3"	76.20	1.65
4"	101.60	2.11

## ISO / SMS Stainless Steel Sanitary Tubes

Produced by SMS 3008, these tubes are widely used in food & beverage and hygienic piping systems across Europe and international markets.

Specifications	
Standard	ASTM A 270 compliant & EN 10217-7
Material	304/304L/1.4301/1.4307 316 L / 1.4404
Length	6.1 mtrs (20 ft)
Surface Finish	Mill finish: - Bright Annealed (ID/OD) - Mechanical Polished (ID/OD) - Electropolished (ID)

OD Inch	OD mm	THK mm
1"	25	1.20
1 1/4"	32	1.20
1 1/2"	38	1.20
2"	51	1.20
2 1/2"	63.50	1.60
3"	76.20	1.60
4"	101.60	2.00

## BS 4825 Stainless Steel Sanitary Tubes

Compliant with BS 4825 Part 1, these tubes are commonly used across the UK hygienic industries. Designed for systems that are regularly dismantled for cleaning due to their robust construction.

Specifications	
Standard	ASTM A 270 compliant & EN 10217-7
Material	304/304L/1.4301/1.4307 316 L / 1.4404
Length	6.1 mtrs (20 ft)
Surface Finish	Mill finish: - Bright Annealed (ID/OD) - Mechanical Polished (ID/OD) - Electropolished (ID)

OD Inch	OD mm	THK mm
1/2"	12.70	1.20
3/4"	19.05	1.20
1"	25.40	1.60
1 1/2"	38.10	1.60
2"	50.80	1.60
2 1/2"	63.50	1.60
3"	76.20	1.60
4"	101.60	2.00

**EN 10357 (DIN SERIES)  
Stainless Steel Sanitary  
Tubes**

EN 10357 is a European standard that specifies the requirements for stainless steel tubes and fittings used in the food, pharmaceutical, and chemical industries. It focuses on ensuring hygiene, durability, and safety in these critical applications. This standard is a harmonization of the former German standard DIN 11850 and is designed to ensure consistent quality and performance for stainless steel tubes in hygienic applications.

Specifications	
Standard	ASTM A 270 compliant & EN 10217-7
Material	304/304L/1.4301/1.4307 316 L / 1.4404
Length	6.1 mtrs (20 ft)
Surface Finish	Mill finish: - Bright Annealed (ID/OD) - Mechanical Polished (ID/OD) - Electropolished (ID)

DIN EN10357	
OD mm	THK mm
19	1.50
23	1.50
29	1.50
35	1.50
41	1.50
53	1.50
70	2.00
85	2.00
104	2.00

MECHANICALLY POLISHED		
SURFACE DESIGNATION	Ra Max	
	μ-in	μ-in
SF1	20	0.51
SF2	25	0.64
SF3	30	0.76

MECHANICALLY POLISHED & ELECTROPOLISHED		
SURFACE DESIGNATION	Ra Max	
	μ-in	μm
SF4	15	0.38
SF5	20	0.51
SF6	25	0.64

SURFACE FINISH COMPARISON [GRIT/Ra]		
GRIT	Ra Max	
	μ-in	μ-in
150	27-32	0.68-0.80
180	16-23	0.46-0.58
240	14-18	0.34-0.46
320	8-10	0.21-0.25

# Chemical Composition

## Stainless Steel Sanitary Tubes – Raw Material Composition

We source and process only premium-grade stainless steel that aligns with ASME BPE, ASTM and EN standards, ensuring hygienic performance, corrosion resistance and weldability for high-purity industries.

All materials undergo strict incoming inspection, chemical validation, and traceability through PMI testing.

Grade	C (Max)	Si (Max)	Mn (Max)	P (Max)	S	Cr (%)	Mo (%)	Ni (%)
304	0.08	0.75	2.0	0.045	0.030	18.00–20.00	—	8.00–10.50
304L	0.03	0.75	2.0	0.045	0.030	18.00–20.00	—	8.00–12.00
316	0.08	0.75	2.0	0.045	0.030	16.00–18.00	2.00–3.00	10.00–14.00
316L	0.03	0.75	2.0	0.045	0.030	16.00–18.00	2.00–3.00	10.00–14.00
1.4404*	0.03	1.00	2.0	0.045	0.005–0.017	16.50–18.50	2.00–2.50	10.00–13.00
1.4435*	0.03	1.00	2.0	0.045	0.005–0.017	17.00–19.00	2.50–3.50	12.50–15.00

\*Controlled Sulphur Material

° Low Ferrite Material

Customized compositions available on request



# Mechanical Composition

## Built for Strength, Engineered for Performance

Our tubes meet stringent mechanical standards with minimum yield strength of 205 MPa, tensile strength of 515 MPa and elongation of 35%, ensuring durability, flexibility and reliable performance under pressure.

Grade	UNS Number	ASTM Specification	Tensile Strength Min.(Mpa)	Yield Strength Min.(Mpa)	Elongation (%) (Min.)	Hardness (Max.)
304	S30400	ASTM A270 / A249 / A269	515	205	35	90 HRB
304L	S30403	ASTM A270 / A249 / A269	485	170	35	90 HRB
316	S31600	ASTM A270 / A249 / A269	515	205	35	90 HRB
316L	S31603	ASTM A270 / A249 / A269	485	170	35	90 HRB
1.4404	-	EN 10217-7	490-690	190	40	-
1.4435	-	EN 10217-7	490-690	190	40	-



# END Use Application



## Pharmaceuticals & Bio-Pharma

High purity, superior surface finish, and corrosion resistance for sterile processing.

## Dairy Industry

Hygienic, easy-to-clean tubing for contamination-free milk and dairy handling.



## Chemical Processing

Engineered to withstand harsh chemicals and maintain structural integrity.

## Desalination

Built for durability and corrosion resistance in high-salinity environments.



## Food & Beverages

Safe, smooth interiors that meet hygiene standards for food-grade applications.

## Health & Cosmetics

Clean and precise flow systems for sensitive formulations and ingredients.





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