



## 1.0 PURPOSE AND SCOPE

This specification establishes the engineering specifications applicable to high purity stainless steel ball valve manufacturing processes.

This specification applies to Evans BA/SN Series ball valve manufacturing unless dictated by specific customer requirements.

## 2.0 GAS SPECIFICATIONS

<b>Argon (Liquid)</b>	
Grade:	Ultra Pure
Oxygen:	1 ppm, maximum
Moisture:	1 ppm, maximum
Total hydrocarbons:	0.5 ppm, maximum
Purity:	99.999%, minimum

<b>Helium (Liquid)</b>	
Grade:	Ultra Grade
Composition:	Helium
Oxygen:	5 ppm, maximum
Moisture:	3.5 ppm, maximum
Purity:	99.997%, minimum

<b>Nitrogen (Liquid)</b>	
Grade:	Ultra Pure
Oxygen:	1 ppm, maximum
Moisture:	1 ppm, maximum
Total hydrocarbons:	0.5 ppm, maximum
Purity:	99.999%, minimum

### 3.0 MATERIALS OF CONSTRUCTION

<b>Ball Valve Body</b>	
Ball:	316 SS
Body, End Cap	ASTM A351 GR CF8M, CF3M
Seats, Stem Packing, Thrust Washer	RTFE/TFM 1600
Stem:	316 SS
Bolts, Handles, Nuts, Washers	304 SS
Handle Cover	Plastic

<b>Tubing:</b> Domestic 316L seamless or welded seam (depending on size) construction, cold drawn bright annealed, sulfur content controlled to 0.005 to 0.017%	
OD – 1 in. and larger	ASTM A269, ASTM A270
OD – ½ in. and ¾ in.	ASTM A269, ASTM A213
OD – less than ½ in.	ASTM A269, ASTM A632
ID Finish No. 180 Grit	25 Ra, max; 8" > 50 Ra, max
Final ID Cleaning	Ultrasonic cleaned in a Cleanroom
Certification	<ul style="list-style-type: none"> <li>• Physical/chemical characteristics</li> <li>• Cleaning compliance</li> </ul>
<b>Optional: Copper Tubing (valve sizes 3"- up only, refer to BR Series for smaller sizes with copper extensions )</b>	
Seamless Copper Water Tube	ASTM B88

### 4.0 WELDING SPECIFICATIONS

Weld atmosphere	Inert gas (argon)
Porosity:	None allowed
Inspection:	100% with no discoloration

### 5.0 CLEANING SPECIFICATIONS

<b>Pre-Heated Deionized Water</b>	
Usage:	100% of all ball valve components
Resistivity:	18 Megohms-cm minimum

<b>Hobart Pre-Washer in Cleanroom</b>
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Usage:	100% of all ball valve components
Time (wash):	4-6 minutes
Time (rinse)	1 minute
Rinse agent:	18 MGH DI water

### Crest Ultrasonic Cleaning System in Cleanroom

Usage:	100% of all ball valve components
Cleaning agent:	Valtron Sp2555 Surfactant
Tanks:	1 wash, 1 pre-rinse, 1 rinse
Time (wash):	5 minute, minimum
Time (rinse)	5 minute, minimum
Tank temperature:	150 degrees F minimum
Filtering:	0.5 to 0.1 micron (sequential)
CFOS Cleaning:	Conforms to CGA G 4.1

### Blow Down with Nitrogen in Cleanroom

Usage:	Ball valve components
In-line N <sub>2</sub> Filtration:	0.01 micron

## 6.0 AIR OVEN DRYING SPECIFICATIONS

Environment:	Clean Room
Usage:	100% of all ball valve components
Temperature:	100 degrees C
Time:	30 minutes, minimum

## 7.0 PARTICLE TEST SPECIFICATIONS

Environment:	Clean Room
Static test:	Counts less than 30 particles per cubic foot, greater than 0.1 micron and less than 10 particles per cubic foot greater than 0.5 micron

## 8.0 TESTING SPECIFICATIONS

<b>Leybold UL 400 Helium Leak Detector Test</b>	
Environment:	Clean Room
Usage:	100% of all ball valve components
External agent:	Helium
Helium detection device:	Mass spectrometer
Device resolution:	0.1 (x10 <sup>-x</sup> scc/sec)
Leak Test Specification:	1x10 <sup>-7</sup> scc/sec, minimum across the seat, outboard/inboard

<b>Pressure Decay Leak Test</b>	
Usage:	Upon customer requirement
Applied pressure:	100 psig-120 psig ball open 100 psig-120 psig across seat
Pressure agent:	Nitrogen
Application time:	30 seconds
Measuring device:	Magnehelic differential pressure
Device resolution:	0.1 inch
Specification:	Less then 0.5 inch per application time

## 9.0 FINAL INSPECTION REQUIREMENTS

Visual inspection	100% of all ball valves
Dimensional check	100% of all ball valves
Final N2 Blowdown	100% of all ball valves
Capping and bagging	100% of all ball valves
Tube Certification	100% of all ball valves
Certification of Conformance	Provided upon request

**Reviewed and Approved by:**

See Record of Procedure Review on File in Master Binder

**Revision History**

<b>Rev</b>	<b>Description of Changes</b>	<b>Author &amp; date</b>
0	Original issue.	John Rudnick 3/15 /00
1	Total reformatting into tables for ease of use, correction in Met One A2100 Plus Laser Particle Counter usage per J Crowley.	M. Buser 3/1/01
2	Added Hobart information to section 6.0.	D. Loprinzi 6/10/01
3	Updated manufacturing and design information	GBP 03/13/06
4	Updated manufacturing and design information	C. Evans 05/13/11
5	Updated inboard/outboard He Leak Test Data	C. Evans 10/28/13
6	Updated inboard/outboard specs	C. Evans 11/23/14