



**Ultra High Purity Products**

h i g h · q u a l i t y ·  
t r u s t · **W E** · i n n o  
v a t i v e · p r e m i u  
m · **C O N N E C T** · w e l  
l m a d e · c h a l l e n  
g e · s e v e r i c e · a g i  
l e · **T H E · W O R L D** ·  
m a n u f a c t u r i n g  
· g r o w t h w i t h u s

# Ultra High Purity Products

## Weld Fittings



- **Size** 1/4", 3/8", 1/2", 3/4", 1"
- **Surface finish** BA, EP
  - BA : Ra 10 µin
  - EP : Ra 5 µin
- **Material** SS316L, SS316L VAR
  - JIS G4303, 3214, 5121, 3459, 3463
  - ASTM A479, 276, 182, 351, 312, 269

## DCR Fittings



- **Size** 1/4", 3/8", 1/2", 3/4", 1"
- **Surface finish** BA, EP
  - BA : Ra 10 µin
  - EP : Ra 5 µin
- **Material** SS316L, SS316L VAR
  - JIS G4303, 3214, 5121, 3459, 3463
  - ASTM A479, 276, 182, 351, 312, 269
  - Gasket material : Nickel, SS316L (ASTM B162, ASTM A167)

## Bend Fittings



- **Size** 1/2" ~ 6", 15A ~ 300A (up to 600A)
- **Surface finish** AP, MP, BA, EP
  - AP : Ra 40 ~ 100 µin
  - MP : Ra 15 ~ 20 µin
  - BA : Ra 15 ~ 28 µin
  - EP : Ra 5 ~ 10 µin

## Regulators



- **Size** 1/4", 1/2"
- **Max inlet pressure** 600, 1000, 3500 psig
- **Outlet pressure range** 30, 60, 150, 250 psig
- **Surface finish** BA, EP
- **Material** SS316L, SS316L VAR
  - Diaphragm : Hastelloy C-22
  - Seat : PCTFE, PI
  - Poppet : SS316L, Hastelloy C-22
  - Spring : SS316L, Inconel X750

## Diaphragm Valves



- **Size** 1/4", 1/2", 3/8", 3/4"
- **Working pressure** 145 psig (HP 3000 psig)
- **Surface finish** BA, EP
  - BA : Ra 10 µin
  - EP : Ra 5 µin
- **Material** SS316L, SS316L VAR
  - Diaphragm : Ni-Co Alloy
  - Seat : PCTFE, PFA
  - Poppet : SS316L, Hastelloy C-22

## Bellows Valves



- **Size** 1/4", 3/8", 1/2"
  - High flow type : 3/4", 1"
- **Cv** Cv 0.36 (1/4")  
Cv 1.10 (3/8", 1/2")  
Cv 2.80 (3/4", 1")
- **Working pressure** 145 psig
- **Surface finish** BA, EP
  - BA : Ra 10 µin
  - EP : Ra 5 µin
- **Material** SS316L, SS316L VAR
  - Bellows : SS316L
  - Seat : PCTFE

## Forging Bellows Valves



- **Size** 15A ~ 40A
- **Working pressure** 145 psig
- **Surface finish** AP, BA, EP
  - AP : Ra 40 µin
  - BA : Ra 10 µin
  - EP : Ra 5 µin
- **Material** SS304, SS316L, SS316L VAR
  - Bellows : SS316L

## Casting Bellows Valves



- **Size** 50A ~ 300A (up to 500A)
- **Working pressure** 145 psig
- **Surface finish** AP, BA, EP
  - AP : Ra 40 µin
  - BA : Ra 10 µin
  - EP : Ra 5 µin
- **Material** SS304, SS316L, SS316L VAR
  - Bellows : SS316L

# Manufacturing Process

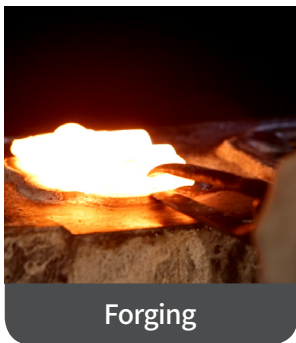
## Process 1



### DK-Lok Specification

Chemical Compositions	316L Stainless		316L Stainless VAR		Remark
	Spec	Act	Spec	Act	
S	0.005	0.001	0.003	0.001	Weldability
Mn	1.000	0.423	0.500	0.020	

## Process 2



- Forging pressure : up to 1000 ton

## Process 3



- CNC and MCT operation
- Six spindle lathe
- Five-axis machines with robotic arm

## Process 4



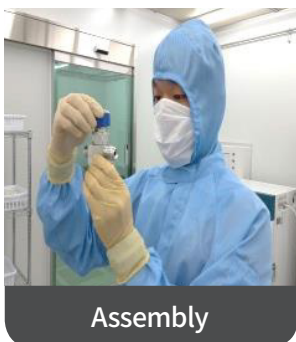
- DK-Lok's own EP system inner surface Ra 5 μin
- After EP, surface passivated

## Process 5



- Ultrasonic hot DI water
- Electric-resistivity 18MΩ·cm
- Final DI water cleaning, N2 Purge, and vacuum drying in a class 1000

## Process 6



- Assembled in class 10

## Process 7



### Inspection

- Surface roughness measurement
- Particle counting test (ASTM F1394)
- Helium leak test (SEMA 90120391B-STD)
- Function & Cv testing
- Surface composition & chemical components (SEMA 91060573B, SEMA 90120430B-STD)
- Moisture analysis (SEMA 90120397B-STD)
- Redual oil content ( $\leq 0.01\text{mg}/\text{ft}^2$ )

## Process 8

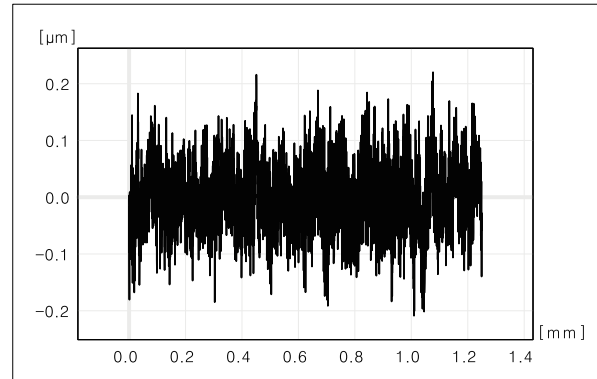
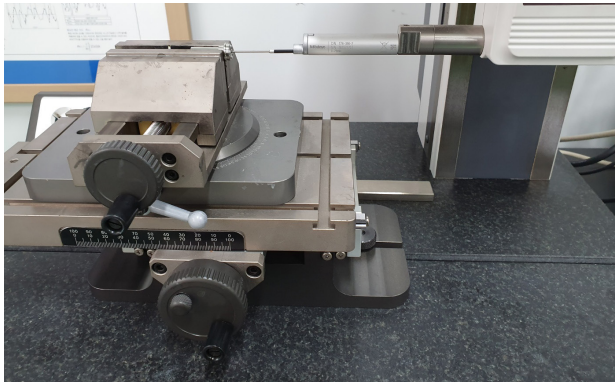


- Double packing in class 100

# Inspection Testing

## - Surface Roughness Measurement

Surface roughness affects the cleanliness of the UHP products. The wetted surface of fittings and valve bodies are prepared with electropolishing and passivation. Surface roughness is measured and controlled by SPC (Statistical Process Control) to ensure either EP grade (Ra 5  $\mu\text{m}$ ) or BA grade (Ra 10  $\mu\text{m}$ ).

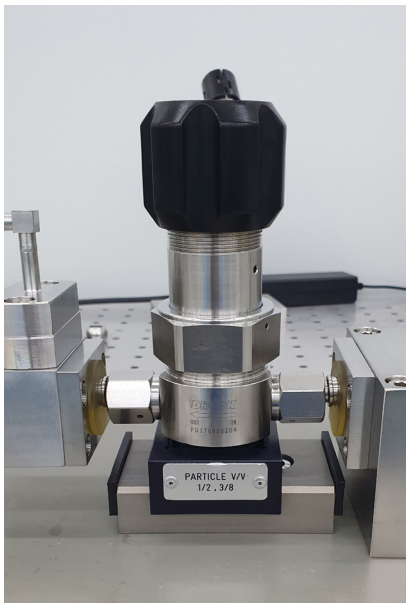


## - Particle Counting Test (ASTM F1394)

By using a laser particle counter, the particle testing is performed to verify the cleanliness of the fitting or valve. We measure/analyze particles above 0.1 $\mu\text{m}$  in accordance with ASTM F1394.

- **Test conditions**

Particle inspection for EP grade only, Pressure 60 ~ 80 psig, N2 Gas 1 cfm.



```

Inst Model          9110-01
Serial #            91101722002
-----
Sample # 1034
Start Time 12/5/2019, 13:53:55
End Time   12/5/2019, 13:54:55
Zone                               None
Location                               Unknown
Recipe                               Default
Sample Time                          00:01:00
Volume                                28.3 L
Instrument Status: OK
    
```

```

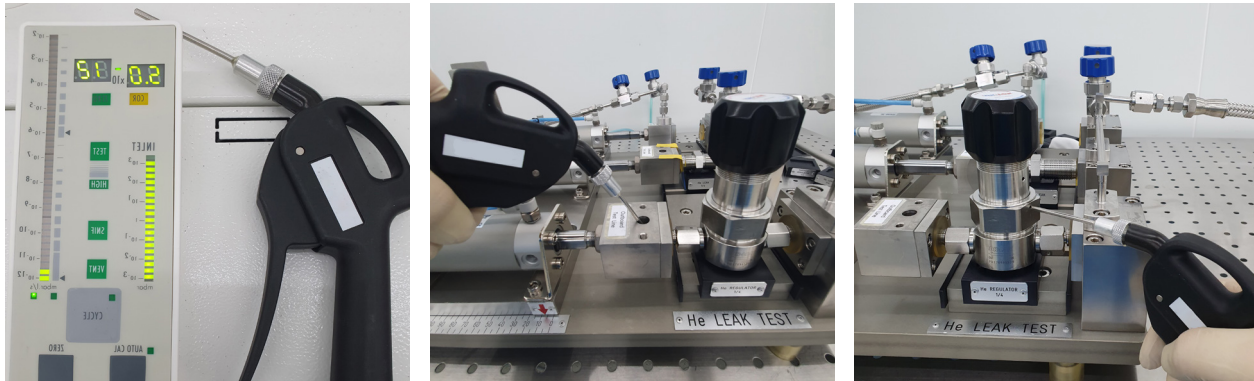
Particle Counts:
Size      Diff      Cumul Alarm
0.10      2          3
0.15      1          1
0.20      0          0
0.25      0          0
0.30      0          0
0.50      0          0
1.00      0          0
5.00      0          0
    
```



# Inspection Testing

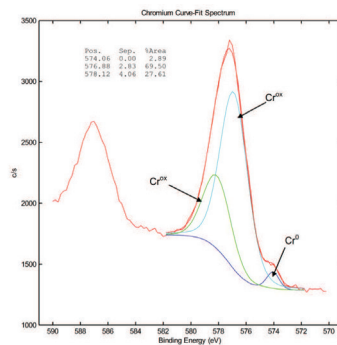
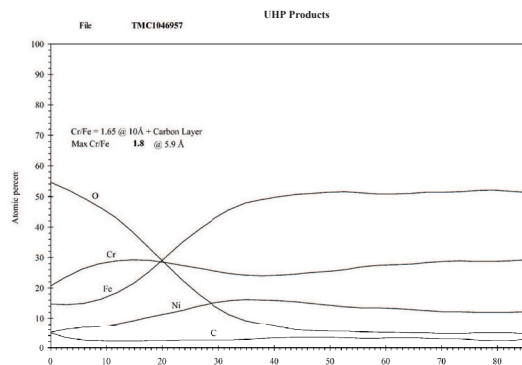
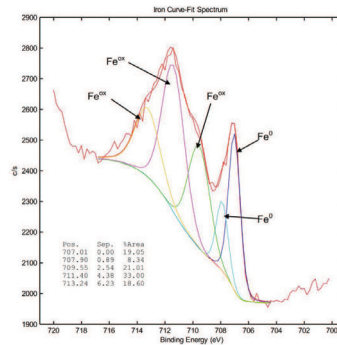
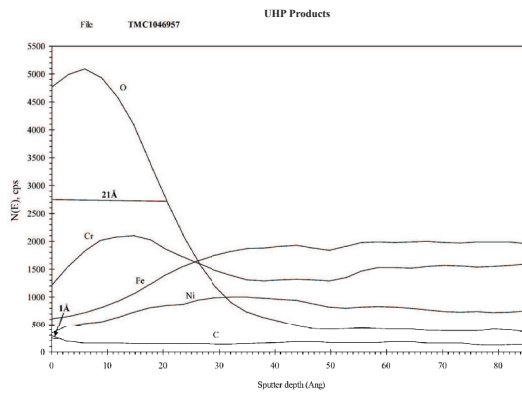
## - Helium Leak Test

Primary function of a fitting or valve is to provide leak-free sealing in a fluid or gas system. Inboard and Outboard Helium Leak Testing, in accordance with SEMA 90120391M-STD, is performed on Metal Gasket Face Seal fittings and valves.



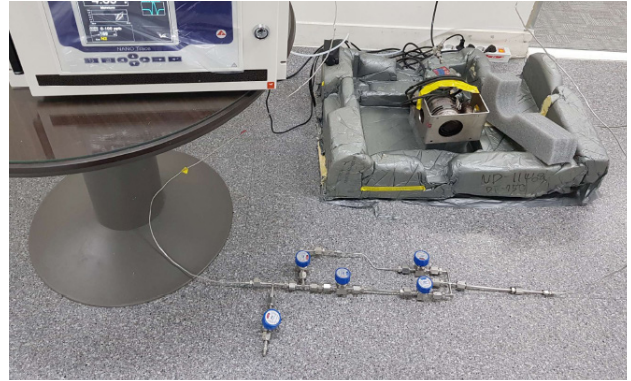
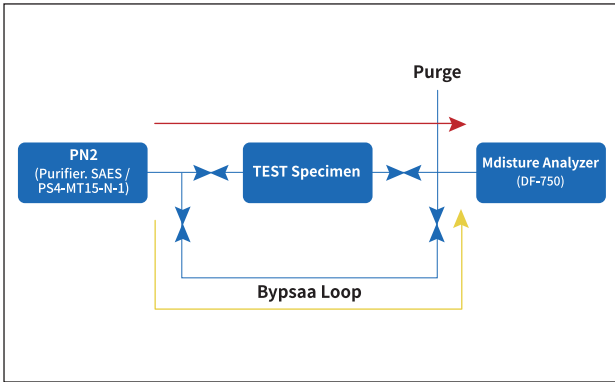
## - AES (Auger Electron Spectroscopy) / XPS (X-ray Photoelectron Spectroscopy)

To verify electropolishing and passivation on electropolished surface, the Cr/Fe elemental ratio, Cr-oxide/Fe-oxide chemical species ratio and oxide layer thickness are measured by using AES and XPS. In addition, the quantities of residual contaminants on the surface are measured. The test method is performed in accordance with SEMA 91060573B & SEMA 90120430B-STD.



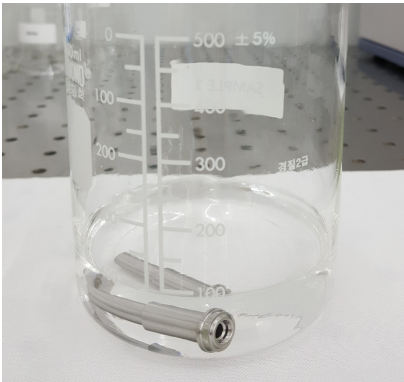
## - Moisture Analysis

Amount of moisture absorbed on the interior of product is measured/analyzed in accordance with SEMA 90120397B-STD. We maintain the residual oil contents of UHP product to equal or less than 0.01mg/ft<sup>2</sup>.

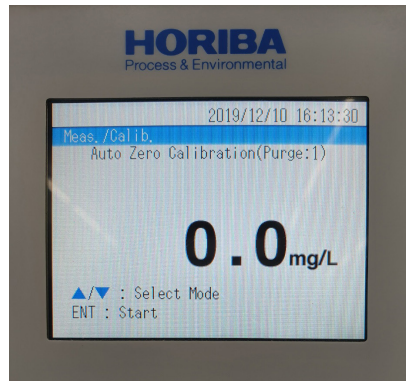


## - Residual Oil Content

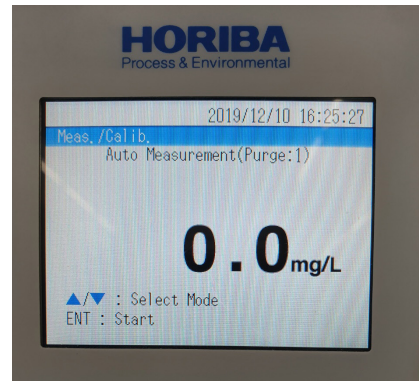
Maintains the residual oil contents of high purity clean product to equal or less than 0.01mg/ft<sup>2</sup>.



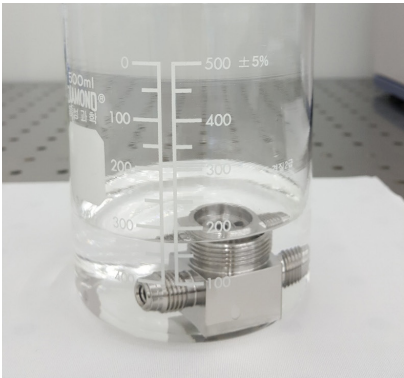
Grand 100ml



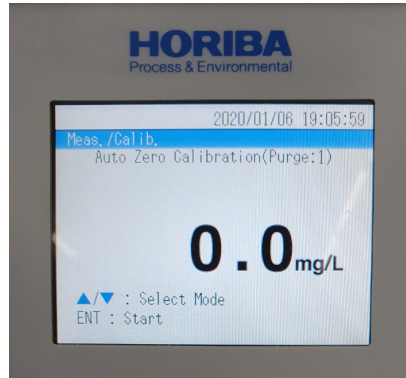
Auto Zero Calibration



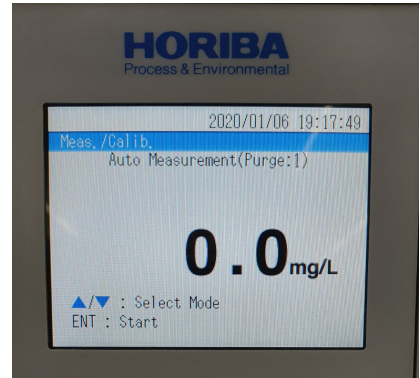
Measure ment



VCD Body 150ml



Auto Zero Calibration



Measure ment

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**IDK-LOK**

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